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| 1. The sun is 25º above the horizon. Find the length of a shadow cast by a building that is  feet tall (see figure). Approximate the answer to two decimal places.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | 281.79 ft | |  | b. | 278.79 ft | |  | c. | 279.79 ft | |  | d. | 280.79 ft | |  | e. | 282.79 ft |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *REFERENCES:* | 6.7.19 | | *QUESTION TYPE:* | Multi-Mode (Multiple choice) | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 6/10/2014 4:24 PM | | *DATE MODIFIED:* | 11/25/2014 6:01 AM | |

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| 2. The sun is 20º above the horizon. Find the length of a shadow cast by a park statue that is 30 feet tall. Approximate the answer to two decimal places.  ​   |  |  |  | | --- | --- | --- | |  | a. | 82.42 ft | |  | b. | 84.42 ft | |  | c. | 85.42 ft | |  | d. | 83.42 ft | |  | e. | 86.42 ft |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *REFERENCES:* | 6.7.20 | | *QUESTION TYPE:* | Multi-Mode (Multiple choice) | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 6/10/2014 4:24 PM | | *DATE MODIFIED:* | 11/25/2014 6:01 AM | |

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| 3. A ladder 17 feet long leans against the side of a house. Find the height from the top of the ladder to the ground if the angle of elevation of the ladder is 80º. Approximate the answer to one decimal place.  ​   |  |  |  | | --- | --- | --- | |  | a. | 19.7 ft | |  | b. | 20.7 ft | |  | c. | 18.7 ft | |  | d. | 16.7 ft | |  | e. | 17.7 ft |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *REFERENCES:* | 6.7.21 | | *QUESTION TYPE:* | Multi-Mode (Multiple choice) | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 6/10/2014 4:24 PM | | *DATE MODIFIED:* | 11/25/2014 6:03 AM | |

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| 4. The length of a shadow of a tree is 120 feet when the angle of elevation of the sun is 33º. Approximate the height of the tree. Approximate the answer to one decimal place.  ​   |  |  |  | | --- | --- | --- | |  | a. | 77.9 ft | |  | b. | 81.9 ft | |  | c. | 79.9 ft | |  | d. | 78.9 ft | |  | e. | 80.9 ft |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *REFERENCES:* | 6.7.22 | | *QUESTION TYPE:* | Multi-Mode (Multiple choice) | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 6/10/2014 4:24 PM | | *DATE MODIFIED:* | 6/16/2015 7:18 AM | |

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| 5. Find the altitude of the isosceles triangle shown in the figure. Round your answer to two decimal places.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | 2.00 | |  | b. | 11.00 | |  | c. | 5.50 | |  | d. | 22.00​ | |  | e. | 7.50 |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *REFERENCES:* | 6.7.15 | | *QUESTION TYPE:* | Multi-Mode (Multiple choice) | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 6/10/2014 4:24 PM | | *DATE MODIFIED:* | 11/25/2014 6:08 AM | |

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| 6. Solve the right triangle shown in the figure for all unknown sides and angles. Round your answers to two decimal places.  ​  ​  ​  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. | ​ | |  | c. |  | |  | d. |  | |  | e. |  |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *REFERENCES:* | 6.7.5 | | *QUESTION TYPE:* | Multi-Mode (Multiple choice) | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 6/10/2014 4:24 PM | | *DATE MODIFIED:* | 6/16/2015 2:01 AM | |

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| 7. An engineer erects a 111-foot cellular telephone tower. Find the angle of elevation to the top of the tower at a point on level ground 62 feet from its base. Round your answer to one decimal place.  ​   |  |  |  | | --- | --- | --- | |  | a. | 60.8º | |  | b. | 64.8º​ | |  | c. | 63.8º | |  | d. | 61.8º | |  | e. | 62.8º |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *REFERENCES:* | 6.7.27 | | *QUESTION TYPE:* | Multi-Mode (Multiple choice) | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 6/10/2014 4:24 PM | | *DATE MODIFIED:* | 6/16/2015 2:06 AM | |

