MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Decide whether the statement is true or false.

1) 4 is a solution of $2x = 8$.
A) True B) False
Answer: A

2) -15 is a solution of $-8x = 125$.
A) True B) False
Answer: B

3) -5 is a solution of $5x - 6 = -31$.
A) True B) False
Answer: A

4) -11 is a solution of $-3x + 9 = 37$.
A) True B) False
Answer: B

5) 1 is a solution of $-8x + 9x = 1$.
A) True B) False
Answer: A

6) 3 is a solution of $-6x - 6x = 4$.
A) True B) False
Answer: B

7) -4 is a solution of $7x + 5x = 13x$.
A) True B) False
Answer: B

Decide whether or not the equations are equivalent.

8) $z^2 = 49$
$z = 7$
A) Equivalent B) Not equivalent
Answer: B

9) $x = -2$
$x^2 = 4$
A) Not equivalent B) Equivalent
Answer: A

10) $x = 4 - 3x$
$2x = 4$
A) Not equivalent B) Equivalent
Answer: A

11) $\frac{x+1}{5} = \frac{4}{5}$

$x + 2 = 5$

A) Equivalent B) Not equivalent

Answer: A

12) $2x - 3 = 8$

$-2x + 8 = -3$

A) Equivalent B) Not equivalent

Answer: A

13) $2x - 3 = 8$

$-2x - 3 = 8$

A) Not equivalent B) Equivalent

Answer: A

Determine whether or not the equation is linear.

14) $6x - 5(x - 9) = 12x$

A) Not linear B) Linear

Answer: B

15) $6x - 5x(x - 2) = 11x$

A) Not linear B) Linear

Answer: A

16) $4x^2 + 5x + 4 = 0$

A) Linear B) Not linear

Answer: B

17) $0.03x + 0.07x = 0.40$

A) Linear B) Not linear

Answer: A

18) $0.04x^2 + 0.05x = 0.20$

A) Linear B) Not linear

Answer: B

19) $3x = 5x - 9x$

A) Not linear B) Linear

Answer: B

20) $5x - 6x = 0$

A) Linear B) Not linear

Answer: A

21) $3x + 7 = 0$

A) Not linear B) Linear

Answer: B

Solve the equation.

22) $-3x + 1 = x - 5$

A) $\left\{\frac{4}{3}\right\}$ B) $\left\{\frac{3}{2}\right\}$ C) $\{1\}$ D) $\{2\}$

Answer: B

23) $2x - 4 + 5(x + 1) = 6x + 5$

A) $\{2\}$ B) $\{-2\}$ C) $\{4\}$ D) $\{-4\}$

Answer: C

24) $7[-5x + 2 - 6(x + 1)] = 3x - 6$

A) $\left\{-\frac{5}{8}\right\}$ B) $\left\{-\frac{11}{40}\right\}$ C) $\left\{-\frac{22}{5}\right\}$ D) $\{-10\}$

Answer: B

25) $\frac{x + 2}{3} = \frac{x - 8}{4}$

A) $\{-32\}$ B) $\{-16\}$ C) $\left\{-\frac{32}{7}\right\}$ D) $\{-26\}$

Answer: A

26) $1 - \frac{3}{4x} = \frac{9}{6}$

A) $\left\{\frac{3}{2}\right\}$ B) $\{6\}$ C) $\left\{-\frac{9}{4}\right\}$ D) $\left\{-\frac{3}{2}\right\}$

Answer: D

27) $7x - 7 - 2(x + 1) = -(-3x - 4)$

A) $\left\{\frac{13}{7}\right\}$ B) $\left\{\frac{5}{7}\right\}$ C) $\left\{\frac{13}{2}\right\}$ D) $\left\{\frac{5}{2}\right\}$

Answer: C

28) $5[-5x - 7 - 6(x + 1)] = 2x + 7$

A) $\left\{-\frac{72}{5}\right\}$ B) $\left\{-\frac{24}{19}\right\}$ C) $\left\{-\frac{2}{5}\right\}$ D) $\left\{-\frac{2}{57}\right\}$

Answer: B

29) $\frac{7x}{9} - 4 = x$

A) $\{-18\}$ B) $\{72\}$ C) $\{36\}$ D) $\{18\}$

Answer: A

30) $\frac{x + 2}{4} = \frac{x + 7}{8}$

A) $\{3\}$ B) $\left\{\frac{13}{2}\right\}$ C) $\{1\}$ D) $\{11\}$

Answer: A

31) -7.9x + 1.2 = -67.8 - 1.0x

A) {8.7} B) {10} C) {8.9} D) {-76}

Answer: B

Decide whether the equation is an identity, a conditional equation, or a contradiction. Give the solution set.

32) 20x + 15 = 5(2x + 11)

A) Conditional; {4}
B) Contradiction; ∅
C) Conditional; {-7}
D) Identity; {all real numbers}

Answer: A

33) 4(16x + 20) = 16(2x - 13)

A) Contradiction; ∅
B) Identity; {all real numbers}
C) Conditional; {4}
D) Conditional; {-9}

Answer: D

34) 5(2x - 31) = 10x - 155

A) Conditional; {0}
B) Contradiction; ∅
C) Identity; {all real numbers}
D) Identity; ∅

Answer: C

35) -2(x + 7) + (-5x) = -7(x - 7) + 5

A) Contradiction; ∅
B) Conditional; {5}
C) Conditional; {0}
D) Identity; {all real numbers}

Answer: A

36) 24(x - 3) = 2(12x - 1) - 70

A) Contradiction; ∅
B) Conditional; {-72}
C) Identity; {all real numbers}
D) Conditional; {0}

Answer: C

37) 2(3x + 20) - 6x - 40 = 0

A) Conditional; {0}
B) Contradiction; ∅
C) Conditional; {3}
D) Identity; {all real numbers}

Answer: D

38) 10x - 48 = 5(2x - 11)

A) Contradiction; ∅
B) Conditional; {-2}
C) Conditional; {2}
D) Identity; {all real numbers}

Answer: A

39) -6x + 108 + 3(2x - 33) = 0

A) Identity; {all real numbers}
B) Conditional; {2}
C) Conditional; {1}
D) Contradiction; ∅

Answer: D

40) 4x + 9(x + 1) + 2 = 11 - 6x

A) Conditional; {0}
B) Conditional; {1}
C) Identity; {all real numbers}
D) Contradiction; ∅

Answer: A

41) $2[3 - (3 - 5x)] - x = -6 + 3(2 + 3x)$

A) Conditional; {6}
B) Conditional; {-3}
C) Contradiction; ∅
D) Identity; {all real numbers}

Answer: D

42) $-0.9(x + 9) + 0.1(x + 9) = -0.8x - 7.2$

A) Conditional; {-0.8}
B) Identity; {all real numbers}
C) Contradiction; ∅
D) Conditional; {-9}

Answer: B

43) $0.2(x - 5) - 0.8(x - 5) = -0.6x + 3$

A) Conditional; {1}
B) Contradiction; ∅
C) Conditional; {-5}
D) Identity; {all real numbers}

Answer: D

Solve the formula for the indicated variable.

44) $A = bh$, for h

A) $h = Ab$
B) $h = A - b$
C) $h = \frac{A}{b}$
D) $h = \frac{b}{A}$

Answer: C

45) $I = Prt$, for P

A) $P = r - It$
B) $P = \frac{r - I}{1 + t}$
C) $P = \frac{r - 1}{It}$
D) $P = \frac{I}{rt}$

Answer: D

46) $S = 2\pi rh + 2\pi r^2$, for h

A) $h = S - r$
B) $h = \frac{S}{2\pi r} - 1$
C) $h = \frac{S - 2\pi r^2}{2\pi r}$
D) $h = 2\pi(S - r)$

Answer: C

47) $V = \frac{1}{3}Bh$, for B

A) $B = \frac{h}{3V}$
B) $B = \frac{3V}{h}$
C) $B = \frac{V}{3h}$
D) $B = \frac{3h}{V}$

Answer: B

48) $P = s_1 + s_2 + s_3$, for s_3

A) $s_3 = P + s_1 + s_2$
B) $s_3 = s_1 + s_2 - P$
C) $s_3 = s_1 + P - s_2$
D) $s_3 = P - s_1 - s_2$

Answer: D

49) $F = \frac{9}{5}C + 32$, for C

A) $C = \frac{F - 32}{9}$
B) $C = \frac{5}{F - 32}$
C) $C = \frac{5}{9}(F - 32)$
D) $C = \frac{9}{5}(F - 32)$

Answer: C

50) $P = 2l + 2w$, for l

A) $l = \frac{P}{2} - 2w$ B) $l = \frac{P}{2w + 2}$ C) $l = \frac{P - 2w}{2}$ D) $l = P - 2w - 2$

Answer: C

51) $R = nE - nr$, for n

A) $n = \frac{R}{E - r}$ B) $n = R - E + r$ C) $n = R + nr - E$ D) $n = \frac{R + nr}{E}$

Answer: A

52) $A = P(1 + nr)$, for r

A) $r = \frac{A}{n}$ B) $r = \frac{Pn}{A - P}$ C) $r = \frac{A - P}{Pn}$ D) $r = \frac{P - A}{Pn}$

Answer: C

53) $I = \frac{nE}{nr + R}$, for n

A) $n = \frac{R}{E - Ir}$ B) $n = \frac{IR}{Ir + E}$ C) $n = \frac{IR}{E - Ir}$ D) $n = IR(Ir - E)$

Answer: C

Solve for y.

54) $5x + 9y = 7$

A) $y = 5 + 5x$ B) $y = \frac{16}{5x}$ C) $y = 16 - 5x$ D) $y = \frac{7 - 5x}{9}$

Answer: D

55) $7x - 5y = 4$

A) $y = 7x + 9$ B) $y = \frac{7x + 4}{5}$ C) $y = 7x - 9$ D) $y = \frac{7x - 4}{5}$

Answer: D

56) $2x = 9y - 8$

A) $y = 17 + 2x$ B) $y = \frac{2x + 8}{9}$ C) $y = \frac{2x - 8}{9}$ D) $y = 17 - 2x$

Answer: B

57) $5 = 7x - 8y$

A) $y = 13 + 7x$ B) $y = \frac{7x - 5}{8}$ C) $y = \frac{7x + 5}{8}$ D) $y = 13 - 7x$

Answer: B

58) $y - 9(x + 5) = 6 + 2y$

A) $y = -9x - 51$ B) $y = -9x + 51$ C) $y = 9x + 39$ D) $y = 9x + 51$

Answer: A

59) $8x - 6(x + y) = y - x$

A) $y = 3x + 7$ B) $y = \frac{3}{7}x$ C) $y = 3x - 7$ D) $y = 3x$

Answer: B

60) $10y + x^2 = x + 8$

A) $y = x + 8 - x^2$ B) $y = x^2 - x - 8$ C) $y = \frac{x + 8 - x^2}{10}$ D) $y = \frac{x^2 - x - 8}{10}$

Answer: C

61) $9x^2 - y + 7x = 0$

A) $y = -9x^2 - 7x$ B) $y = 9x^2 + 7x$ C) $y = -9x^2 + 7x$ D) $y = 9x^2 - 7x$

Answer: B

62) $7x + 9 = 5y - 9$

A) $y = 7x + 18$ B) $y = \frac{7x - 18}{5}$ C) $y = 7x - 18$ D) $y = \frac{7x + 18}{5}$

Answer: D

Solve the problem.

63) Levi borrowed $6944 at 4% simple interest for 6 months. How much will the interest amount to? What is the total amount that Levi will have to pay back at the end of 6 months? Round answers to the nearest cent if necessary.

A) $138.88; $7082.88 B) $140.05; $7084.05 C) $115.73; $7059.73 D) $162.03; $7106.03

Answer: A

64) Sophia borrowed $13,671 at 6% simple interest for 3 months. How much will the interest amount to? What is the total amount that she will have to pay back at the end of 3 months? Round answers to the nearest cent if necessary.

A) $136.71; $13,807.71 B) $206.79; $13,877.79 C) $205.07; $13,876.07 D) $273.42; $13,944.42

Answer: C

65) Hannah borrowed $47,838 at 5% simple interest for 15 months. How much will the interest amount to? What is the total amount that she will have to pay back at the end of 15 months? Round answers to the nearest cent if necessary.

A) $2790.55; $50,628.55 B) $3189.20; $51,027.20

C) $2989.88; $50,827.88 D) $3015.00; $50,853.00

Answer: C

Use these equations to convert between the two systems.

$C = \frac{5}{9}(F - 32)$ $F = \frac{9}{5}C + 32$

Round answer to the nearest tenth of a degree if necessary.

66) $F = 229°$

A) $C = 354.6°$ B) $C = 123.7°$ C) $C = 444.2°$ D) $C = 109.4°$

Answer: D

67) C = 76°

A) F = 60° B) F = 194.4° C) F = 168.8° D) F = 24.4°

Answer: C

68) F = 22°

A) C = 30° B) C = -5.6° C) C = 8.7° D) C = -18°

Answer: B

69) C = 8°

A) F = 72° B) F = -13.3° C) F = 22.2° D) F = 46.4°

Answer: D

Solve the problem.

70) Find the corresponding Celsius temperature for a temperature of 242°F. Round to the nearest tenth, if necessary.

A) 467.6°C B) 116.7°C C) 130.9°C D) 378°C

Answer: B

71) Find the corresponding Fahrenheit temperature for a temperature of 84°C. Round to the nearest tenth, if necessary.

A) 208.8°F B) 64.4°F C) 183.2°F D) 28.9°F

Answer: C

72) Find the length of a rectangular lot with a perimeter of 92 m if the length is 6 m more than the width.

A) 46 m B) 52 m C) 20 m D) 26 m

Answer: D

73) A square plywood platform has a perimeter which is 7 times the length of a side, decreased by 18. Find the length of a side.

A) 9 B) 1 C) 6 D) 3

Answer: C

74) A rectangular Persian carpet has a perimeter of 224 inches. The length of the carpet is 24 in. more than the width. What are the dimensions of the carpet?

A) Width: 88 in.; length: 112 in. B) Width: 68 in.; length: 92 in.

C) Width: 100 in.; length: 124 in. D) Width: 44 in.; length: 68 in.

Answer: D

75) A triangular shaped lake-front lot has a perimeter of 1500 ft. One side is 100 ft longer than the shortest side, while the third side is 200 ft longer than the shortest side. Find the lengths of all three sides.

A) 100 ft, 200 ft, 300 ft B) 500 ft, 600 ft, 700 ft C) 500 ft, 500 ft, 500 ft D) 400 ft, 500 ft, 600 ft

Answer: D

76) In triangle *ABC*, the angle *C* is six times as large as angle *A*. The measure of angle *B* is 44° greater than that of angle *A*. Find the measure of the angles.

A) 17° , 61° and 119° B) 17° , 78° and 102° C) 17° , 78° and 85° D) 17° , 61° and 102°

Answer: D

77) In triangle *ABC*, angle *A* is three times as large as angle *C*. The measure of angle *B* is 35° less than that of angle *C*. Find the measure of the angles.

A) 86° , 8° and 43° B) 86° , 8° and 86° C) 129° , 8° and 86° D) 129° , 8° and 43°

Answer: D

78) A cylindrical container has a volume of 1936π cm^3 and a radius of 11 cm. Find the height of the container.

A) 16 cm B) 11 cm C) 22 cm D) 4 cm

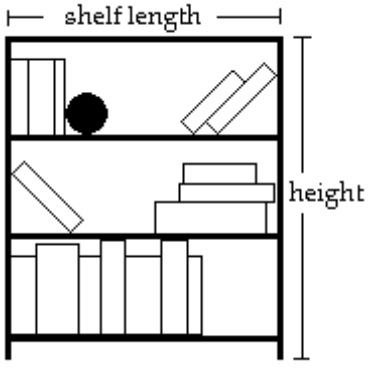
Answer: A

79) A circular hole is filled with concrete to make a footing for a load-bearing pier. The hole measures 18 inches across and requires 1.5 bags of concrete in order to fill it to ground level. What is the depth of the hole? Round your answer to the nearest inch. (One bag of concrete, when mixed with the appropriate amount of water, makes 1800 $in.^3$ of material.)

