**Chapter 2    Review of Basic Algebra**

***Exercise* 2.1**

A. 1. 

1. 
2. 
3. 
4. 
5. 
6. 
7. 
8. 
9. 
10. 
11. 
12. 
13. 
14. 
15. 
16. 
17. 
18. 
19. 
20. 
21. 
22. 
23. 
24. 



1. ****

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1. ****

****

1. 



1. 



1. ****



B. 1. 

1. 
2. 
3. 
4. 
5. 
6. 
7. 
8. 
9. 
10. 
11. 
12. 
13. 
14. 
15. 
16. 
17. 
18. 
19. 
20. 
21. 



1. 
2. 
3. 
4. 
5. 
6. 
7. 
8. 
9. 
10. 

C. 1. 

1. 



1. 
2. 
3. 
4. 
5. 
6. 
7. 
8. 
9. 



1. 



1. 
2. 
3. 



1. ****

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1. ****





1. ****

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1. ****

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1. ****

****

***Exercise* 2.2**

A. 1. 

1. 
2. 
3. 
4. 
5. 
6. 
7. 
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9. 
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11. 
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13. 
14. 
15. 
16. 
17. 
18. 
19. 
20. 
21. 
22. 
23. ****
24. 
25. ****
26. ****
27. ****
28. ****
29. ****

B. 1. 

1. 
2. 
3. 
4. 
5. 
6. 
7. 
8. 
9. 
10. 
11. 
12. 
13. 
14. 
15. 
16. 
17. 
18. 
19. 
20. 
21. 
22. 
23. 
24. 
25. 
26. 
27. 
28. 
29. 
30. 
31. 

***Exercise* 2.3**

A. 1. 

1. 
2. 
3. 
4. 
5. 
6. 
7. 

B. 1. 

1. 
2. 
3. 
4. 
5. 
6. 
7. 
8. 
9. 
10. 
11. 
12. 
13. 
14. 
15. 
16. 



1. 



1. 



1. 



1. 



1. 



***Exercise* 2.4**

A. 1. 



1. 



1. 



1. 



1. 



1. 



B. 1. 



1. 



1. 



1. 



C. 1. 

1. 
2. 
3. 



1. 



1. 



***Business Math News Box***

1.



$10.53 is less than the current $11.25 cost per share.

2.



3.



The first $5000 allocation purchased 200 shares at $25 per share. The second $5000 allocation only bought 156.25 shares because the price rose to $32 per share in the second month. The third $5000 allocation bought 250 shares at $20 per share. After three months, the couple owned 606.25 shares at an average cost of $24.74. Their investment is worth $15 156.25. (i.e., 606.25 shares  $25 current value).

If they had invested $15 000 all at once, they would only have 600 shares. At the current share price, their investment would only be worth $15 000, the same as the original lump sum.

4. Answers will vary. However, markets tend to go up in the long term.

***Exercise* 2.5**

A. 1. 



1. 



1. 



1. 



1. 



1. 



1. 



1. 



1. 



1. 



1. 



1. 



1. 



1. 



1. 



1. 



1. 



1. 



B. 1. 





1. 



1. 



1. 



1. 



1. 



1. 



1. 



1. ****



|  |  |
| --- | --- |
| CHECK: | |
| L.S. | R.S. |
|  |  |

1. ****

****

|  |  |
| --- | --- |
| CHECK: | |
| L.S. | R.S. |
|  |  |

***Exercise* 2.6**

A. 1. 



1. 





1. 



1. 



1. 





1. 



1. 



1. 



1. ****



|  |  |
| --- | --- |
| CHECK: | |
| L.S. | R.S. |
|  |  |

1. ****





|  |  |
| --- | --- |
| CHECK: | |
| L.S. |  |
|  | 3660 |

B. 1. 



1. 



1. 



1. 



1. 



1. 



1. 



1. 



1. ****

****

1. ****

****

C. 1. 



1. 



1. 



1. 



1. ****



D. 1. 



2. 



3. 



4. 



5. 



6. 



7. 

****

****

8. 