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| 8. The height of an outdoor basketball backboard is  feet, and the backboard casts a shadow  feet long.  Find the angle of elevation of the sun. Round your answer to one decimal place.  ​   |  |  |  | | --- | --- | --- | |  | a. | 36.0º | |  | b. | 37.0º | |  | c. | 35.0º | |  | d. | 39.0º | |  | e. | 38.0º |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *REFERENCES:* | 6.7.28c | | *QUESTION TYPE:* | Multi-Mode (Multiple choice) | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 6/10/2014 4:24 PM | | *DATE MODIFIED:* | 11/25/2014 5:23 AM | |

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| 9. You are holding one of the tethers attached to the top of a giant character balloon in a parade. Before the start of the parade the balloon is upright and the bottom is floating approximately 20 feet above ground level. You are standing approximately *a* = 130 feet ahead of the balloon (see figure).  ​  ​  Find an expression for the angle of elevation from you to the top of the balloon.  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *REFERENCES:* | 6.7.31b | | *QUESTION TYPE:* | Multi-Mode (Multiple choice) | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 6/10/2014 4:24 PM | | *DATE MODIFIED:* | 6/16/2015 2:41 AM | |

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| 10. You are holding one of the tethers attached to the top of a giant character balloon in a parade. Before the start of the parade the balloon is upright and the bottom is floating approximately 20 feet above ground level. You are standing approximately *a* = 100 feet ahead of the balloon (see figure). Round your answer to two decimal places.  ​  ​  Find the height *h* of the balloon if the angle of elevation to the top of the balloon is 35º.  ​   |  |  |  | | --- | --- | --- | |  | a. | 55.02 ft | |  | b. | 56.02 ft | |  | c. | 53.02 ft | |  | d. | 57.02 ft | |  | e. | 54.02 ft |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *REFERENCES:* | 6.7.31c | | *QUESTION TYPE:* | Multi-Mode (Multiple choice) | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 6/10/2014 4:24 PM | | *DATE MODIFIED:* | 11/25/2014 6:29 AM | |

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| 11. For the simple harmonic motion described by the trigonometric function, find the least positive value of *t* for which *d* = 0.  ​  ​  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. | ​ | |  | d. | ​ | |  | e. |  |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *REFERENCES:* | 6.7.60d | | *QUESTION TYPE:* | Multi-Mode (Multiple choice) | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 6/10/2014 4:24 PM | | *DATE MODIFIED:* | 6/16/2015 2:44 AM | |

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| 12. For the simple harmonic motion described by the trigonometric function, find the least positive value of *t* for which *d* = 0.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *REFERENCES:* | 6.7.59d | | *QUESTION TYPE:* | Multi-Mode (Multiple choice) | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 6/10/2014 4:24 PM | | *DATE MODIFIED:* | 6/16/2015 2:52 AM | |

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| 13. An observer in a lighthouse *a* = 340 feet above sea level observes two ships directly offshore.  The angles of depression to the ships are 4º and 6.5º (see figure). How far apart are the ships? Round your answer to one decimal place.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | 1878.1 ft | |  | b. | 1879.1 ft | |  | c. | 1880.1 ft | |  | d. | 1881.1 ft | |  | e. | 1882.1 ft |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *REFERENCES:* | 6.7.24 | | *QUESTION TYPE:* | Multi-Mode (Multiple choice) | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 6/10/2014 4:24 PM | | *DATE MODIFIED:* | 11/26/2014 1:20 AM | |