A) 11 in. B) 8 in. C) 15 in. D) 17 in.

Answer: A

80) A bookcase is to be constructed as shown in the figure below. The height of the bookcase is 2 feet longer than the length of a shelf. If 22 feet of lumber is available for the entire unit (including the shelves, but NOT the back of the bookcase), find the length and height of the unit.



A) length = 4.5 ft; height = 6.5 ft B) length = 10.0 ft; height = 13.5 ft
C) length = 3 ft; height = 5 ft D) length = 3 ft; height = 6 ft

Answer: C

81) Find the height of a moving box if its length is 30 in., its width is 33 in., and its surface area is 3618 in^2. Assume that the surface area includes the top of the moving box.

A) 12,870 in. B) 13 in. C) 33 in. D) 30 in.

Answer: B

82) Chuck and Dana agree to meet in Chicago for the weekend. Chuck travels 250 miles in the same time that Dana travels 230 miles. If Chuck's rate of travel is 4 mph more than Dana's, and they travel the same length of time, at what speed does Chuck travel?

A) 50 mph B) 46 mph C) 45 mph D) 55 mph

Answer: A

83) In the morning, May drove to an appointment at 50 mph. Her average speed on the return trip in the afternoon was 40 mph. The return trip took $\frac{1}{8}$ hour longer. How far did she travel to the appointment?

A) 20 mi B) 7.5 mi C) 0.5 mi D) 25 mi

Answer: D

84) Noah and Ben are running in the Walker Street Fun Run. Noah runs at 7 mph, Ben at 5 mph. If they start at the same time, how long (in minutes) will it be before they are $\frac{1}{5}$ mile apart?

A) 24 min B) 6 min C) 10 min D) 150 min

Answer: B

85) Jill is 9 kilometers away from Joe. Both begin to walk toward each other at the same time. Jill walks at 1.5 kilometers per hour. They meet in 2 hours. How fast is Joe walking?

A) 3 km/hr B) 1.5 km/hr C) 5 km/hr D) 4 km/hr

Answer: A

86) Candy and Delvis are riding bicycles in the same direction. Candy is traveling at a speed of 5 miles per hour, and Delvis is traveling at a speed of 10 miles per hour. In 3 hours what is the distance between them (assuming that they began at the same point and time)?

A) 24 mi B) 15 mi C) 12 mi D) 16 mi

Answer: B

87) From a point on a river, two boats are driven in opposite directions, one at 9 miles per hour and the other at 11 miles per hour. In how many hours will they be 40 miles apart?

A) 3 hr B) 2 hr C) 1 hr D) 4 hr

Answer: B

88) Tom Quig traveled 290 miles east of St. Louis. For most of the trip he averaged 70 mph, but for one period of time he was slowed to 20 mph due to a major accident. If the total time of travel was 7 hours, how many miles did he drive at the reduced speed?

A) 80 mi B) 100 mi C) 90 mi D) 75 mi

Answer: A

89) On a recent trip, Sarah's car traveled 20 mph faster on the first 110 miles than it did on the remaining 80 miles. The total time for the trip was 4 hr. Find the speed of Sarah's car on the first part of the trip.

A) 31 mph B) 58 mph C) 38 mph D) 9 mph

Answer: B

90) An airplane leaves Los Angeles for Denver at a speed of 450 mph. Thirty minutes later, a plane going from Denver to Los Angeles leaves Denver, which is 850 miles from Los Angeles, at a speed of 470 mph. When they meet, how far are they from Denver?

A) 319 mi B) 111 mi C) 277 mi D) 55 mi

Answer: A

91) An airplane flies from Metro City to Gotham with a tailwind that increases its normal speed by 100 mph. On the return trip, the plane must fly against this wind, which decreases its normal speed by the same amount. The flight from Metro City takes 2.00 hours and the return trip takes 3.60 hours. How far is it from Metro City to Gotham?

A) 1200 mi B) 1100 mi C) 900 mi D) 1020 mi

Answer: C

92) How many liters of a 30% alcohol solution must be mixed with 50 liters of a 90% solution to get a 50% solution?

A) 150 L B) 100 L C) 15 L D) 10 L

Answer: B

93) In a chemistry class, 3 liters of a 4% silver iodide solution must be mixed with a 10% solution to get a 6% solution. How many liters of the 10% solution are needed?

A) 3 L B) 2.5 L C) 1.5 L D) 0.5 L

Answer: C

94) It is necessary to have a 40% antifreeze solution in the radiator of a certain car. The radiator now has 20 liters of 20% solution. How many liters of this should be drained and replaced with 100% antifreeze to get the desired strength?

A) 5 L B) 6.7 L C) 10 L D) 8 L

Answer: A

95) How much pure acid should be mixed with 6 gallons of a 50% acid solution in order to get an 80% acid solution?

A) 9 gal B) 24 gal C) 15 gal D) 3 gal

Answer: A

96) A chemist needs 130 milliliters of a 72% solution but has only 17% and 82% solutions available. Find how many milliliters of each that should be mixed to get the desired solution.

A) 30 mL of 17%; 100 mL of 82% B) 20 mL of 17%; 110 mL of 82%
C) 110 mL of 17%; 20 mL of 82% D) 100 mL of 17%; 30 mL of 82%

Answer: B

97) Mardi received an inheritance of $50,000. She invested part at 1.75% and deposited the remainder in tax-free bonds at 2%. Her total annual income from the investments was $925. Find the amount invested at 1.75%.

A) $29,000 B) $15,000 C) $49,075 D) $30,000

Answer: D

98) Walt made an extra $10,000 last year from a part-time job. He invested part of the money at 2% and the rest at 3.25%. He made a total of $237.50 in interest. How much was invested at 3.25%?

A) $5000 B) $8000 C) $7000 D) $3000

Answer: D

99) Roberto invested some money at 2.5%, and then invested $5000 more than twice this amount at 4%. His total annual income from the two investments was $1565.00. How much was invested at 4%?

A) $31,000 B) $15,000 C) $26,000 D) $3100

Answer: A

100) Helen Weller invested $12,000 in an account that pays 1.25% simple interest. How much additional money must be invested in an account that pays 3.5% simple interest so that the average return on the two investments amounts to 2%?

A) $9000 B) $6000 C) $8000 D) $12,000

Answer: B

101) Don James wants to invest $63,000 to earn $1547 per year. He can invest in B-rated bonds paying 3.9% per year or in a Certificate of Deposit (CD) paying 1.3% per year. How much money should be invested in each to realize exactly $1547 in interest per year?

A) $29,000 in B-rated bonds and $34,000 in a CD B) $34,000 in B-rated bonds and $29,000 in a CD

C) $35,000 in B-rated bonds and $28,000 in a CD D) $28,000 in B-rated bonds and $35,000 in a CD

Answer: D

102) A bank loaned out $54,000, part of it at the rate of 2.75% per year and the rest at a rate of 3.25% per year. If the interest received was $1595.00, how much was loaned at 2.75%?

A) $22,000 B) $32,000 C) $33,000 D) $21,000

Answer: B

103) Kevin invested part of his $5000 bonus in a certificate of deposit that paid 2% annual simple interest, and the remainder in a mutual fund that paid 4% annual simple interest. If his total interest for that year was $120, how much did Kevin invest in the mutual fund?

A) $4988.00 B) $1120.00 C) $4868.00 D) $1000.00

Answer: D

104) A person's emotional quotient (EQ) is found by multiplying emotional age by 100 and dividing by chronological age. Using this information, if a 5 yr old person has an EQ of 102 what is that person's emotional age?

A) 5 years old B) 4.9 years old C) 21.4 years old D) 5.1 years old

Answer: D

105) A toy company uses the linear model $y = -2x + 568$ to predict the decline in sales of a toy after it has been on the market more than one year. If x is the number of months after the first year and y is the number of toys sold in hundreds during that month, how many toys will be sold 11 months after the first year?

A) 59,000 toys B) -27,850 toys C) -112,500 toys D) 54,600 toys

Answer: D

106) A computer company uses the linear model $y = -33x + 35,836$ to predict the decline in sales of a computer after it has been on the market more than one year. If x is the number of months after the first year and y is the number of computers sold during that month, how many computers will be sold 9 months after the first year?

A) 1086 computers B) 35,143 computers C) 35,539 computers D) 36,133 computers

Answer: C

107) Your home state uses a linear model $y= 45(x - 70) + 1610$ to predict the number of vacationers (y) as compared to the average temperature for that week (x). Find the number of vacationers predicted for a week with an average temperature of 60 degrees.

A) 7460 vacationers B) 4240 vacationers C) 72,000 vacationers D) 1160 vacationers

Answer: D

Indicate whether the statement is true always, sometimes, or never.

108) A real number is a complex number.
A) Never B) Sometimes C) Always
Answer: C

109) A complex number is an imaginary number.
A) Always B) Never C) Sometimes
Answer: C

110) The sum of two imaginary numbers is an imaginary number.
A) Always B) Sometimes C) Never
Answer: B

111) The difference between two real numbers is a real number.
A) Never B) Always C) Sometimes
Answer: B

112) The product of two imaginary numbers is a real number.
A) Never B) Always C) Sometimes
Answer: C

113) The product of a pair of complex conjugates is a real number.
A) Never B) Sometimes C) Always
Answer: C

114) The product of a pair of complex conjugates (with $b \neq 0$) is the difference of the squares of the real and imaginary parts.
A) Always B) Never C) Sometimes
Answer: B

115) To find the quotient $\frac{5 + 8i}{5 - 8i}$, multiply numerator and denominator by $5 + 8i$.
A) Never B) Sometimes C) Always
Answer: C

116) When i is raised to an even power, the result is -1.
A) Always B) Sometimes C) Never
Answer: B

117) When i is raised to an odd power, the result is -1.
A) Sometimes B) Never C) Always
Answer: B

Identify the number as real, complex, pure imaginary, or nonreal complex. More than one of these descriptions may apply.

118) $-10 + i$
A) Complex B) Real, complex
C) Complex, pure imaginary, nonreal complex D) Nonreal complex
Answer: D

119) 5 - 3i

A) Complex, pure imaginary, nonreal complex
B) Complex
C) Nonreal complex
D) Real, complex

Answer: C

120) 7

A) Nonreal complex
B) Complex, pure imaginary, nonreal complex
C) Complex
D) Real, complex

Answer: D

121) -2

A) Nonreal complex
B) Real, complex
C) Complex, pure imaginary, nonreal complex
D) Complex

Answer: B

122) 0

A) Complex, pure imaginary, nonreal complex
B) Real, complex
C) Complex
D) Nonreal complex

Answer: B

123) π

A) Complex
B) Real, complex
C) Nonreal complex
D) Complex, pure imaginary, nonreal complex

Answer: B

124) $\sqrt{5}$

A) Complex
B) Nonreal complex
C) Real, complex
D) Complex, pure imaginary, nonreal complex

Answer: C

125) $\sqrt{-6}$

A) Complex
B) Complex, pure imaginary, nonreal complex
C) Real, complex
D) Nonreal complex

Answer: B

Write the number as the product of a real number and i.

126) $\sqrt{-49}$

A) $-i\sqrt{49}$
B) $-7i$
C) $7i$
D) $7\sqrt{i}$

Answer: C

127) $-\sqrt{-16}$

A) $-4i$
B) 4
C) $4i$
D) $i\sqrt{16}$

Answer: A

128) $\sqrt{-23}$

A) $\sqrt{23i}$
B) $i\sqrt{23}$
C) $i\sqrt{-23}$
D) $-i\sqrt{23}$

Answer: B

129) $\sqrt{-44}$

A) $2\sqrt{11}i$ B) $2i\sqrt{11}$ C) $-2\sqrt{11}i$ D) $-2i\sqrt{11}$

Answer: B

Multiply or divide, as indicated. Simplify the answer.

130) $\sqrt{-5} \cdot \sqrt{-5}$

A) $5i$ B) -5 C) $-5i$ D) 5

Answer: B

131) $\frac{\sqrt{-18}}{\sqrt{-2}}$

A) -3 B) $-3i$ C) $3i$ D) 3

Answer: D

132) $\frac{\sqrt{-150}}{\sqrt{6}}$

A) -5 B) 5 C) $5i$ D) $-5i$

Answer: C

133) $\frac{\sqrt{-10}}{\sqrt{-250}}$

A) $-\frac{1}{5}i$ B) $-\frac{1}{5}$ C) $\frac{1}{5}$ D) $\frac{1}{5i}$

Answer: C

134) $\frac{\sqrt{-8}}{\sqrt{72}}$

A) $\frac{1}{3}$ B) $-\frac{1}{3}$ C) $-\frac{1}{3}i$ D) $\frac{1}{3}i$

Answer: D

135) $\frac{\sqrt{-10} \cdot \sqrt{-2}}{\sqrt{5}}$

A) $2i$ B) -2 C) $-2i$ D) 2

Answer: B

Write the number in standard form a + bi.

136) $\frac{8 - \sqrt{-20}}{2}$

A) $4 - i\sqrt{5}$ B) $4 - i\sqrt{10}$ C) $4 + i\sqrt{10}$ D) $4 - 2i\sqrt{5}$

Answer: A

137) $\frac{4 + \sqrt{-80}}{2}$

A) $2 + 2i\sqrt{10}$ B) $2 - 4i\sqrt{10}$ C) $2 + 2i\sqrt{5}$ D) $2 - 4i\sqrt{5}$

Answer: C

138) $\frac{-5 + \sqrt{-75}}{20}$

A) $-\frac{1}{4} + \frac{5\sqrt{3}}{4}i$ B) $-\frac{1}{4} + \frac{3\sqrt{5}}{4}i$ C) $-\frac{1}{4} + \frac{\sqrt{3}}{20}i$ D) $-\frac{1}{4} + \frac{\sqrt{3}}{4}i$

Answer: D

Find the sum or difference. Write the answer in standard form.

139) (9 - 2i) + (6 + 5i)

A) -15 - 3i B) 15 - 3i C) 15 + 3i D) 3 + 7i

Answer: C

140) 3i + (-9 - i)

A) 9 - 2i B) 9 - 4i C) -9 + 4i D) -9 + 2i

Answer: D

141) (8 + 9i) - (-6 + i)

A) 14 - 8i B) -14 - 8i C) 2 + 10i D) 14 + 8i

Answer: D

142) (-3 + 8i) - 7

A) -10 + 8i B) 10 - 8i C) 4 - 8i D) 4 + 8i

Answer: A

143) (4 - 7i) + (-8 + 2i) + 2i

A) -4 + 3i B) -4 - 3i C) -2 - 3i D) 12 - 5i

Answer: B

144) 7i + (-3 - i)

A) -3 + 6i B) 3 - 8i C) -3 + 8i D) 3 - 6i

Answer: A

145) (-1 + 9i) - (6 + 5i) - (-3 + 7i)

A) -4 + 21i B) 2 + 21i C) -4 - 3i D) -10 + 11i

Answer: C

146) (2 + 6i) - (-8 - 6i) + (8 + 8i)

A) 18 + 20i B) -18 + 4i C) 18 + 8i D) 2 + 8i

Answer: A

147) $i\sqrt{5} + 1 - (7 + 8i\sqrt{5}) - (6 - i\sqrt{5})$

A) $12 - 10i\sqrt{5}$ B) $-12 - 6i\sqrt{5}$ C) $-12 + 6i\sqrt{5}$ D) $-12 - 10i\sqrt{5}$

Answer: B

148) $3\sqrt{2} - (7\sqrt{2} + i) + 9i - (-2\sqrt{2} + 9i)$

A) $-2\sqrt{2} - i$ B) $-2 - 17i\sqrt{2}$ C) $-2\sqrt{2} + i$ D) $2 - 17i\sqrt{2}$

Answer: A

Find the product. Write the answer in standard form.