****

9. ****

****

10. ****

****

***Exercise* 2.7**

1. Let the cost be $*x*.

Selling price 



The cost was 

1. Let the regular selling price be $*x*.

Sale price 



The regular selling price was 

1. Let the price be $*x*.

Total 



The price was 

1. Let the regular price be $*x*.

Sale price 



The regular selling price was 

1. Let the last month’s index be *x*.

This month’s index 



Last month the index was 

1. Let the original hourly wage be $*x*.

New hourly wage 



The hourly wage before the increase was 

1. Let Vera’s sales be $*x*.

Tai’s sales 

Total sales 



Tai’s sales 

1. Let the shorter piece be *x* cm.

Length of longer piece  cm.

Total length  cm



The longer piece is 2(25) cm + 15 cm

1. Let the cost of a ticket be $*x*.

Total



The cost per ticket is 

1. Let Ken’s investment be $*x*.

Martina’s investment 

Total investment 



Martina’s investment is 

1. Let the number of chairs produced by the first shift be *x*.

Number of chairs produced by the second shift 

Total production 



Production by the second shift is 

1. Let the number of type A lights be *x*.

Number of type B lights 

Value of type A lights 

Value of type B lights 



The number of type B lights is 

1. Let the number of units of Product A be *x*;

then the number of units of Product B is 

The number of hours for Product A is 4*x*;

The number of hours for Product B is 



Production of Product A is 

1. Let the number of dimes be *x*.

Number of nickels 

Number of quarters 

Value of the dimes  cents

Value of nickels  cents

Value of quarters  cents



Alick has 

1. Let the number of $12 tickets be *x*.

Number of $8 tickets 

Number of $15 tickets 

Value of the $12 tickets 

Value of the $8 tickets 

Value of the $15 tickets 



Sales were 

1. Let the number of medium pizzas be *x*.

Number of large pizzas 

Number of small pizzas 

Value of medium pizzas 

Value of large pizzas 

Value of small pizzas 



Sales were 

1. Let the taxable income (in dollars) be *x*.

Then *x* – 44 701 is the amount by which his income exceeds $44 701.

6705.15 + 0.22 ( *x* – 44701 ) = 7162.53

6705.15 + 0.22*x* – 9834.22 = 7162.53

0.22*x* = 10 291.60

*x* = $46 780

His taxable income is $46 780.

1. Let the amount invested at 3% be $*x*.

Then the amount invested at 4.5% is (3000 – *x*).

0.03*x* + 0.045 (3000 – *x*) = 128.25

0.03*x* + 135 – 0.045*x* = 128.25

–0.015*x*  – 6.75

*x*  $450 at 3%

3000 – 450 = $2550 at 4.5%

1. Let *x* be the number on the second shift.

Then 2*x* is the number on the second shift.

And *x*  12 is the number on the third shift.

*x* + 2x + (*x* – 12) = 196

4*x* – 12 = 196

4*x* = 208

*x* = 52 on the second shift

2*x* = 2(52) = 104 on the first shift

*x* – 12 = 52 – 12 = 40 on the third shift

1. Let *x* be the number of options received by each employee.

Then 1.5*x* is the number received by each team leader.

And 3*x* is the number received by each senior manager.

421*x* + 22(1.5*x*) + 7(3*x*) =

421*x* + 33*x* + 21*x* =

475*x* = 171 000

*x* = 360 options for each employee

1.5*x* = 1.5(360) = 540 options for each team leader

(2)(540) = 1080 options for each senior manager

Check: 421(360) + 22(540) + 7(1080) = 171 000

1. Let the amount of money spent on recreational players be $*x*.

If twice as much money was spent on rep players, then the amount spent on recreational players can be determined by

$*x* + $2*x* = $4320

$3*x* = $4320

$*x* = $1440

And therefore, the amount spent on rep players was $4320  $1440 = $2880.

Let the number of Youth Large shirts purchased for recreational players be *y*.