149) $7i(5 - 5i)$

A) $35i - 35$ B) $-35i - 35i^2$ C) $35 + 35i$ D) $35i + 35i^2$

Answer: C

150) $(8 - 4i)(7 + 5i)$

A) $-20i^2 + 12i - 56$ B) $76 + 12i$ C) $76 - 12i$ D) $36 - 68i$

Answer: B

151) $(4 - 5i)(6 - 6i)$

A) $54 - 6i$ B) $-6 + 54i$ C) $30i^2 - 54i + 24$ D) $-6 - 54i$

Answer: D

152) $(8 - 5i)^2$

A) $89 + 80i$ B) $39 - 80i$ C) $89 - 80i$ D) $39 + 80i$

Answer: B

153) $i(7 - 3i)(4 - 3i)$

A) $9i^3 + 33i^2 + 28i$ B) $-33 - 19i$ C) $33 + 19i$ D) $37 + 9i$

Answer: C

154) $(6 + 8i)(6 - 8i)$

A) -28 B) $36 - 64i^2$ C) 100 D) $36 + 64i^2$

Answer: C

155) $(-2 + 3i)^3$

A) $46 + 36i + i^3$ B) $46 + 9i$ C) $46 + 107i$ D) $i^3 - 54i^2 + 36i + a^3$

Answer: B

156) $-8i(-4 - 8i)^2$

A) $512i - 512i^2 - 512i^3$ B) $384 - 512i$

C) $384i$ D) $512 + 384i$

Answer: D

157) $(\sqrt{5} + 7i)(\sqrt{5} - 7i)$

A) 54 B) $5 - 49i$ C) -2 D) $5 + 49i$

Answer: A

158) $(3 + i)(3 - i)(6 + 7i)$

A) $60 + 7i$ B) $54 - 7i^3$ C) $48 + 56i$ D) $60 + 70i$

Answer: D

Find the quotient. Write the answer in standard form.

159) $\frac{4 + 2i}{7 - 9i}$

A) $\frac{46}{13} + \frac{22}{13}i$ B) $-\frac{23}{16} + \frac{5}{32}i$ C) $\frac{1}{13} + \frac{5}{13}i$ D) $-\frac{1}{32} + \frac{5}{32}i$

Answer: C

160) $\frac{4 + 3i}{5 + 3i}$

A) $\frac{29}{34} + \frac{3}{34}i$ B) $\frac{11}{34} - \frac{27}{34}i$ C) $\frac{11}{16} - \frac{3}{16}i$ D) $\frac{29}{16} - \frac{3}{16}i$

Answer: A

161) $\frac{9 - 4i}{5 + 3i}$

A) $\frac{57}{16} + \frac{47}{16}i$ B) $\frac{33}{16} + \frac{47}{16}i$ C) $\frac{57}{34} - \frac{7}{34}i$ D) $\frac{33}{34} - \frac{47}{34}i$

Answer: D

162) $\frac{5 - 5i}{5 - 3i}$

A) $\frac{5}{4} + \frac{5}{16}i$ B) $\frac{10}{17} + \frac{40}{17}i$ C) $\frac{5}{8} + \frac{5}{16}i$ D) $\frac{20}{17} - \frac{5}{17}i$

Answer: D

163) $\frac{7 + 3i}{6 - 9i}$

A) $-\frac{1}{9} + \frac{3}{5}i$ B) $\frac{23}{13} + \frac{15}{13}i$ C) $-\frac{23}{15} + \frac{3}{5}i$ D) $\frac{5}{39} + \frac{9}{13}i$

Answer: D

164) $\frac{6 + 5i}{3 + 4i}$

A) $-\frac{2}{25} - \frac{39}{25}i$ B) $-\frac{38}{7} - \frac{9}{7}i$ C) $\frac{2}{7} - \frac{9}{7}i$ D) $\frac{38}{25} - \frac{9}{25}i$

Answer: D

165) $\frac{5 - 5i}{4 + 2i}$

A) $\frac{1}{2} - \frac{3}{2}i$ B) $15 + 5i$ C) $\frac{5}{2} + \frac{1}{4}i$ D) $\frac{1}{12} + \frac{1}{4}i$

Answer: A

166) $\frac{-13}{-i}$

A) 13 B) 13i C) -13 D) -13i

Answer: D

167) $\frac{9}{-i}$

A) 9 B) -9 C) 9i D) -9i

Answer: C

168) $\frac{6}{7i}$

A) $-\frac{6}{7}i$ B) $\frac{6}{7}$ C) $-\frac{6}{7}$ D) $\frac{6}{7}i$

Answer: A

Simplify the power of i.

169) i^{56}

A) -i B) 1 C) -1 D) i

Answer: B

170) i^{30}

A) -1 B) 1 C) -i D) i

Answer: A

171) i^{61}

A) 1 B) -i C) i D) -1

Answer: C

172) i^{59}

A) -i B) -1 C) i D) 1

Answer: A

173) $\frac{1}{i^{43}}$

A) -1 B) 1 C) i D) -i

Answer: C

174) $\frac{1}{i^{41}}$

A) -i B) -1 C) 1 D) i

Answer: A

175) i^{-22}

A) -i B) -1 C) i D) 1

Answer: B

176) i^{-55}

A) i B) 1 C) -1 D) -i

Answer: A

177) $\frac{1}{i^{-18}}$

A) -1 B) -i C) i D) 1

Answer: A

178) $\frac{1}{i^{-11}}$

A) i B) -1 C) 1 D) -i

Answer: D

Solve the problem.

179) Which one of the following equations is set up for direct use of the zero-factor property?

A) $(4x + 5)^2 = 8$ B) $x^2 + x = 8$ C) $4x^2 + 5x - 8 = 0$ D) $(4x + 5)(x - 8) = 0$

Answer: D

Solve the equation by the zero-factor property.

180) $x^2 + 7x - 18 = 0$

A) {-2, 9} B) {2, 9} C) {-9, -2} D) {-9, 2}

Answer: D

181) $2x^2 = 21x - 49$

A) $\left\{-7, -\frac{7}{2}\right\}$ B) $\left\{\frac{7}{2}, 7\right\}$ C) $\left\{-7, \frac{7}{2}\right\}$ D) {7, 14}

Answer: B

182) $x^2 - 2x - 24 = 0$

A) {6, -4} B) {-20, -4} C) {5, - 5} D) {-6, 4}

Answer: A

183) $35x^2 + 43x + 12 = 0$

A) $\left\{-\frac{5}{4}, -\frac{3}{7}\right\}$ B) $\left\{\frac{4}{5}, \frac{3}{7}\right\}$ C) $\left\{\frac{5}{4}, \frac{7}{3}\right\}$ D) $\left\{-\frac{4}{5}, -\frac{3}{7}\right\}$

Answer: D

184) $x^2 + 14x + 40 = 0$

A) $\{2\sqrt{10}, -2\sqrt{10}\}$ B) {-20, -8} C) {-10, -4} D) {4, 10}

Answer: C

185) $2x^2 - 3x - 5 = 0$

A) $\left\{\frac{5}{2}, -1\right\}$ B) $\left\{\frac{2}{5}, 1\right\}$ C) $\left\{\frac{2}{5}, -1\right\}$ D) $\left\{\frac{2}{5}, 0\right\}$

Answer: A

Solve the problem.

186) Which one of the following equations is set up for direct use of the square root property?

A) $3x^2 + 5x + 7 = 0$ B) $(3x + 5)^2 = 7$ C) $x^2 + x = 7$ D) $(3x + 5)(x + 7) = 0$

Answer: B

Solve the equation by the square root property.

187) $x^2 = 225$

A) $\{\pm 15\}$ B) $\{112.5\}$ C) $\{15\}$ D) $\{\pm 15i\}$

Answer: A

188) $x^2 = -81$

A) $\{\pm 9\}$ B) $\{40.5\}$ C) $\{\pm 9i\}$ D) $\{9\}$

Answer: C

189) $x^2 = 20$

A) $\{400\}$ B) $\{\pm 2\sqrt{5}\}$ C) $\{10\}$ D) $\{\sqrt{20}\}$

Answer: B

190) $(x - 14)^2 = 81$

A) $\{5, 23\}$ B) $\{23\}$ C) $\{-67\}$ D) $\{-5, -23\}$

Answer: A

191) $(x - 7)^2 = 11$

A) $\{7 + \sqrt{11}\}$ B) $\{\sqrt{11} - \sqrt{-7}\}$

C) $\{7 \pm \sqrt{11}\}$ D) $\{\sqrt{11} - 7, -\sqrt{11 - 7}\}$

Answer: C

192) $(7x + 4)^2 = 4$

A) $\left\{-\frac{2}{7}, -\frac{6}{7}\right\}$ B) $\left\{\frac{0}{7}\right\}$ C) $\left\{-\frac{2}{7}, 0\right\}$ D) $\left\{\frac{2}{7}, \frac{6}{7}\right\}$

Answer: A

193) $(7x + 5)^2 = 14$

A) $\left\{\pm\frac{\sqrt{3}}{7}i\right\}$ B) $\left\{\frac{-5 \pm \sqrt{14}}{7}\right\}$ C) $\left\{\frac{-5 + \sqrt{14}}{7}\right\}$ D) $\{-5 \pm \sqrt{14}\}$

Answer: B

194) $(x + 1)^2 = -3$

A) $\{-1 \pm \sqrt{3}\}$ B) $\{2, 4\}$ C) $\{-1 \pm i\sqrt{3}\}$ D) $\{-1 - \sqrt{3}\}$

Answer: C

Solve the problem.

195) Only one of the following equations does not require Step 1 of the method for completing the square. Which one is it?

A) $2x^2 - 5x - 6 = 0$ B) $(2x - 5)(x - 6) = 0$ C) $x^2 - x = 6$ D) $(2x - 5)^2 = 6$

Answer: C

Solve the equation by completing the square.

196) $x^2 - 2x - 24 = 0$

A) {-6, 4} B) {6, -4} C) {-20, -4} D) $\{\pm 2i\sqrt{6}\}$

Answer: B

197) $x^2 + 3x - 9 = 0$

A) $\left\{\frac{-3 - 3\sqrt{5}}{2}\right\}$ B) $\{-3 \pm 3\sqrt{5}\}$ C) $\left\{\frac{-3 + 3\sqrt{5}}{2}\right\}$ D) $\left\{\frac{-3 \pm 3\sqrt{5}}{2}\right\}$

Answer: D

198) $x^2 + 4x + 13 = 0$

A) $\{2 \pm 3i\}$ B) {1, -5} C) $\{-2 \pm \sqrt{13}\}$ D) $\{-2 \pm 3i\}$

Answer: D

199) $2x^2 + 7x + 3 = 0$

A) {3, -1} B) $\left\{-2 \pm \frac{\sqrt{3}}{2}i\right\}$ C) $\left\{\frac{-7 \pm 2\sqrt{6}}{4}\right\}$ D) $\left\{-3, -\frac{1}{2}\right\}$

Answer: D

200) $4x^2 - 4x - 8 = 0$

A) $\{2, -1\}$ B) $\left\{\frac{1}{2}, 1\right\}$ C) $\left\{\frac{1}{2}, -1\right\}$ D) $\left\{\frac{1}{2}, 0\right\}$

Answer: A

201) $x^2 + 10x = -16$

A) {-2, -8} B) {2, -8} C) {2, 8} D) {-2, 8}

Answer: A

202) $x^2 + 4x = 3$

A) $\{-1 \pm \sqrt{7}\}$ B) $\{-2 \pm \sqrt{7}\}$ C) $\{2 + \sqrt{7}\}$ D) $\{-2 \pm 1\sqrt{7}\}$

Answer: B

203) $4x^2 - 7x = 1$

A) $\left\{\frac{7 \pm \sqrt{65}}{8}\right\}$ B) $\left\{-\frac{7}{8} \pm \frac{\sqrt{65}}{8}i\right\}$ C) $\left\{\frac{7}{8} \pm \frac{\sqrt{65}}{8}i\right\}$ D) $\left\{\frac{-7 \pm \sqrt{65}}{8}\right\}$

Answer: A

204) $8x^2 + 7x = -2$

A) $\left\{\frac{7}{16} \pm \frac{\sqrt{15}}{16}i\right\}$ B) $\left\{\frac{-7 \pm \sqrt{15}}{16}\right\}$ C) $\left\{\frac{7 \pm \sqrt{15}}{16}\right\}$ D) $\left\{-\frac{7}{16} \pm \frac{\sqrt{15}}{16}i\right\}$

Answer: D

205) $x^2 = 3 - 4x$

A) $\{2 + \sqrt{7}\}$ B) $\{-2 \pm \sqrt{7}\}$ C) $\{-1 \pm \sqrt{7}\}$ D) $\{-2 \pm 2\sqrt{7}\}$

Answer: B

Solve the equation using the quadratic formula.

206) $x^2 - 14x + 53 = 0$

A) $\{14 \pm 4i\}$ B) $\{-7 \pm 2i\}$ C) $\{7 \pm 2i\}$ D) $\{9, 5\}$

Answer: C

207) $x^2 + x + 5 = 0$

A) $\left\{\frac{-1 \pm \sqrt{19}}{2}\right\}$ B) $\left\{\frac{1 \pm \sqrt{19}}{2}\right\}$ C) $\left\{\frac{1}{2} \pm \frac{\sqrt{19}}{2}i\right\}$ D) $\left\{-\frac{1}{2} \pm \frac{\sqrt{19}}{2}i\right\}$

Answer: D

208) $4x^2 + 8x + 2 = 0$

A) $\left\{\frac{-2 \pm \sqrt{6}}{2}\right\}$ B) $\left\{\frac{-2 \pm \sqrt{2}}{8}\right\}$ C) $\left\{\frac{-8 \pm \sqrt{2}}{2}\right\}$ D) $\left\{\frac{-2 \pm \sqrt{2}}{2}\right\}$

Answer: D

209) $2x^2 + 12x = -7$

A) $\left\{\frac{-6 \pm \sqrt{22}}{2}\right\}$ B) $\left\{\frac{-12 \pm \sqrt{22}}{2}\right\}$ C) $\left\{\frac{-6 \pm \sqrt{22}}{4}\right\}$ D) $\left\{\frac{-6 \pm \sqrt{2}}{2}\right\}$

Answer: A

210) $2x^2 = -8x - 7$

A) $\left\{\frac{-8 \pm \sqrt{2}}{2}\right\}$ B) $\left\{\frac{-4 \pm \sqrt{2}}{4}\right\}$ C) $\left\{\frac{-4 \pm \sqrt{30}}{2}\right\}$ D) $\left\{\frac{-4 \pm \sqrt{2}}{2}\right\}$

Answer: D

211) $\frac{4}{9}x^2 - \frac{4}{3}x = -1$

A) $\left\{-\frac{3}{2}\right\}$ B) $\left\{\frac{2}{3}\right\}$ C) $\left\{\frac{3}{2}\right\}$ D) $\left\{\frac{3 \pm 2\sqrt{2}}{2}\right\}$

Answer: C

212) $6 = -\frac{6}{x} - \frac{1}{x^2}$

A) $\left\{\frac{-3 \pm \sqrt{3}}{6}\right\}$ B) $\left\{\frac{-6 \pm \sqrt{3}}{6}\right\}$ C) $\left\{\frac{-3 \pm \sqrt{3}}{12}\right\}$ D) $\left\{\frac{-3 \pm \sqrt{15}}{6}\right\}$

Answer: A

213) $(x + 6)(x - 1) = 5$

A) $\left\{-\frac{-5}{2} \pm \frac{i\sqrt{69}}{2}\right\}$ B) $\left\{\frac{-5 \pm \sqrt{69}}{2}\right\}$ C) $\left\{\frac{5 \pm \sqrt{69}}{2}\right\}$ D) $\left\{\frac{-5}{2} \pm \frac{i\sqrt{69}}{2}\right\}$

Answer: B

214) $(2x - 1)(x + 1) = 3$

A) $\left\{\frac{-1 \pm \sqrt{33}}{4}\right\}$ B) $\left\{\frac{1 \pm \sqrt{33}}{4}\right\}$ C) $\left\{\frac{-1 \pm \sqrt{57}}{2}\right\}$ D) $\left\{\frac{1 \pm \sqrt{33}}{2}\right\}$

Answer: A

Solve the cubic equation using factoring and the quadratic formula.