$10*y* + $8(50) + $8(50) = $1440

$10*y* + $400 + $400 = $1440

$10*y* = $640

*y* = 64

64 Youth Large shirts were purchased for recreational players.

Let the number of Adult Small and Adult Medium shirts be *z*.

For rep players, the cost of shirts is given by

$8(50 – 10) + $10(3 × 64) + $16*z* + $16*z* = $2880

Therefore, the number of shirts of each Adult size ordered can be calculated as

$320 + $1920 + $16(2*z*) = $2880

$2240 + $16(2*z*) = $2880

$16(2*z*) = $640

2*z* = 40

*z* = 20

20 Adult Small and 20 Adult Medium shirts were purchased for rep players.

(50 + 50 + 64) + (40 + 192 + 20 + 20) = 436

There are a total of 436 players in the organization.

***Review Exercise***

1. (a) 

(b) 

(c) 

(d) 

(e) 



(f ) 

2. (a) 

(b) 

(c) 

(d) 

(e) 

(f ) 

(g) 

(h) 

(i) 

(j) 

(k) 



(l) 



(m) 



(n) 



(o) 



(p) 



3. (a) for 



(b) for 



(c) for 



(d) for 



(e) for 



(f ) for 



4. (a) 

(b) 

(c) 

(d) 

(e) 

(f ) 

(g) 

(h) 

(i) 

(j) 

(k) 

(l) 

(m) 

(n) 

(o) 

(p) 

(q) 

(r) 

5. (a) 

(b) 

(c) 

(d) 

(e) 

(f ) 

(g) 

(h) 



(i) 



6. (a) 



(b) 



(c) 



(d) 



(e) 



(f ) 



(g) 



(h) 



(i) 



(j) 



(k) 



(l) 



7. (a) 



(b) 



Check LS 

RS 

(c) 



(d) 



(e) 



(f ) 





(g) 





8. (a) 



(b) 



(c) 

(d) 

9. Let the size of the workforce be *x*.

Number laid off 

Number after the layoff 



 the number laid off is 

10. Let last year’s average property value be $*x*.

Current average value 



 Last year’s average value was 

11. Let the quoted price be $*x*.



 The gratuities 

12. Let the value of the building be $*x*.

Value of the land 

Total value of the property 



The value assigned to land is 

13. Let the cost of power be $*x*.

Cost of heat 

Cost of water 

Total cost 



Cost of heat 

Cost of power 

Cost of water 

14. Let the amount allocated to newspaper advertising be $*x*.

Amount allocated to TV advertising 

Amount allocated to direct selling 



The amount allocated to newspaper advertising is $12 250; the amount allocated to TV advertising is $37 750; the amount allocated to direct selling is $37 500.

15. Let the number of minutes on Machine B be *x*.

Time on Machine A  minutes

Time on Machine C  minutes

Total time  minutes



Time on Machine B is 25 minutes; time on Machine A is  time on Machine C is 

16. Let the number of pairs of superlight poles be *x*.

Number of pairs of ordinary poles

Value of superlight poles

Value of ordinary poles

Total value of all poles



The number of pairs of superlight poles is 27; the number of pairs of ordinary poles is 45.

17. Let the number of $2 coins be *x*.

Number of $1 coins 

Number of quarters 

Value of the $2 coins 

Value of the $1 coins 

Value of the quarters 



The number of $2 coins is 25; the number of $1 coins is  the number of quarters is 

18. Let $*x* represent Jaime’s monthly savings.

Jaime has $975 after paying for school and transportation.

0.30(975) + 600 + *x* = 975

892.50 + *x* = 975

*x* = 82.50

Jamie saves $82.50 per month.

19. Let *x* represent the total valuation of Baldwin Industries.

Then Inspire Inc.’s stake is 0.49*x* and Crown Company’s stake is 0.24*x*.

0.80(0.49*x*) = $19 600 000

0.392*x* = $19 600 000

*x* = $50 000 000

0.24(50 000 000) = $12 000 000

Crown Company’s stake in Baldwin Industries is worth $12 Million.