215) $x^3 + 1 = 0$

A) $\{-1, \pm i\}$ B) $\left\{-1, \frac{1}{2} \pm \frac{\sqrt{3}}{2}i\right\}$ C) $\{-1, 1 \pm i\sqrt{3}\}$ D) $\{-1, -1 \pm i\sqrt{3}\}$

Answer: B

216) $x^3 - 1 = 0$

A) $\{1, \pm i\}$ B) $\{1, -1 \pm i\sqrt{3}\}$ C) $\left\{1, -\frac{1}{2} \pm \frac{\sqrt{3}}{2}i\right\}$ D) $\{1, 1 \pm i\sqrt{3}\}$

Answer: C

217) $x^3 + 8 = 0$

A) $\{-2, 1 \pm i\sqrt{6}\}$ B) $\{-2, -1 \pm \sqrt{5}\}$ C) $\{-2, 1 \pm i\sqrt{3}\}$ D) $\{-2, \pm 2i\}$

Answer: C

218) $x^3 - 8 = 0$

A) $\{2, 1 \pm i\sqrt{6}\}$ B) $\{2, -1 \pm \sqrt{5}\}$ C) $\{2, \pm 2i\}$ D) $\{2, -1 \pm i\sqrt{3}\}$

Answer: D

219) $x^3 + 64 = 0$

A) $\{-4, 2 \pm 2i\sqrt{5}\}$ B) $\{-4, 2 \pm 2i\sqrt{3}\}$ C) $\{-4, -2 \pm 2i\}$ D) $\{-4, -2 \pm 2i\sqrt{6}\}$

Answer: B

220) $x^3 - 64 = 0$

A) $\{4, 2 \pm 2i\sqrt{6}\}$ B) $\{4, 2 \pm 2\sqrt{5}\}$ C) $\{4, -2 \pm 2i\}$ D) $\{4, -2 \pm 2i\sqrt{3}\}$

Answer: D

Solve the equation.

221) $x^2 = 36$

A) $\pm\sqrt{6}$ B) $\pm i\sqrt{6}$ C) $\pm 6i$ D) ± 6

Answer: D

222) $x^2 = -25$

A) $\pm\sqrt{5}$ B) $\pm 5i$ C) ± 5 D) $\pm i\sqrt{5}$

Answer: B

223) $x^2 - 3 = 0$

A) $\pm 3i$ B) $\pm i\sqrt{3}$ C) ± 3 D) $\pm\sqrt{3}$

Answer: D

224) $x^2 + 3 = 0$

A) ± 3 B) $\pm\sqrt{3}$ C) $\pm 3i$ D) $\pm i\sqrt{3}$

Answer: D

225) $x^2 = 44$

A) $\pm 4\sqrt{11}$ B) $\pm 2\sqrt{11}$ C) $\pm 2i\sqrt{11}$ D) $\pm 4i\sqrt{11}$

Answer: B

226) $x^2 = -18$

A) $\pm 9i\sqrt{2}$ B) $\pm 3i\sqrt{2}$ C) $\pm 3\sqrt{2}$ D) $\pm 9\sqrt{2}$

Answer: B

227) $x - 5 = 0$

A) -5 B) ± 5 C) $\sqrt{5}$ D) 5

Answer: D

228) $x + 17 = 0$

A) 17 B) $-i\sqrt{17}$ C) -17 D) $i\sqrt{17}$

Answer: C

Solve the problem.

229) Only one of the following equations is set up so that the values of a, b, and c can be determined immediately. Which one is it?

A) $(3x + 5)^2 = 1$ B) $(3x + 5)(x + 1) = 0$ C) $3x^2 + 5x + 1 = 0$ D) $x^2 + x = 1$

Answer: C

Solve the equation for the indicated variable. Assume no denominator is 0.

230) $M = \pi r^2 hd$, for r

A) $r = \pm\sqrt{\pi Mhd}$ B) $r = \dfrac{\pm\sqrt{\pi Mhd}}{hd}$ C) $r = \dfrac{\pm\sqrt{M\pi hd}}{\pi hd}$ D) $r = \dfrac{\pm M\sqrt{\pi hd}}{\pi hd}$

Answer: C

231) $A = 2\pi a^2$, for a

A) $a = \dfrac{\pm A\sqrt{2\pi}}{2\pi}$ B) $a = \dfrac{\pm\sqrt{2\pi A}}{2\pi}$ C) $a = \sqrt{2\pi A}$ D) $a = \dfrac{\pm\sqrt{A\pi}}{2}$

Answer: B

232) $Ve = \dfrac{1}{2}mv^2$, for v

A) $v = \pm\sqrt{2Ve}$ B) $v = \dfrac{\pm\sqrt{2mVe}}{m}$ C) $v = \pm\sqrt{\dfrac{Ve}{2m}}$ D) $v = \pm 2\dfrac{\sqrt{Ve}}{m}$

Answer: B

233) $rm = t^2 - mt$, for t

A) $t = \dfrac{m \pm \sqrt{m^2 - 4mr}}{4}$ B) $t = \dfrac{m \pm \sqrt{m^2 + 4mr}}{2m}$

C) $t = \dfrac{m \pm \sqrt{m^2 + 4rm}}{2}$ D) $t = \sqrt{mr - m}$

Answer: C

234) $2x^2 - 4xy + 3y^2 = 1$, for x

A) $x = -y \pm 2\sqrt{1 - y^2}$ B) $x = \frac{2y \pm \sqrt{2 - 2y^2}}{2}$ C) $x = y \pm (1 - y)$ D) $x = -y \pm \sqrt{1 - y^2}$

Answer: B

235) $2x^2 - 4xy + 3y^2 = 1$, for y

A) $y = \frac{2x \pm 4\sqrt{3 - 2x^2}}{3}$ B) $y = \frac{2x \pm \sqrt{6 - 4x^2}}{3}$

C) $y = \frac{2x \pm \sqrt{3 - 2x^2}}{3}$ D) $y = \frac{2x \pm 2\sqrt{3 - 2x^2}}{3}$

Answer: C

Evaluate the discriminant for the equation. Then use it to predict the number of distinct solutions, and whether they are rational, irrational, or nonreal complex.

236) $s^2 + 3s - 4 = 0$

A) Two distinct irrational solutions B) Two distinct rational solutions
C) Two distinct nonreal complex solutions D) One rational solution (a double solution)

Answer: B

237) $t^2 + 2t + 1 = 0$

A) One rational solution (a double solution) B) Two distinct nonreal complex solutions
C) Two distinct irrational solutions D) Two distinct rational solutions

Answer: A

238) $v^2 - 5v - 3 = 0$

A) Two distinct nonreal complex solutions B) Two distinct irrational solutions
C) One rational solution (a double solution) D) Two distinct rational solutions

Answer: B

239) $w^2 + 4w + 5 = 0$

A) Two distinct irrational solutions B) Two distinct rational solutions
C) One rational solution (a double solution) D) Two distinct nonreal complex solutions

Answer: D

240) $4x^2 + 12x + 9 = 0$

A) Two distinct nonreal complex solutions B) Two distinct rational solutions
C) One rational solution (a double solution) D) Two distinct irrational solutions

Answer: C

241) $2y^2 = -5y - 6$

A) Two distinct irrational solutions B) One rational solution (a double solution)
C) Two distinct nonreal complex solutions D) Two distinct rational solutions

Answer: C

242) $4 + 7z^2 = 8z$

A) One rational solution (a double solution)
B) Two distinct rational solutions
C) Two distinct irrational solutions
D) Two distinct nonreal complex solutions

Answer: D

243) $2 - 5a^2 = 4a - 3$

A) Two distinct nonreal complex solutions
B) One rational solution (a double solution)
C) Two distinct rational solutions
D) Two distinct irrational solutions

Answer: D

Find the values of a, b, and c for which the quadratic equation $ax^2 + bx + c = 0$ has the given numbers as solutions. Then use those values to write a quadratic equation.

244) 8, 5

A) $x^2 + 40x + 13 = 0$
B) $x^2 + 13x + 40 = 0$
C) $x^2 + 40x - 13 = 0$
D) $x^2 - 13x + 40 = 0$

Answer: D

245) -4, -5

A) $x^2 + 20x + 9 = 0$
B) $x^2 + 9x + 20 = 0$
C) $x^2 - 9x + 20 = 0$
D) $x^2 + 20x - 9 = 0$

Answer: B

246) 2, -9

A) $x^2 + 7x - 18 = 0$
B) $x^2 - 18x + 7 = 0$
C) $x^2 - 7x - 18 = 0$
D) $x^2 - 18x - 7 = 0$

Answer: A

247) -2, 9

A) $x^2 + 7x - 18 = 0$
B) $x^2 - 7x - 18 = 0$
C) $x^2 - 18x - 7 = 0$
D) $x^2 - 18x + 7 = 0$

Answer: B

248) $-5 + \sqrt{5}, -5 - \sqrt{5}$

A) $x^2 + 10x + 30 = 0$
B) $x^2 + 25x + 30 = 0$
C) $x^2 - 10x + 20 = 0$
D) $x^2 + 10x + 20 = 0$

Answer: D

249) $-8 + 4\sqrt{2}, -8 - 4\sqrt{2}$

A) $x^2 + 16x + 32 = 0$
B) $x^2 - 32x - 16 = 0$
C) $x^2 + 8x + 56 = 0$
D) $x^2 - 64x + 96 = 0$

Answer: A

250) 4i, -4i

A) $x^2 - 8 - 16 = 0$
B) $x^2 - 16 = 0$
C) $x^2 + 8 + 16 = 0$
D) $x^2 + 16 = 0$

Answer: D

251) 24i, -24i

A) $x^2 + 576 = 0$
B) $x^2 + 48 + 576 = 0$
C) $x^2 - 48 - 576 = 0$
D) $x^2 - 576 = 0$

Answer: A

Solve the problem.

252) Find two consecutive integers whose product is 20.

A) 4, 5 or -4, -5 B) 4, -5 C) -4, -5 D) 4, 5

Answer: A

253) Find two consecutive even integers whose product is 224.

A) -14, -16 B) 14, -16 C) 14, 16 or -14, -16 D) 14, 16

Answer: C

254) Find two consecutive odd integers whose product is 899.

A) -29, -31 B) 29, 31 or -29, -31 C) 29, 31 D) 29, -31

Answer: B

255) The sum of the squares of two consecutive integers is 61. Find the integers.

A) 5, -6 B) 5, 6 or -5, -6 C) 5, 6 D) -5, -6

Answer: B

256) The sum of the squares of two consecutive even integers is 52. Find the integers.

A) 4, 6 B) -4, -6 C) 4, 6 or -4, -6 D) 5, -7

Answer: C

257) The sum of the squares of two consecutive odd integers is 1154. Find the integers.

A) 23, -25 B) 23, 25 C) -23, -25 D) 23, 25 or -23, -25

Answer: D

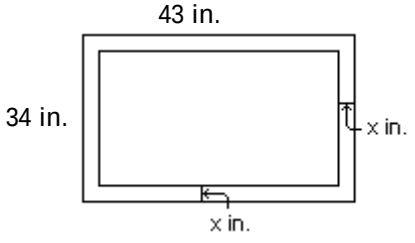
258) The difference of the squares of two positive consecutive even integers is 108. Find the integers.

A) 24, 22 B) 28, 30 C) 26, 24 D) 26, 28

Answer: D

Answer the question.

259) The mat around the picture shown measures x inches across. Which one of the following equations says that the area of the picture itself is 900 square inches?



A) $(43)(34) - x^2 = 900$ B) $2(43 - 2x) + 2(34 - 2x) = 900$

C) $(43 - 2x)(34 - 2x) = 900$ D) $(43 - x)(34 - x) = 900$

Answer: C

Solve the problem.

260) The length of a rectangle is 4 inches more than its width. If 2 inches are taken from the length and added to the width, the figure becomes a square with an area of 169 square inches. What are the dimensions of the original figure?

A) 13 in. by 13 in. B) 11 in. by 13 in. C) 11 in. by 15 in. D) 9 in. by 13 in.

Answer: C

261) The outside of a picture frame has a length which is 3 cm more than width. The area enclosed by the outside of the picture frame is 154 square cm. Find the width of the outside of the picture frame.

A) 11 cm B) 12 cm C) 14 cm D) 17 cm

Answer: A

262) The area of a square is numerically 77 more than the perimeter. Find the length of the side.

A) 44 units B) 11 units C) 242 units D) 61 units

Answer: B

263) The area of a square is numerically 4 less than the perimeter. Find the length of the side, if the side is greater than 1.

A) 5 units B) 2 units C) 9 units D) 8 units

Answer: B

264) The height of a box is 7 inches. The length is three inches more than the width. Find the width if the volume is 126.

A) 3 in. B) 6 in. C) 7 in. D) 18 in.

Answer: A

265) The height of a box is 5 inches. Its length is 5 inches more than its width. Find the length if the volume is 120.

A) 8 in. B) 5 in. C) 24 in. D) 3 in.

Answer: A

266) A 16 ft by 18 ft rectangular garden is to have a gravel path of uniform width bordering it. How wide is the path if the total area covered by the garden and path is 440 ft^2?

A) 2 ft B) 3.5 ft C) 1 ft D) 3 ft

Answer: A

267) A rug is to fit in a room so that a border of even width is left on all four sides. If the room is 12 feet by 15 feet and the area of the rug is 108 square feet, how wide will the border be?

A) 2.2 ft B) 3 ft C) 1.5 ft D) 1 ft

Answer: C

268) A can has a surface area of 790 square inches. Its height is 6.91 inches. What is the radius of the circular top? Round to the nearest hundredth.

A) 8.28 in. B) 3.99 in. C) 18.2 in. D) 10.39 in.

Answer: A

269) A square lawn has an area of 1152 square feet. A sprinkler placed at the center of the lawn sprays a water in a circular pattern that just covers the lawn. What is the radius of the circle?

A) 24 ft B) 16.97 ft C) 33.94 ft D) 48 ft

Answer: A

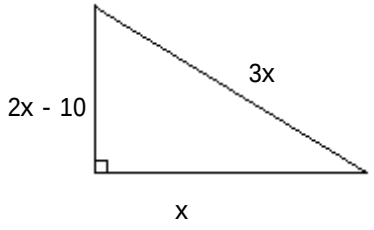
Answer the question.

270) If a rectangle is x feet long and y feet wide, which one of the following expressions is the length of its diagonal in terms of x and y?

A) $x + y$ B) $\sqrt{x + y}$ C) $x^2 + y^2$ D) $\sqrt{x^2 + y^2}$

Answer: D

271) To solve for the lengths of the right triangle sides, which equation is correct?



A) $(2x - 10)^2 + x^2 = (3x)^2$ B) $x^2 + (3x)^2 = (2x - 10)^2$

C) $(2x - 10)^2 = x^2 + (3x)^2$ D) $x^2 = (3x)^2 + (2x - 10)^2$

Answer: A

Solve the problem.

272) Two cars leave an intersection. One car travels north; the other east. When the car traveling north had gone 12 mi, the distance between the cars was 4 mi more than the distance traveled by the car heading east. How far had the east bound car traveled?

A) 20 mi B) 12 mi C) 24 mi D) 16 mi

Answer: D

273) A ladder is resting against a wall. The top of the ladder touches the wall at a height of 12 ft. Find the length of the ladder if the length is 4 ft more than its distance from the wall.

A) 20 ft B) 12 ft C) 24 ft D) 16 ft

Answer: A

274) A lot is in the shape of a right triangle. The shorter leg measures 90 m. The hypotenuse is 30 m longer than the length of the longer leg. How long is the longer leg?

A) 180 m B) 150 m C) 120 m D) 90 m

Answer: C

275) A boat is 180 feet from the base of cliff. If the distance from the top of the cliff to the boat is 45 more than twice the height of the cliff. Find the height of the cliff. Round to the nearest tenth of a foot if necessary.

A) 135 ft B) 45 ft C) 75 ft D) 100.6 ft

Answer: C

276) A boat is 84 feet from the base of cliff. If the distance from the top of the cliff to the boat is 21 less than twice the height of the cliff to the water. Find the height of the cliff. Round to the nearest tenth of a foot if necessary.

A) 63 ft B) 49 ft C) 35 ft D) 105 ft

Answer: A

277) A building needs a ramp to make it handicap accessible. By law, the ramp must run 10 inches horizontally for every 1 inch of rise. If the surface of the ramp is 52 inches long how far above the ground is the inclined end of the ramp? Round to the nearest tenth of an inch.

A) 4.7 in. B) 5.2 in. C) 4.1 in. D) 17.3 in.

Answer: B

278) A ball is dropped from a cliff that is 368 feet high. The distance S (in feet) that it falls in t seconds is given by the formula $S = 16t^2$. How many seconds (to tenths) will it take for the ball to hit the ground?

A) 18.8 sec B) 19.2 sec C) 4.8 sec D) 8464 sec

Answer: C

279) A rock falls from a tower that is 208 feet high. As it is falling, its height is given by the formula $h = 208 - 16t^2$. How many seconds (in tenths) will it take for the rock to hit the ground (h = 0)?

A) 3.6 sec B) 13.9 sec C) 14.4 sec D) 2704 sec

Answer: A

280) A rock falls from a tower that is 117.6 m high. As it is falling, its height is given by the formula $h = 117.6 - 4.9t^2$, with t in seconds. How many seconds will it take for the rock to hit the ground (h = 0)?

A) 10.8 sec B) 2822.4 sec C) 10.6 sec D) 4.9 sec

Answer: D

281) The position of an object moving in a straight line is given by $s = 2t^2 - 3t$, where s is in meters and t is the time in seconds the object has been in motion. How long (to the nearest tenth) will it take the object to move 9 meters?

A) 10.0 sec B) 3.0 sec C) 2.8 sec D) 13.5 sec

Answer: B

282) A ball is thrown downward from a window in a tall building. Its position at time t in seconds is $s = 16t^2 + 32t$, where s is in feet. How long (to the nearest tenth) will it take the ball to fall 133 feet?

A) 1.9 sec B) 4.4 sec C) 2.9 sec D) 2.1 sec

Answer: D

283) Your company uses the quadratic model $y = -11x^2 + 350x$ to represent how many units (y) of a new product will be sold (x) weeks after its release . How many units can you expect to sell in week 5?

A) 1695 units B) 2025 units C) 1805 units D) 1475 units

Answer: D

284) Your company uses the quadratic model $y = -4.5x^2 + 150x$ to represent the average number of new customers who will be signed on (x) weeks after the release of your new service. How many new customers can you expect to gain in week 8?

A) 456 customers B) 1164 customers C) 312 customers D) 912 customers

Answer: D

285) If an amount of money, called the principal, P, is deposited into an account that earns interest at a rate r, compounded annually, then in two years that investment will grow to an amount A, given by the formula $A = P(1 + r)^2$. If a principal amount of $5500 grows to $6415.20 in two years, what is the interest rate?

A) 6% B) 10% C) 9% D) 8%

Answer: D

286) The stadium vending company finds that sales of hot dogs average 45,000 hot dogs per game when the hot dogs sell for $2.50 each. For each 50 cent increase in the price, the sales per game drop by 5000 hot dogs. What price per hot dog should the vending company charge to realize the maximum revenue?

A) $2.00 B) $4.50 C) $3.75 D) $3.50

Answer: D

Decide what values of the variable cannot possibly be solutions for the equation.

287) $\frac{1}{3x} + \frac{8}{x} = 10$

A) 0 B) -3 C) 1, 3 D) 0, $-\frac{1}{3}$

Answer: A

288) $\frac{1}{x - 3} - \frac{1}{x + 8} = 10$

A) $-\frac{1}{8}, \frac{1}{3}$ B) -3, 8 C) -8, 3 D) $-\frac{1}{3}, \frac{1}{8}$

Answer: C

289) $\frac{4}{x - 1} + \frac{6x}{1 - x} = 11$

A) -1, 1 B) -1, 0, 1 C) 1 D) -1, 0

Answer: C

290) $\frac{x}{x - 5} - \frac{13x}{6x + 6} = 0$

A) -1, 5 B) -5, 6 C) -5, 0, 1 D) -6, 5

Answer: A

291) $\frac{x}{x - 3} - \frac{1}{x + 9} = \frac{10}{x^2 + 6x - 27}$

A) -9, 3 B) -9, 0, 3 C) -3, 9, -27 D) -3, 0, 9

Answer: A

Solve the equation.

292) $\frac{1}{x} + \frac{2}{17x} = -2$

A) $\left\{-\frac{19}{2}\right\}$ B) $\left\{-\frac{3}{2}\right\}$ C) $\left\{-\frac{19}{34}\right\}$ D) $\emptyset$

Answer: C

293) $\frac{2}{5x} - 8 = \frac{3}{5x}$

A) $\emptyset$ B) $\left\{-\frac{5}{8}\right\}$ C) $\left\{-\frac{1}{40}\right\}$ D) $\left\{-\frac{3}{8}\right\}$

Answer: C

294) $\frac{3x + 6}{3} - \frac{4x}{x - 3} = x$

A) $\{1\}$ B) $\{-1\}$ C) $\left\{-\frac{3}{11}\right\}$ D) $\{-3\}$

Answer: D

295) $\frac{-5}{x - 2} + \frac{2}{x + 2} = \frac{-20}{x^2 - 4}$

A) {2} B) {-2} C) $\varnothing$ D) $\left\{\frac{8}{3}\right\}$

Answer: C

296) $\frac{4}{x - 9} + \frac{9}{x + 6} = \frac{7}{x^2 - 3x - 54}$

A) $\left\{-\frac{11}{2}\right\}$ B) $\left\{\frac{28}{3}\right\}$ C) $\varnothing$ D) $\left\{\frac{64}{13}\right\}$

Answer: D

297) $\frac{3}{x + 5} + \frac{8}{x + 2} = \frac{10}{x^2 + 7x + 10}$

A) $\varnothing$ B) $\left\{-\frac{39}{7}\right\}$ C) $\left\{-\frac{36}{11}\right\}$ D) $\left\{-\frac{56}{11}\right\}$

Answer: C

298) $\frac{x}{x - 5} = \frac{5}{x - 5} + 5$

A) {5} B) {0} C) {-5} D) $\varnothing$

Answer: D

299) $\frac{5}{x^2 - 4} - \frac{3}{x^2 + 5x + 6} = \frac{3}{x^2 + x - 6}$

A) {-3, -2, 2} B) $\left\{\frac{27}{5}\right\}$ C) {15} D) {7}

Answer: C

300) $1 - \frac{7}{x} - \frac{18}{x^2} = 0$

A) {9, 2} B) {-9, 2} C) {9, -2} D) {-9, -2}

Answer: C

301) $\frac{10}{x - 2} = 1 + \frac{12}{x + 2}$

A) {-6, 8} B) {-12, 8} C) {6, -8} D) $\varnothing$

Answer: C

302) $\frac{16}{x+2} = 1 + \frac{2}{x-4}$

A) $\{-2, 4\}$ B) $\varnothing$ C) $\{-12\}$ D) $\{6, 10\}$

Answer: D

303) $1 + \frac{1}{x} = \frac{20}{x^2}$

A) $\{-4, 5\}$ B) $\left\{-\frac{1}{5}, \frac{1}{4}\right\}$ C) $\{-5, 4\}$ D) $\{4, 5\}$

Answer: C

304) $\frac{24}{x-2} + \frac{24}{x+2} = 5$

A) $\left\{-\frac{2}{5}, 10\right\}$ B) $\left\{-\frac{5}{2}, -10\right\}$ C) $\{2, 10\}$ D) $\left\{\frac{2}{5}, -10\right\}$

Answer: A

305) $\frac{6}{x+5} = 1 - \frac{1}{x-5}$

A) $\varnothing$ B) $\{0, -5\}$ C) $\{1, 5\}$ D) $\{0, 7\}$

Answer: D

306) $\frac{-5x^2 - 4}{x-4} = \frac{-15x}{x-4} + 4$

A) $\left\{\frac{4}{5}, -3\right\}$ B) $\left\{\frac{-5 \pm \sqrt{145}}{3}\right\}$ C) $\{3\}$ D) $\left\{-\frac{4}{5}, 3\right\}$

Answer: D

307) $\frac{6x}{x-6} - \frac{4}{x} = \frac{24}{x^2 - 6x}$

A) $\left\{\frac{2}{3}\right\}$ B) $\left\{\frac{3}{2}\right\}$ C) $\left\{\frac{2}{3}, -\frac{2}{3}\right\}$ D) $\left\{0, \frac{2}{3}\right\}$

Answer: A

308) $\frac{x}{x-5} - \frac{5}{x+5} = \frac{50}{x^2 - 25}$

A) $\{\pm 5i\}$ B) $\left\{\frac{1}{5}\right\}$ C) $\varnothing$ D) $\{\pm 5\}$

Answer: C

309) $\frac{x+24}{7} = \frac{5x-4}{x}$

A) $\left\{\frac{28}{9}\right\}$ B) $\left\{\frac{30}{17}\right\}$ C) $\{4, 7\}$ D) $\{-4, -7\}$

Answer: C

Solve the problem.

310) Martha can rake the leaves in her yard in 2 hours. Her brother can do the job in 4 hours. How long will it take them to do the job working together?

A) $\frac{8}{2}$ hr B) $\frac{1}{8}$ hr C) $\frac{4}{3}$ hr D) $\frac{1}{6}$ hr

Answer: C

311) One maid can clean the house in 5 hours. Another maid can do the job in 3 hours. How long will it take them to do the job working together?

A) $\frac{1}{15}$ hr B) $\frac{15}{8}$ hr C) $\frac{15}{2}$ hr D) $\frac{1}{8}$ hr

Answer: B

312) Frank can type a report in 3 hours. James takes 7 hours to type it. How long will it take the two of them typing together?

A) $\frac{1}{10}$ hr B) $\frac{1}{21}$ hr C) $\frac{21}{10}$ hr D) $\frac{21}{4}$ hr

Answer: C

313) An experienced accountant can prepare a tax return in 8 hours. A novice accountant can do the job in 14 hours. How long will it take them to do the job working together?

A) $\frac{56}{3}$ hr B) $\frac{1}{22}$ hr C) $\frac{1}{112}$ hr D) $\frac{56}{11}$ hr

Answer: D

314) A water tank can be filled in 6 minutes and emptied in 8 minutes. If the drain is accidentally left open when the tank is being filled, how long does it take to fill the tank?

A) 24 min B) $\frac{24}{7}$ min C) $\frac{1}{14}$ min D) $\frac{1}{48}$ min

Answer: A

Solve the equation.

315) $x = \sqrt{2x + 15}$

A) {5, -3} B) $\emptyset$ C) {2} D) {5}

Answer: D

316) $\sqrt{x + 3} = x - 3$

A) {1, 6} B) {1, 13} C) {6} D) {6, 13}

Answer: C

317) $\sqrt{x + 7} + 5 = x$

A) {2, 9} B) {2} C) {9} D) {9, 18}

Answer: C

318) $\sqrt{3x + 10} = 5 - 2x$

A) $\left\{\frac{3}{4}, 5\right\}$ B) {5} C) $\left\{\frac{5}{4}, 9\right\}$ D) $\left\{\frac{3}{4}\right\}$

Answer: D

319) $\sqrt{2x + 15} - x = 6$

A) $\{-7, -3\}$ B) $\{-3\}$ C) $\{-7\}$ D) $\emptyset$

Answer: B

320) $4x = \sqrt{1 - 6x}$

A) $\left\{\frac{1}{8}\right\}$ B) $\left\{-\frac{1}{2}\right\}$ C) $\left\{\frac{1}{4}\right\}$ D) $\left\{\frac{1}{2}\right\}$

Answer: A

321) $\sqrt{3x + 1} = 3 + \sqrt{x - 4}$

A) $\emptyset$ B) $\{-1\}$ C) $\{-5, -8\}$ D) $\{5, 8\}$

Answer: D

322) $\sqrt{2x + 3} - \sqrt{x + 1} = 1$

A) $\{-3, -1\}$ B) $\{3\}$ C) $\emptyset$ D) $\{3, -1\}$

Answer: D

323) $\sqrt{2x + 5} - \sqrt{x - 2} = 3$

A) $\{3, 8\}$ B) $\{2, 38\}$ C) $\{2\}$ D) $\{-2\}$

Answer: B

324) $\sqrt{3x - 2} + \sqrt{11 + x} = -1$

A) $\left\{-\frac{5}{2}\right\}$ B) $\{0\}$ C) $\emptyset$ D) $\{5\}$

Answer: C

325) $\sqrt{x + 6} + \sqrt{2 - x} = 4$

A) $\{\sqrt{31}, -2\}$ B) $\{0\}$ C) $\{-2\}$ D) $\{2, -2\}$

Answer: C

326) $\sqrt{10 + x} + \sqrt{11 - 5x} = -1$

A) $\{1\}$ B) $\{0\}$ C) $\left\{\frac{11}{2}\right\}$ D) $\emptyset$

Answer: D

327) $\sqrt{2x + 3} + \sqrt{4 - x} = 4$

A) $\emptyset$ B) $\{-3\}$ C) $\left\{3, \frac{11}{9}\right\}$ D) $\{3\}$

Answer: C

328) $\sqrt{9x - 3} - \sqrt{4x + 5} = 0$

A) $\left\{\frac{5}{8}\right\}$ B) $\left\{\frac{2}{5}\right\}$ C) $\left\{\frac{8}{13}\right\}$ D) $\left\{\frac{8}{5}\right\}$

Answer: D

329) $4\sqrt{x} = \sqrt{9x + 9}$

A) $\left\{\frac{9}{7}\right\}$ B) $\left\{\frac{9}{25}\right\}$ C) $\left\{-\frac{9}{5}\right\}$ D) $\left\{-\frac{9}{8}\right\}$

Answer: A

330) $\sqrt[3]{x + 3} = 8$

A) {509} B) {512} C) {5} D) {61}

Answer: A

331) $\sqrt[3]{3x + 7} = -1$

A) $\left\{\frac{8}{3}\right\}$ B) $\left\{-\frac{8}{3}\right\}$ C) $\{-2\}$ D) $\{-8\}$

Answer: B

332) $\sqrt[6]{x^2 - 13} = 1$

A) $\{\sqrt{13}\}$ B) $\{\sqrt{14}\}$ C) $\{-\sqrt{14}, \sqrt{14}\}$ D) $\{-\sqrt{13}, \sqrt{13}\}$

Answer: C

333) $\sqrt[5]{6x + 7} = 3$

A) {243} B) {236} C) $\left\{\frac{81}{2}\right\}$ D) $\left\{\frac{118}{3}\right\}$

Answer: D

334) $\sqrt[3]{2x - 5} + 5 = 3$

A) $\left\{\frac{5}{2}\right\}$ B) $\{-4\}$ C) $\left\{-\frac{3}{2}\right\}$ D) $\{-13\}$

Answer: C

335) $\sqrt[3]{5x^2 + 5x - 10} = \sqrt[3]{5x^2 - 3x + 6}$

A) $\{-2\}$ B) $\{2\}$ C) $\left\{-\frac{1}{2}\right\}$ D) $\left\{\frac{1}{2}\right\}$

Answer: B

336) $\sqrt[3]{4 + 6x} - \sqrt[3]{1 - 8x} = 0$

A) $\left\{\frac{14}{3}\right\}$ B) $\left\{-\frac{3}{14}\right\}$ C) $\left\{\frac{3}{14}\right\}$ D) $\left\{-\frac{14}{3}\right\}$

Answer: B

337) $\sqrt[4]{x - 3} + 8 = 0$

A) $\varnothing$ B) $\left\{-\frac{4096}{3}\right\}$ C) $\left\{\frac{4096}{3}\right\}$ D) $\left\{\frac{8}{3}\right\}$

Answer: A

338) $\sqrt[4]{x+9} = \sqrt[4]{5x}$

A) $\left\{\frac{4}{9}\right\}$ B) $\left\{\frac{9}{4}\right\}$ C) $\emptyset$ D) $\left\{\frac{9}{5}\right\}$