***Self-Test***

1. (a) 

(b) 

(c) 



(d) 



2. (a) For 



(b) For 



(c) For N = 12, C = 400, P = 2000, *n* = 24



(d) For I = 324, P = 5400, *r* = 0.15



(e) For S = 1606, *d* = 0.125, *t* = 



(f ) For S = 1566, *r* = 0.10, *t* = 



3. (a) 

(b) 

(c) 

(d) 

(e) 

(f) 

4. (a) 

(b) 

(c) 

(d) 



(e) 



(f ) 



5. (a)



Since the bases are common



(b)



6. (a)



(b) 



(c) 



(d) 



(e) 



(f ) 



(g) 





(h) 



7. (a) 



(b) 













8. Let the regular selling price be $*x*.

Reduction in price 



The regular selling price is $240.

9. Let the floor space occupied by shipping be *x*.

Floor space occupied by weaving 

Total floor space 



The floor space occupied by weaving is 4600 square metres.

10. Let the number of units of Product A be *x*.

Number of units of Product B 

Number of hours for Product A 

Number of hours for Product B 



11. The number of units of Product B is 

Let the sum of money invested in the bank be $*x*.

Sum of money invested in the credit union 

Yield on the bank investment 

Yield on the credit union investment 



The sum of money invested in the credit union certificate is



***Challenge Problems***

1. Counting a nickel as a quarter overstates the total by $0.20; for *x* nickels, the total must be reduced by $0.20*x*.

Counting a toonie as a loonie understates the total by $1.00; for *x* toonies, the total must be increased by $1.00*x*.

The total adjustment 

The clerk must increase the total by $0.80*x*.

2. There are 5 tires, so each tire is idle at some point. Therefore, the number of rotations is 5.

The distance per rotation  km;

each tire will be used for four rotations for a total distance of 3200 km. (See table below.)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  | *Distance* |
| *Rotation* | *Tire A* | *Tire B* | *Tire C* | *Tire D* | *Tire E* | *travelled* |
| 1 | 800 | 800 | 800 | 800 | — | 800 |
| 2 | 800 | 800 | 800 | — | 800 | 800 |
| 3 | 800 | 800 | — | 800 | 800 | 800 |
| 4 | 800 | — | 800 | 800 | 800 | 800 |
| 5 | — | 800 | 800 | 800 | 800 | 800 |
| Total | 3200 | 3200 | 3200 | 3200 | 3200 | 4000 |

3. The lowest possible two-digit number is 10;

the highest possible two-digit number is 99.

For a difference in value of $17.82, the two-digit numbers must differ by 18, such as 10 and 28, 11 and 29, etc.

The lowest possible correct value of the cheque is $10.28;

the largest possible correct value of the cheque is $81.99.

In either case the difference between is $17.82.

(a) FALSE In the possible correct cheque value $81.99, the *x*-value 81 is greater than 70.

(b) TRUE In the possible correct cheque value $18.36, the *y*-value 36 equals 2*x*.

(c) TRUE A cheque cannot have zero cents.

(d) FALSE Let the correct amount be $A;

then the incorrect amount is $2A;

the difference is $A;



For the correct value $17.82, the incorrect cheque value $82.17 is unequal to 2($17.82).

(e) FALSE In the possible correct amount $10.28, the sum of the digits is , which is not divisible by 9.

***Case Study***

1. $73 566 – $49 355 = $24 211
2. The contributions continue until the 65th year. Therefore, total contributions (65 – 45) × 12 months per year × $250 = $60 000.
3. The contributions continue until the 65th year.
   1. Total contributions (65 – 45) × 12 months per year × $100 = $24 000. Total value of TFSA = $29 529. Therefore, interest earned is $29 529 – 24 000 = $5529.
   2. Total contributions (65 – 45) × 12 months per year × $250 = $60 000. Total value of TFSA = $73 566. Therefore, interest earned is $73 566 – 60 000 = $13 566.
4. Annual salary of $48 000/12 months = $4000.00 per month.

a. $150/$4000 = 0.0375 or 3.75% of salary

b. $250/$4000 = 0.0625 = 6.25% of salar