Answer: B

339) $(x^2 + 2)^{1/2} - (2x + 5)^{1/2} = 0$

A) {3, -1} B) {3} C) $\emptyset$ D) {-3, 1}

Answer: A

340) $(x^2 - 3)^{1/2} - (x + 3)^{1/2} = 0$

A) {-3} B) {2, 3} C) {-2, 3} D) {-3, 3}

Answer: C

341) $(3x + 1)^{1/2} = 3 + (x - 4)^{1/2}$

A) {5, 8} B) $\emptyset$ C) {-1} D) {-5, -8}

Answer: A

342) $(2x + 5)^{1/2} - (x - 2)^{1/2} = 3$

A) {3, 8} B) {2} C) {-2} D) {2, 38}

Answer: D

343) $(10 + x)^{1/2} + (11 - 5x)^{1/2} = -1$

A) $\left\{-1, \frac{10}{9}\right\}$ B) $\emptyset$ C) {0} D) {1}

Answer: B

344) $(2x + 3)^{1/2} + (4 - x)^{1/2} = 4$

A) {3} B) $\left\{3, \frac{11}{9}\right\}$ C) {-3} D) $\emptyset$

Answer: B

345) $(7 - 9x)^{1/3} - (8 + 3x)^{1/3} = 0$

A) $\left\{\frac{1}{12}\right\}$ B) $\emptyset$ C) $\left\{-\frac{1}{12}\right\}$ D) $\{-12\}$

Answer: C

346) $(x - 4)^{1/4} + 10 = 0$

A) $\emptyset$ B) $\{2500\}$ C) $\left\{\frac{5}{2}\right\}$ D) $\{-2500\}$

Answer: A

347) $x^{2/3} = 3x^{1/3}$

A) {0, -27} B) $\emptyset$ C) {0, 3} D) {0, 27}

Answer: D

348) $x^{1/2} = 4x^{1/4}$

A) {0, 16} B) ∅ C) {0, 4} D) {0, 256}

Answer: D

349) $x^{1/2} = -3x^{1/4}$

A) {0, -3} B) {0, 9} C) {0} D) ∅

Answer: D

350) $(x + 6)^{2/5} = (25x)^{1/5}$

A) $\left\{-\frac{8}{21}\right\}$ B) {4, 9} C) {4, - 9} D) {-4, 9}

Answer: B

351) $6x^{2/5} + 13x^{1/5} + 5 = 0$

A) $\left\{-\frac{3125}{243}, -\frac{1}{32}\right\}$ B) {3, 2} C) $\left\{\frac{3125}{243}, \frac{1}{32}\right\}$ D) $\left\{-\frac{5}{3}, -\frac{1}{2}\right\}$

Answer: A

352) $(x + 5)^{2/3} + 4(x + 5)^{1/3} + 3 = 0$

A) {32, -6} B) {-1, 1} C) ∅ D) {-32, -6}

Answer: D

353) $25x^4 - 61x^2 + 36 = 0$

A) $\left\{-1, -\frac{5}{6}\right\}$ B) $\left\{-1, -\frac{5}{6}, \frac{5}{6}, 1\right\}$ C) $\left\{-\frac{6}{5}, -1, 1, \frac{6}{5}\right\}$ D) $\left\{1, \frac{6}{5}\right\}$

Answer: C

354) $x^4 + 2000 = 141x^2$

A) {16, 125} B) $\{4, 5\sqrt{5}\}$ C) $\{-5\sqrt{5}, -4, 4, 5\sqrt{5}\}$ D) {-125, -16, 16, 125}

Answer: C

355) $(3x - 5)^2 + 7(3x - 5) + 12 = 0$

A) $\left\{\frac{1}{3}, -\frac{2}{3}\right\}$ B) $\left\{3, -\frac{8}{3}\right\}$ C) $\left\{\frac{1}{3}, \frac{2}{3}\right\}$ D) $\left\{-\frac{9}{5}, \frac{8}{3}\right\}$

Answer: C

356) $(-7x + 3)^2 = 4(-7x + 3) + 5$

A) $\left\{\frac{2}{7}, -\frac{4}{7}\right\}$ B) $\left\{-\frac{8}{7}, -\frac{2}{7}\right\}$ C) {5, -1} D) $\left\{-\frac{2}{7}, \frac{4}{7}\right\}$

Answer: D

357) $(x - 1)^4 - 5(x - 1)^2 + 4 = 0$

A) {-1, -4} B) {-2, -1, 1, 2} C) {1, 4} D) {-1, 0, 2, 3}

Answer: D

358) $6x^{-2} - 31x^{-1} + 5 = 0$

A) $\left\{-\frac{1}{6}, -5\right\}$ B) $\left\{\frac{1}{6}, 5\right\}$ C) $\left\{6, \frac{1}{5}\right\}$ D) $\left\{-6, -\frac{1}{5}\right\}$

Answer: C

359) $90x^{-2} - 5x^{-1} = 20$

A) $\left\{2, -\frac{9}{4}\right\}$ B) $\left\{\frac{1}{2}, -\frac{4}{9}\right\}$ C) $\left\{\frac{1}{2}, \frac{4}{9}\right\}$ D) $\left\{-\frac{1}{2}, -\frac{4}{9}\right\}$

Answer: A

360) $8x^{-2/5} + 14x^{-1/5} + 6 = 0$

A) $\left\{-1, -\frac{4}{3}\right\}$ B) $\left\{-1, -\frac{1024}{243}\right\}$ C) {2, 3} D) $\left\{1, \frac{1024}{243}\right\}$

Answer: B

Solve for the indicated variable.

361) $\frac{1}{A} = \frac{1}{m} + \frac{1}{t}$, for t

A) $t = \frac{m - A}{mA}$ B) $t = 1 + \frac{mA}{m - A}$ C) $t = 2 - \frac{mA}{m - A}$ D) $t = \frac{mA}{m - A}$

Answer: D

362) $\frac{1}{Q} = \frac{1}{T_1} + \frac{1}{T_2}$, for T_2

A) $T_2 = \frac{Q - T_1}{T_1 Q}$ B) $T_2 = \frac{T_1 - Q}{T_1 Q}$ C) $T_2 = \frac{QT_1}{T_1 - Q}$ D) $T_2 = \frac{QT_1}{T_1 + 4Q}$

Answer: C

363) $\frac{1}{A} = \frac{1}{B} + \frac{1}{C}$, for A

A) $A = \frac{BC}{B + C}$ B) A = 4 + B + C C) $A = \frac{B - C}{BC}$ D) $A = \frac{B}{B + C}$

Answer: A

364) $Z = A(1 + x)^{1/2}$, for x

A) $x = \left(\frac{Z}{A}\right)^2$ B) $x = \left(\frac{Z}{A}\right)^2 - 1$ C) $x = \left(\frac{A}{Z}\right)^2$ D) $x = \left(\frac{Z}{A}\right)^2 + 1$

Answer: B

365) $M = \pi r^2 hd$, for r

A) $r = \frac{\pm M\sqrt{\pi hd}}{\pi hd}$ B) $r = \frac{\pm\sqrt{M\pi hd}}{\pi hd}$ C) $r = \frac{\pm\sqrt{\pi Mhd}}{hd}$ D) $r = \pm\sqrt{\pi Mhd}$

Answer: B

366) $A = 2\pi a^2$, for a

A) $a = \sqrt{2\pi A}$ B) $a = \frac{\pm A\sqrt{2\pi}}{2\pi}$ C) $a = \frac{\pm\sqrt{2\pi A}}{2\pi}$ D) $a = \frac{\pm\sqrt{A\pi}}{2}$

Answer: C

367) $V = \frac{1}{m}\sqrt{2Vem}$, for m

A) $m = \frac{2V^3}{e}$ B) $m = \frac{2e}{V}$ C) $m = \frac{2V}{e}$ D) $m = \frac{\pm\sqrt{2Ve}}{Ve}$

Answer: B

368) $Ve = \frac{1}{2}mv^2$, for v

A) $v = \frac{\pm\sqrt{2mVe}}{m}$ B) $v = \pm\sqrt{2Ve}$ C) $v = \pm\sqrt{\frac{Ve}{2m}}$ D) $v = \pm 2\frac{\sqrt{Ve}}{m}$

Answer: A

Write the inequality in interval notation.

369) $x \geq -5$

A) $(-5, \infty)$ B) $[-5, \infty)$ C) $[-5, \infty]$ D) $(-\infty, -5]$

Answer: B

370) $-9 \leq x < -3$

A) $(-9, -3]$ B) $[-9, -3)$ C) $(-9, -3)$ D) $[-9, -3]$

Answer: B

371) $1 < x$

A) $(-\infty, 1]$ B) $(1, \infty]$ C) $[1, \infty)$ D) $(1, \infty)$

Answer: D

372) $7 > x \geq -5$

A) $(-5, 7)$ B) $[-5, 7)$ C) $[-5, 7]$ D) $(-5, 7]$

Answer: B

373) $-9 < x \leq -2$

A) $(-9, -2)$ B) $[-9, -2)$ C) $(-9, -2]$ D) $[-9, -2]$

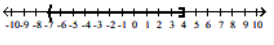
Answer: C

374) $-2 < x < 1$

A) $[-2, 1)$ B) $[-2, 1]$ C) $(-2, 1)$ D) $(-2, 1]$

Answer: C

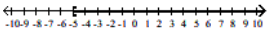
375)



A) $[-7, 4)$ B) $(-3, 8]$ C) $[-4, 7)$ D) $(-7, 4]$

Answer: D

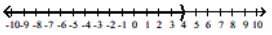
376)



A) $(-\infty, 6]$ B) $[-5, \infty)$ C) $[6, \infty)$ D) $(-\infty, -5]$

Answer: B

377)



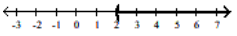
A) $(4, \infty)$ B) $(-\infty, \infty]$ C) $(-\infty, -5]$ D) $(-\infty, 4)$

Answer: D

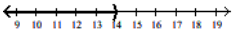
Solve and graph the inequality. Give answer in interval notation.

378) $4x + 6 > 3x + 8$

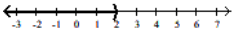
A) $(2, \infty)$



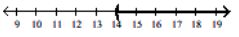
B) $(-\infty, 14)$



C) $(-\infty, 2)$



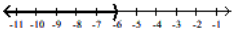
D) $(14, \infty)$



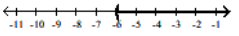
Answer: A

379) $-6x - 3 \leq -7x - 5$

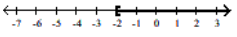
A) $(-\infty, -6)$



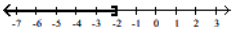
B) $(-6, \infty)$



C) $[-2, \infty)$



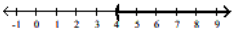
D) $(-\infty, -2]$



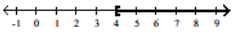
Answer: D

380) $4x + 9 \geq 3x + 13$

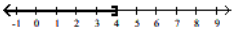
A) $(4, \infty)$



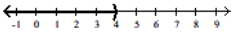
B) $[4, \infty)$



C) $(-\infty, 4]$



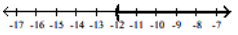
D) $(-\infty, 4)$



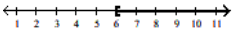
Answer: B

381) $-12x + 1 \geq -11x + 7$

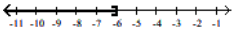
A) $(-12, \infty)$



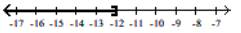
B) $[6, \infty)$



C) $(-\infty, -6]$



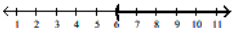
D) $(-\infty, -12]$



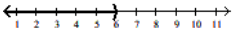
Answer: C

382) $8 + 6x + 2 \geq 5x + 7$

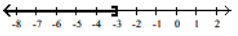
A) $(6, \infty)$



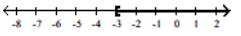
B) $(-\infty, 6)$



C) $(-\infty, -3]$



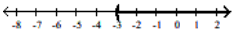
D) $[-3, \infty)$



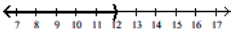
Answer: D

383) $12x + 20 > 4(2x + 2)$

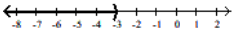
A) $(-3, \infty)$



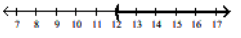
B) $(-\infty, 12)$



C) $(-\infty, -3)$



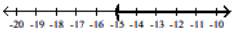
D) $(12, \infty)$



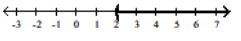
Answer: A

384) $-3(4x - 1) < -15x + 9$

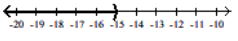
A) $(-15, \infty)$



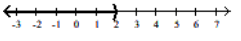
B) $(2, \infty)$



C) $(-\infty, -15)$



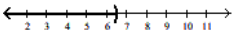
D) $(-\infty, 2)$



Answer: D

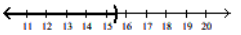
385) $\frac{2x - 5}{4} < \frac{13}{2}$

A) $\left(-\infty, \frac{13}{2}\right)$



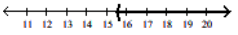
$\frac{13}{2}$

B) $\left(-\infty, \frac{31}{2}\right)$



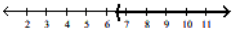
$\frac{31}{2}$

C) $\left(\frac{31}{2}, \infty\right)$



$\frac{31}{2}$

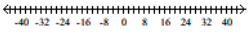
D) $\left(\frac{13}{2}, \infty\right)$



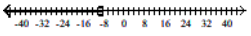
$\frac{13}{2}$

Answer: B

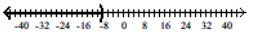
386) $\frac{x}{5} - \frac{1}{2} \leq \frac{x}{2} + 2$



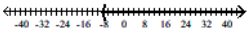
A) $\left(-\infty, -\frac{25}{3}\right]$



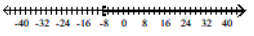
B) $\left(-\infty, -\frac{25}{3}\right)$



C) $\left(-\frac{25}{3}, \infty\right)$

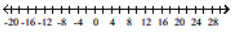


D) $\left[-\frac{25}{3}, \infty\right)$

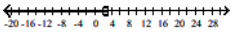


Answer: D

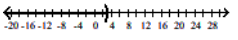
387) $\frac{x - 2}{24} \geq \frac{x - 2}{30} + \frac{1}{120}$



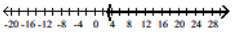
A) $(-\infty, 3]$



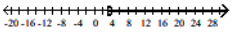
B) $(-\infty, 3)$



C) $(3, \infty)$



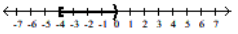
D) $[3, \infty)$



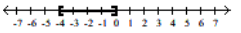
Answer: D

388) $0 < -3x \leq 12$

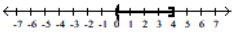
A) $[-4, 0)$



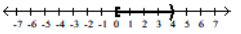
B) $[-4, 0]$



C) $(0, 4]$



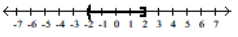
D) $[0, 4)$



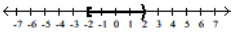
Answer: A

389) $-4 < 3x + 2 \leq 8$

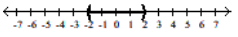
A) $(-2, 2]$



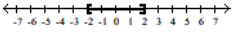
B) $[-2, 2)$



C) $(-2, 2)$



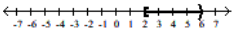
D) $[-2, 2]$



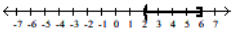
Answer: A

390) $-14 < -3x + 4 \leq -2$

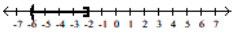
A) $[2, 6)$



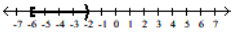
B) $(2, 6]$



C) $(-6, -2]$



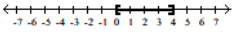
D) $[-6, -2)$



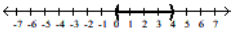
Answer: A

391) $11 > 2x + 3 \geq 3$

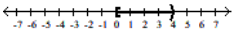
A) $[0, 4]$



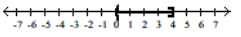
B) $(0, 4)$



C) $[0, 4)$



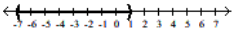
D) $(0, 4]$



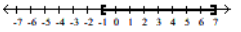
Answer: C

392) $-1 \le \frac{x+1}{2} \le 3$

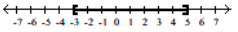
A) $(-7, 1)$



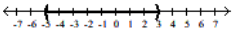
B) $[-1, 7]$



C) $[-3, 5]$



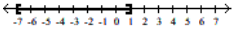
D) $[-5, 3]$



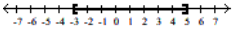
Answer: C

393) $-1 \le \frac{x+1}{-2} \le 3$

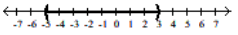
A) $[-7, 1]$



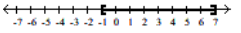
B) $(-3, 5)$



C) $[-5, 3]$



D) $(-1, 7)$



Answer: A

Solve the quadratic inequality. Write the solution set in interval notation.

394) $(x - 9)(x + 8) > 0$

A) $(-\infty, -9) \cup (8, \infty)$ B) $(-8, 9)$ C) $(-\infty, -8) \cup (9, \infty)$ D) $(-8, \infty)$

Answer: C

395) $x^2 - 7x + 10 > 0$

A) $(5, \infty)$ B) $(2, 5)$ C) $(-\infty, 2)$ D) $(-\infty, 2) \cup (5, \infty)$

Answer: D

396) $x^2 - 4x - 12 < 0$

A) $(-2, 6)$ B) $(6, \infty)$ C) $(-\infty, -2) \cup (6, \infty)$ D) $(-\infty, -2)$

Answer: A

397) $x^2 - 3x - 28 \le 0$

A) $[7, \infty)$ B) $(-\infty, -4] \cup [7, \infty)$ C) $(-\infty, -4]$ D) $[-4, 7]$

Answer: D

398) $x^2 - 7x + 12 \ge 0$

A) $[3, 4]$ B) $(-\infty, 3]$ C) $[4, \infty)$ D) $(-\infty, 3] \cup [4, \infty)$

Answer: D

399) $x^2 + 7x \le -12$

A) $(-\infty, 3] \cup [4, \infty)$ B) $(3, 4)$ C) $[3, 4]$ D) $[-4, -3]$

Answer: D

400) $(5 + 4x)^2 \geq -4$

A) $\left(-\infty, -\frac{7}{4}\right] \cup \left[-\frac{3}{4}, \infty\right)$ B) $\emptyset$ C) $\left[-\frac{7}{4}, -\frac{3}{4}\right]$ D) $(-\infty, \infty)$

Answer: D

401) $(7 + 4x)^2 \leq -1$

A) $\emptyset$ B) $(-\infty, \infty)$ C) $\left(-\infty, -2\right) \cup \left[-\frac{3}{2}, \infty\right)$ D) $\left[-2, -\frac{3}{2}\right]$

Answer: A

402) $x^2 - 10x + 20 \geq 0$

A) $(-\infty, 5 - \sqrt{5}) \cup (5 + \sqrt{5}, \infty)$ B) $(-\infty, -\sqrt{5}] \cup [\sqrt{5}, \infty)$

C) $[5 - \sqrt{5}, 5 + \sqrt{5}]$ D) $(-\infty, 5 - \sqrt{5}] \cup [5 + \sqrt{5}, \infty)$

Answer: D

403) $-3x^2 + 2x - 5 \leq 0$

A) $(-\infty, \infty)$ B) $\left[\frac{1}{3}, 5\right]$ C) $\emptyset$ D) $\left[-3, -\frac{1}{5}\right]$

Answer: A

Solve the inequality. Write the solution set in interval notation.

404) $(x + 4)(x + 3)(x - 9) > 0$

A) $(-4, -3) \cup (9, \infty)$ B) $(-\infty, -3)$ C) $(-\infty, -4) \cup (-3, 9)$ D) $(9, \infty)$

Answer: A

405) $(x + 6)(x + 1)(x - 9) < 0$

A) $(9, \infty)$ B) $(-6, -1) \cup (9, \infty)$ C) $(-\infty, -1)$ D) $(-\infty, -6) \cup (-1, 9)$

Answer: D

406) $(x + 8)(x + 6)(x - 9) > 0$

A) $(-8, -6) \cup (9, \infty)$ B) $(9, \infty)$ C) $(-\infty, -8) \cup (-6, 9)$ D) $(-\infty, -6)$

Answer: A

407) $(x + 7)(x - 6)(x + 2) > 0$

A) $(-\infty, 6) \cup (2, 7)$ B) $(-7, -2) \cup (6, \infty)$ C) $(-\infty, -7) \cup (2, 6)$ D) $(-7, -6) \cup (2, \infty)$

Answer: B

408) $(x - 4)(x - 10)(x + 5) < 0$

A) $(-10, -4) \cup (5, \infty)$ B) $(-\infty, -5) \cup (4, 10)$ C) $(-\infty, -4) \cup (5, 10)$ D) $(-4, -5) \cup (10, \infty)$

Answer: B

409) $x^2(x + 64)^2 \geq 0$

A) $\emptyset$ B) $(-\infty, \infty)$ C) $(-\infty, -8] \cup [0, 8]$ D) $[-8, 0] \cup [8, \infty)$

Answer: B

410) $x^2(x + 16)^2 < 0$

A) $(-\infty, -4] \cup [0, 4]$ B) $\emptyset$ C) $(-\infty, \infty)$ D) $[-4, 0] \cup [4, \infty)$

Answer: B

411) $x^3 - 6x^2 > 0$

A) $(-\infty, 6)$ B) $(-\infty, 0) \cup (6, \infty)$ C) $(0, 6)$ D) $(6, \infty)$

Answer: D

412) $x^3 + 4x^2 - 9x - 36 \geq 0$

A) $[-4, \infty)$ B) $[-4, -3] \cup [3, \infty)$ C) $[-3, 3] \cup [4, \infty)$ D) $[-4, 3]$

Answer: B

413) $x^3 + 4x^2 - 16x \leq 64$

A) $[-4, 4]$ B) $(-\infty, -4] \cup [4, \infty)$ C) $[4, \infty)$ D) $(-\infty, 4]$

Answer: D

Solve the rational inequality. Write the solution set in interval notation.

414) $\frac{1}{x - 5} > 0$

A) $(5, \infty)$ B) $[-5, \infty]$ C) $(-\infty, -5)$ D) $(-5, -\infty)$

Answer: A

415) $\frac{-4}{-3x - 5} > 0$

A) $\left(-\frac{5}{3}, \infty\right)$ B) $\left(-\infty, \frac{5}{3}\right)$ C) $(0, \infty)$ D) $\left(-\infty, -\frac{3}{5}\right)$

Answer: A

416) $\frac{x - 7}{x + 8} \leq 0$

A) $[-8, 7]$ B) $(-8, 7]$ C) $(-7, 8]$ D) $[-7, 8]$

Answer: B

417) $\frac{2x}{-5x + 2} \geq 14$

A) $\left[\frac{7}{18}, \frac{2}{5}\right)$ B) $\left(-\infty, 0\right] \cup \left(\frac{2}{5}, \infty\right)$ C) $\left(-\infty, \frac{7}{18}\right] \cup \left[\frac{7}{18}, \infty\right)$ D) $\left[0, \frac{2}{5}\right)$

Answer: A

418) $\frac{x + 11}{x + 4} < 3$

A) $(-\infty, -4) \cup \left(-\frac{1}{2}, \infty\right)$ B) $\left(-\infty, -\frac{1}{2}\right) \cup (4, \infty)$ C) $\emptyset$ D) $\left(-4, -\frac{1}{2}\right)$

Answer: A

419) $8 \geq \frac{1}{x}$

A) $(-\infty, 0) \cup \left[\frac{1}{8}, \infty\right)$ B) $(0, 8]$ C) $\left(0, \frac{1}{8}\right)$ D) $(-\infty, 0) \cup [8, \infty)$

Answer: A

420) $\frac{2x + 7}{x - 7} \le 0$

A) $\left[-\frac{7}{2}, 7\right)$ B) $\left[-\frac{7}{2}, 7\right]$ C) $\left(-\infty, -\frac{7}{2}\right] \cup (7, \infty)$ D) $\left(-\infty, -\frac{7}{2}\right] \cup [7, \infty)$

Answer: A

421) $\frac{(x - 3)(x + 7)}{x - 4} \le 0$

A) $(-\infty, -7) \cup (3, 4)$ B) $[-7, 3] \cup (4, \infty)$ C) $(-\infty, -7] \cup [3, 4)$ D) $[3, 4)$

Answer: C

422) $\frac{-2x + 5}{7x^2 + 4} > 0$

A) $\left(-\frac{5}{2}, \infty\right)$ B) $\left(-\infty, \frac{5}{2}\right)$ C) $\left(-\infty, -\frac{2}{5}\right)$ D) $(-\infty, 0)$

Answer: B

423) $\frac{8}{(x + 4)^2} < 0$

A) $(-\infty, -4)$ B) $\emptyset$ C) $(-4, 0)$ D) $(-\infty, \infty)$

Answer: B

Solve the problem.

424) The profit made when t units are sold, $t > 0$, is given by $P = t^2 - 33t + 272$. Determine the number of units to be sold in order for $P = 0$ (the break-even point).

A) $t = 33$ B) $t = 16$ or $t = 17$ C) $t = -16$ or $t = -17$ D) $t > 16$

Answer: B

425) The profit made when t units are sold, $t > 0$, is given by $P = t^2 - 30t + 200$. Determine the number of units to be sold in order for $P > 0$ (a profit is made).

A) $20 < t < 10$ B) $t = 20$ or $t = 10$ C) $t = 30$ D) $t > 20$ or $t < 10$

Answer: D

426) The profit made when t units are sold, $t > 0$, is given by $P = t^2 - 27t + 176$. Determine the number of units to be sold in order for $P < 0$ (a loss is taken).

A) $11 < t < 16$ B) $t > 0$ C) $t = 11$ or $t = 16$ D) $t < 11$ or $t > 16$

Answer: A

427) The cost of producing t units is $C = 3t^2 + 9t$, and the revenue generated from sales is $R = 4t^2 + t$. Determine the number of units to be sold in order to generate a profit.

A) $t > 0$ B) $t > 8$ C) $t > 10$ D) $t > 9$

Answer: B

428) A rectangular enclosure must have an area of at least 600 yd^2. If 140 yd of fencing is to be used, and the width cannot exceed the length, within what limits must the width of the enclosure lie?

A) $35 \le w \le 60$ B) $0 \le w \le 10$ C) $10 \le w \le 60$ D) $10 \le w \le 35$

Answer: D

429) A coin is tossed upward from a balcony 228 ft high with an initial velocity of 32 ft/sec. During what interval of time will the coin be at a height of at least 100 ft? ($h = -16t^2 + v_0t + h_0$.)

A) $4 \le t \le 8$ B) $0 \le t \le 4$ C) $3 \le t \le 4$ D) $0 \le t \le 1$

Answer: B

430) A retailer knows that n games can be sold in a month if the price is 20 - 0.2n dollars per game. If he buys each game for $10, and if he wishes to make a profit of at least $120 per month on sales of this game, how many games must he sell each month?

A) $20 \le n \le 30$ B) $15 \le n \le 20$ C) $15 \le n \le 25$ D) $20 \le n \le 50$

Answer: A

431) If a rocket is propelled upward from ground level, its height in meters after t seconds is given by $h = -9.8t^2 + 98t$. During what interval of time will the rocket be higher than 235.2 m?

A) $4 < t < 6$ B) $8 < t < 10$ C) $6 < t < 8$ D) $0 < t < 4$

Answer: A

432) A flare fired from the bottom of a gorge is visible only when the flare is above the rim. If it is fired with an initial velocity of 112 ft/sec, and the gorge is 192 ft deep, during what interval can the flare be seen? ($h = -16t^2 + v_0t + h_0$.)

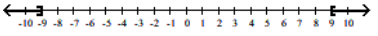
A) $9 < t < 10$ B) $6 < t < 7$ C) $3 < t < 4$ D) $0 < t < 3$

Answer: C

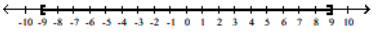
Graph the solution set.

433) $|x| = 9$

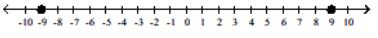
A)



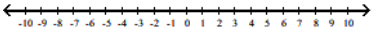
B)



C)



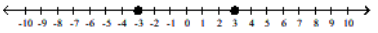
D)



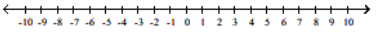
Answer: C

434) $|x| = -3$

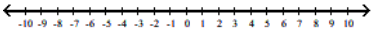
A)



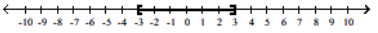
B)



C)



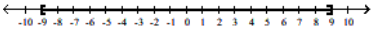
D)



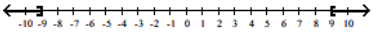
Answer: B

435) $|x| > 9$

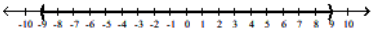
A)



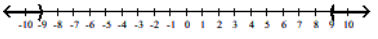
B)



C)



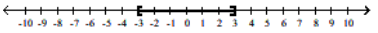
D)



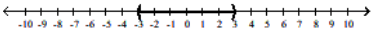
Answer: D

436) $|x| \geq 3$

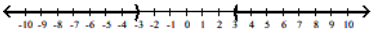
A)



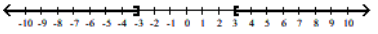
B)



C)



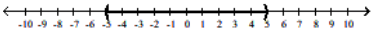
D)



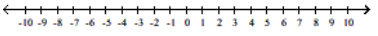
Answer: D

437) $|x| > -5$

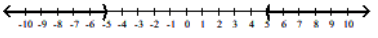
A)



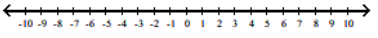
B)



C)



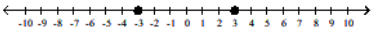
D)



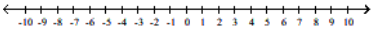
Answer: D

438) $|x| \neq 3$

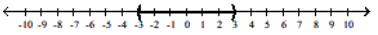
A)



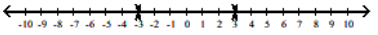
B)



C)



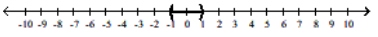
D)



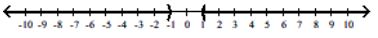
Answer: D

439) $|x| < 1$

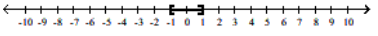
A)



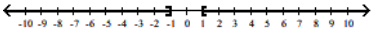
B)



C)



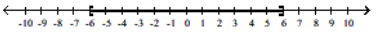
D)



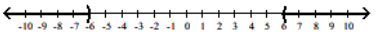
Answer: A

440) $|x| \leq 6$

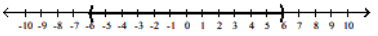
A)



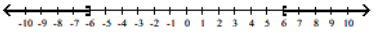
B)



C)



D)



Answer: A

Solve the equation.

441) $|9x + 6| = 5$

A) $\left\{-\frac{11}{9}, \frac{1}{9}\right\}$ B) $\left\{\frac{11}{9}, \frac{1}{9}\right\}$ C) $\left\{-\frac{1}{9}\right\}$ D) $\left\{-\frac{1}{9}, -\frac{11}{9}\right\}$

Answer: D

442) $|2x - 8| = 7$

A) $\left\{\frac{1}{2}, -\frac{15}{2}\right\}$ B) $\left\{\frac{15}{2}\right\}$ C) $\left\{-\frac{1}{2}, -\frac{15}{2}\right\}$ D) $\left\{\frac{15}{2}, \frac{1}{2}\right\}$

Answer: D

443) $|-7x + 6| = 1$

A) $\left\{\frac{5}{7}, 1\right\}$ B) $\left\{1, -\frac{5}{7}\right\}$ C) $\left\{-1, -\frac{5}{7}\right\}$ D) $\left\{\frac{5}{7}\right\}$

Answer: A

444) $|-7x + 5| = 16$

A) $\left\{-\frac{11}{7}\right\}$ B) $\left\{-\frac{11}{7}, 3\right\}$ C) $\left\{-3, \frac{11}{7}\right\}$ D) $\left\{\frac{11}{7}, -\frac{11}{7}\right\}$

Answer: B

445) $|3 - 9x| = 4$

A) $\left\{-\frac{1}{9}\right\}$ B) $\left\{\frac{1}{9}, -\frac{1}{9}\right\}$ C) $\left\{-\frac{1}{9}, \frac{7}{9}\right\}$ D) $\left\{-\frac{7}{9}, \frac{1}{9}\right\}$

Answer: C

446) $\left|\frac{5}{x - 9}\right| = 9$

A) {9}

B) $\left\{-\frac{86}{9}, -\frac{76}{9}\right\}$

C) $\left\{-\frac{76}{9}, -\frac{86}{9}\right\}$

D) $\left\{\frac{86}{9}, \frac{76}{9}\right\}$

Answer: D

447) $\left|\frac{7x + 9}{8}\right| = 1$

A) $\left\{\frac{17}{4}, \frac{1}{4}\right\}$

B) $\left\{-\frac{1}{7}\right\}$

C) $\left\{-2, -\frac{5}{2}\right\}$

D) $\left\{-\frac{1}{7}, -\frac{17}{7}\right\}$

Answer: D

448) $\left|\frac{5x + 6}{4x - 9}\right| = 2$

A) $\left\{-\frac{24}{13}, 4\right\}$

B) $\left\{4, \frac{24}{13}\right\}$

C) $\left\{-\frac{4}{5}, -\frac{8}{5}\right\}$

D) $\left\{8, \frac{12}{13}\right\}$

Answer: D

449) $|5x + 4| = |8x + 1|$

A) $\left\{-\frac{3}{13}, \frac{5}{3}\right\}$

B) $\left\{1, -\frac{5}{13}\right\}$

C) $\left\{-\frac{5}{3}, 1\right\}$

D) $\left\{\frac{5}{3}, 1\right\}$

Answer: B

450) $|5x - 2| = |2x - 3|$

A) $\left\{-\frac{5}{3}, 1\right\}$

B) $\left\{-\frac{1}{7}, \frac{5}{3}\right\}$

C) $\left\{\frac{5}{3}, 1\right\}$

D) $\left\{-\frac{1}{3}, \frac{5}{7}\right\}$

Answer: D

451) $|7x + 6| = |1 - 10x|$

A) $\left\{-\frac{7}{17}, 1\right\}$

B) $\left\{\frac{7}{17}, 1\right\}$

C) $\left\{-\frac{5}{17}, \frac{7}{3}\right\}$

D) $\left\{\frac{5}{3}, -\frac{7}{17}\right\}$

Answer: C

452) $|-6 + 7x| = |9 - 6x|$

A) $\left\{\frac{15}{13}, -3\right\}$

B) $\left\{15, -\frac{3}{13}\right\}$

C) $\left\{-\frac{3}{13}, 1\right\}$

D) $\left\{\frac{3}{13}, 1\right\}$

Answer: A

453) $|2x - 6| = |x + 8|$

A) $\left\{14, -\frac{2}{3}\right\}$

B) $\varnothing$

C) $\{14\}$

D) $\left\{-14, \frac{2}{3}\right\}$

Answer: A

454) $|5x + 4| = |x + 9|$

A) $\varnothing$

B) $\left\{\frac{5}{4}, -\frac{13}{6}\right\}$

C) $\left\{-\frac{5}{4}, \frac{13}{6}\right\}$

D) $\left\{\frac{5}{4}\right\}$

Answer: B

455) $|4x - 5| = |x + 2|$

A) $\left\{\frac{7}{3}, \frac{3}{5}\right\}$ B) $\left\{-\frac{7}{3}, -1\right\}$ C) $\emptyset$ D) $\left\{\frac{7}{3}, -4\right\}$

Answer: A

456) $|x - 2| + 3 = 6$

A) $\{5, -1\}$ B) $\{5\}$ C) $\emptyset$ D) $\{-5, 1\}$

Answer: A

457) $|2x + 5| + 8 = 14$

A) $\left\{\frac{1}{2}, -\frac{11}{2}\right\}$ B) $\left\{-\frac{1}{2}, \frac{11}{2}\right\}$ C) $\left\{\frac{1}{5}, -\frac{11}{5}\right\}$ D) $\emptyset$

Answer: A

458) $|6x - 6| + 6 = 12$

A) $\{-2, 0\}$ B) $\{2, 0\}$ C) $\{-2, 0\}$ D) $\emptyset$

Answer: B

459) $|x - 5| = 0$

A) $\{5\}$ B) $\{-5, 5\}$ C) $(-5, \infty)$ D) $(-\infty, 5)$

Answer: A

460) $|6x + 1| = -5$

A) $\left\{\frac{2}{3}, 1\right\}$ B) $\{-1\}$ C) $\emptyset$ D) $\left\{-\frac{5}{6}, -1\right\}$

Answer: C

461) $|4x + 1| - 5 = -13$

A) $\left\{-\frac{7}{4}, -\frac{9}{4}\right\}$ B) $\left\{\frac{7}{4}, \frac{9}{4}\right\}$ C) $\emptyset$ D) $\left\{-\frac{9}{4}\right\}$

Answer: C

462) $\left|x^2 + 3x - 10\right| = 0$

A) $\{2, 5\}$ B) $\{-2, 5\}$ C) $\{-5, 2\}$ D) $\{-5, -2\}$

Answer: C

463) $\left|2x^3 - 7x^2 - 9x\right| = 0$

A) $\left\{\frac{2}{9}, -1\right\}$ B) $\left\{\frac{2}{9}, 1, 0\right\}$ C) $\left\{\frac{2}{9}, 0\right\}$ D) $\left\{\frac{9}{2}, -1, 0\right\}$

Answer: D

464) $\left|x^2 + 9\right| = |6x|$

A) $\{-3, 3\}$ B) $\emptyset$ C) $\{-3\}$ D) $\{3\}$

Answer: A

Solve the inequality. Write the solution set in interval notation.

465) $|-3 - 8x| > 6$

A) $\left(\frac{9}{8}, -\frac{3}{8}\right)$ B) $\left(-\frac{3}{8}, -\frac{9}{8}\right)$ C) $\left(-\infty, -\frac{9}{8}\right) \cup \left(\frac{3}{8}, \infty\right)$ D) $\left(-\infty, \frac{7}{8}\right) \cup \left(-\frac{5}{8}, \infty\right)$

Answer: C

466) $|7 + 6x| > 8$

A) $\left(-\infty, -\frac{5}{2}\right) \cup \left(\frac{1}{6}, \infty\right)$ B) $\left(\frac{1}{6}, \frac{5}{2}\right)$ C) $\left(-\frac{5}{2}, \frac{1}{6}\right)$ D) $\left(-\infty, \frac{1}{6}\right) \cup \left(\frac{17}{6}, \infty\right)$

Answer: A

467) $|x + 3| > 6$

A) $\emptyset$ B) $(-\infty, -9) \cup (3, \infty)$ C) $(-9, 3)$ D) $(3, \infty)$

Answer: B

468) $|2 - 3x| \geq 11$

A) $\left[-\frac{13}{3}, 3\right]$ B) $(-\infty, 3] \cup \left[\frac{13}{3}, \infty\right)$ C) $(-\infty, -3] \cup \left[\frac{13}{3}, \infty\right)$ D) $\left[-3, \frac{13}{3}\right]$

Answer: C

469) $|7 - x| \geq 9$

A) $(-\infty, -2] \cup [16, \infty)$ B) $[-2, 16]$ C) $[16, \infty)$ D) $[-2, \infty)$

Answer: A

470) $\left|\frac{5}{6} - \frac{1}{7}x\right| > \frac{2}{9}$

A) $(-\infty, \infty)$ B) $\left(-\infty, -\frac{133}{18}\right) \cup \left(\frac{77}{18}, \infty\right)$

C) $\left(\frac{77}{18}, \frac{133}{18}\right)$ D) $\left(-\infty, \frac{77}{18}\right) \cup \left(\frac{133}{18}, \infty\right)$

Answer: D

471) $|x + 4| < 2$

A) $(-6, -2)$ B) $(-6, 2)$ C) $(-\infty, -6) \cup (-2, \infty)$ D) $\emptyset$

Answer: A

472) $|8x + 8| < 1$

A) $\left(-\infty, -\frac{9}{8}\right) \cup \left(-\frac{7}{8}, \infty\right)$ B) $\left(-\infty, -\frac{9}{8}\right)$ C) $\left(-\frac{9}{8}, -\frac{7}{8}\right)$ D) $(-\infty, 8)$

Answer: C

473) $|-5x + 3| < 2$

A) $\left(\frac{1}{5}, 1\right)$ B) $\left(\frac{1}{5}, -1\right)$ C) $\left(-\infty, \frac{1}{5}\right) \cup (1, \infty)$ D) $\left(-\infty, -\frac{7}{5}\right) \cup \left(-\frac{3}{5}, \infty\right)$

Answer: A

474) $|2 - 3x| \le 11$

A) $\left[-\frac{13}{3}, 3\right]$ B) $(-\infty, -3] \cup \left[\frac{13}{3}, \infty\right)$ C) $\left[-3, \frac{13}{3}\right]$ D) $(-\infty, 3] \cup \left[\frac{13}{3}, \infty\right)$

Answer: C

475) $|4 - x| \le 9$

A) $[-5, \infty)$ B) $[13, \infty)$ C) $[-5, 13]$ D) $(-\infty, -5] \cup [13, \infty)$

Answer: C

476) $\left|\frac{5}{8} - \frac{1}{5}x\right| < \frac{2}{7}$

A) $\left(-\infty, \frac{95}{56}\right) \cup \left(\frac{255}{56}, \infty\right)$ B) $\left(\frac{95}{56}, \frac{255}{56}\right)$

C) $(-\infty, \infty)$ D) $\left(-\infty, -\frac{255}{56}\right) \cup \left(\frac{95}{56}, \infty\right)$

Answer: B

477) $|7x - 7| + 4 < 7$

A) $\emptyset$ B) $\left(-\infty, \frac{4}{7}\right)$ C) $\left(-\infty, \frac{4}{7}\right) \cup \left(\frac{10}{7}, \infty\right)$ D) $\left(\frac{4}{7}, \frac{10}{7}\right)$

Answer: D

478) $|7x + 9| - 3 < 3$

A) $\left(-\frac{15}{7}, -\frac{3}{7}\right)$ B) $\emptyset$

C) $\left(-\infty, -\frac{15}{7}\right) \cup \left(-\frac{3}{7}, \infty\right)$ D) $\left(-\infty, -\frac{15}{7}\right)$

Answer: A

479) $|3x - 8| - 1 \ge 3$

A) $\emptyset$ B) $\left[\frac{4}{3}, 4\right]$ C) $\left(\infty, \frac{4}{3}\right] \cup [4, \infty)$ D) $[4, \infty]$

Answer: C

480) $|x + 1| - 9 > 13$

A) $(-\infty, -23) \cup (3, \infty)$ B) $(-\infty, -23) \cup (21, \infty)$ C) $(-23, 21)$ D) $(-\infty, -3) \cup (23, \infty)$

Answer: B

481) $3 + \left|1 - \frac{1}{2}x\right| \ge 5$

A) $(-\infty, -6] \cup [2, \infty)$ B) $(-\infty, -2] \cup [6, \infty)$ C) $[-6, 2]$ D) $[-2, 6]$

Answer: B

482) $|x + 2| \ge 0$

A) $[-2, 2]$ B) $\emptyset$ C) $(-\infty, -2) \cup (-2, \infty)$ D) $(-\infty, \infty)$

Answer: D

483) $|8x - 7| > -8$

A) $\left(-\infty, \frac{3}{8}\right) \cup \left(-\frac{13}{8}, \infty\right)$ B) $(-\infty, \infty)$ C) $\emptyset$ D) $\left(-\infty, \frac{15}{8}\right) \cup \left(-\frac{1}{8}, \infty\right)$

Answer: B

484) $|-2x + 3| > -2$

A) $\emptyset$ B) $\left(\frac{1}{2}, \frac{5}{2}\right)$ C) $\left(-\infty, \frac{5}{2}\right)$ D) $(-\infty, \infty)$

Answer: D

485) $|-3x - 9| \geq -3$

A) $\emptyset$ B) $(-\infty, -2)$ C) $(-\infty, \infty)$ D) $(-4, -2)$

Answer: C

486) $|x + 2| \leq 0$

A) $\{-2\}$ B) $(-\infty, -2)$ C) $\{2\}$ D) $\emptyset$

Answer: A

487) $|x + 3| < 0$

A) $\{3\}$ B) $(-\infty, -3)$ C) $\emptyset$ D) $\{-3\}$

Answer: C

488) $|3x - 9| \leq -6$

A) $\emptyset$ B) $(5, 1)$

C) $(-\infty, 5) \cup (1, \infty)$ D) $\left(-\infty, -\frac{1}{3}\right) \cup \left(-\frac{13}{3}, \infty\right)$

Answer: A

489) $\left|x^4 + 6x^2 + 9\right| < 0$

A) $(-\infty, \infty)$ B) $(-3, 3)$ C) $(-\infty, -3) \cup (3, \infty)$ D) $\emptyset$

Answer: D

490) $\left|x^4 + 8x^2 + 16\right| > 0$

A) $(-4, 4)$ B) $\emptyset$ C) $(-\infty, -4) \cup (4, \infty)$ D) $(-\infty, \infty)$

Answer: D

491) $\left|\frac{4x + 1}{x - 6}\right| \geq 0$

A) $(-6, 6)$ B) $\left(-\infty, -\frac{1}{4}\right] \cup (6, \infty)$ C) $\left[-\frac{1}{4}, 6\right)$ D) $(-\infty, 6) \cup (6, \infty)$

Answer: D

Write the statement as an absolute value inequality.

492) x is within 10 units of 9

A) $|x - 10| < 9$ B) $|x - 9| < 10$ C) $|x - 9| \leq 10$ D) $|10 - x| < 9$

Answer: C

493) z is no less than 6 units from 17

A) $|z - 17| \geq 6$ B) $|z - 17| > 6$ C) $|z - 17| \leq 6$ D) $|z - 6| > 17$

Answer: A

494) m is no more than 7 units from 19

A) $|m - 19| > 7$ B) $|m - 19| \leq 7$ C) $|m - 19| < 7$ D) $|m - 7| < 19$

Answer: B

495) p is 5 units from 8

A) $|p - 5| = 8$ B) $|p - 8| < 5$ C) $|p| = 3$ D) $|p - 8| = 5$

Answer: D

Solve the problem.

496) The temperatures in parts of Antarctica in degrees Celsius roughly satisfy the inequality $|C + 92| \leq 53$. What range of temperatures corresponds to this inequality?

A) [-145°C, -39°C] B) [-145°C, 145°C] C) [-39°C, 145°C] D) [-39°C, 39°C]

Answer: A

497) In a milling operation, the thickness of the metal bars that can be produced satisfies the inequality $|x - 1.97| \leq 1.38$. What range of thicknesses corresponds to this inequality?

A) [1.38, 1.97] B) [0.59, 3.35] C) [0.59, 6.7] D) [0.3, 3.35]

Answer: B

498) The average annual growth rate of Cyprus trees in inches satisfies the inequality $|x - 3.25| \leq 2.69$. What range of growth corresponds to this inequality?

A) [0.56, 11.88] B) [0.56, 5.94] C) [2.69, 3.25] D) [0.28, 5.94]

Answer: B

499) The number of non-text books read by college students ranges from 6 to 44. Using B as the variable, write an absolute value inequality that corresponds to this range.

A) $|B - 38| \leq 6$ B) $|B - 19| \leq 25$ C) $|B - 6| \leq 38$ D) $|B - 25| \leq 19$

Answer: D

500) The high temperature on December 12 in Hilton Head, SC ranges from 33°F to 89°F. Using F as the variable, write an absolute value inequality that corresponds to this range.

A) $|F - 28| \leq 61$ B) $|F - 33| \leq 56$ C) $|F - 56| \leq 33$ D) $|F - 61| \leq 28$

Answer: D

501) A real estate development consists of home sites that range in width from 59 to 115 feet and in depth from 135 to 191 feet. Using x as the variable in both cases, write absolute value inequalities that correspond to these ranges.

A) $|B - 56| \leq 59$, $|x - 56| \leq 135$ B) $|B - 59| \leq 56$, $|x - 135| \leq 56$

C) $|x - 87| \leq 28$, $|x - 163| \leq 28$ D) $|x - 28| \leq 87$, $|x - 28| \leq 163$

Answer: C