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| 14. A passenger in an airplane at an altitude of *a* = 20 kilometers sees two towns directly to the east of the plane. The angles of depression to the towns are 28º and 55º (see figure). How far apart are the towns? How far apart are the ships? Round your answer to one decimal place.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | 23.6 km | |  | b. | 24.6 km | |  | c. | 25.6 km | |  | d. | 26.6 km | |  | e. | 27.6 km |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *REFERENCES:* | 6.7.25 | | *QUESTION TYPE:* | Multi-Mode (Multiple choice) | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 6/10/2014 4:24 PM | | *DATE MODIFIED:* | 11/26/2014 1:24 AM | |

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| 15. A cellular telephone tower that is 150 feet tall is placed on top of a mountain that is 1200 feet above sea level. What is the angle of depression from the top of the tower to a cell phone user who is 6 horizontal miles away and 400 feet above sea level? Round your answer to two decimal places.  ​   |  |  |  | | --- | --- | --- | |  | a. | 3.72º | |  | b. | 1.72º | |  | c. | 5.72º | |  | d. | 4.72º | |  | e. | 2.72º |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *REFERENCES:* | 6.7.29 | | *QUESTION TYPE:* | Multi-Mode (Multiple choice) | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 6/10/2014 4:24 PM | | *DATE MODIFIED:* | 11/26/2014 1:30 AM | |

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| 16. A Global Positioning System satellite orbits *a* = 13,000 miles above Earth’s surface (see figure). Find the angle of depression from the satellite to the horizon. Assume the radius of Earth is 4000 miles. Round your answer to two decimal places.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | 77.39º | |  | b. | 78.39º | |  | c. | 79.39º | |  | d. | 76.39º | |  | e. | 80.39º |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *REFERENCES:* | 6.7.30 | | *QUESTION TYPE:* | Multi-Mode (Multiple choice) | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 6/10/2014 4:24 PM | | *DATE MODIFIED:* | 11/26/2014 1:44 AM | |

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| 17. The designers of a water park are creating a new slide and have sketched some preliminary  drawings. The length of the ladder is *a* = 24 feet, and its angle of elevation is 60º (see figure).  ​  ​  Find the height of the slide. Round your answer to two decimal places.  ​   |  |  |  | | --- | --- | --- | |  | a. | About 21.78 ft | |  | b. | About 22.78 ft | |  | c. | About 23.78 ft | |  | d. | About 20.78 ft | |  | e. | About 24.78 ft |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *REFERENCES:* | 6.7.32a | | *QUESTION TYPE:* | Multi-Mode (Multiple choice) | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 6/10/2014 4:24 PM | | *DATE MODIFIED:* | 6/16/2015 3:38 AM | |

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| 18. The designers of a water park are creating a new slide and have sketched some preliminary  drawings. The length of the ladder is *a* = 26 feet, and its angle of elevation is 60º (see figure).  ​  ​  Find the angle of depression  from the top of the slide to the end of the slide at the ground in terms of the horizontal distance *d*the rider travels.  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *REFERENCES:* | 6.7.32b | | *QUESTION TYPE:* | Multi-Mode (Multiple choice) | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 6/10/2014 4:24 PM | | *DATE MODIFIED:* | 11/26/2014 2:25 AM | |

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| 19. You are holding one of the tethers attached to the top of a giant character balloon in a parade. Before the start of the parade the balloon is upright and the bottom is floating approximately 20 feet above ground level. You are standing approximately *a* = 130 feet ahead of the balloon (see figure).  ​  ​  Find the length *l* of the tether you are holding in terms of *h,* the height *h* of the balloon from top to bottom.  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. | ​ | |  | c. |  | |  | d. | ​ | |  | e. |  |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *REFERENCES:* | 6.7.31a | | *QUESTION TYPE:* | Multi-Mode (Multiple choice) | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 6/10/2014 4:24 PM | | *DATE MODIFIED:* | 11/26/2014 2:42 AM | |

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| 20. A police department has set up a speed enforcement zone on a straight length of highway. A patrol car is parked parallel to the zone, *a* = 210 feet from one end and *b* = 130 feet from the other end (see figure).  ​  ​  Find the length *l* of the zone. Round your answer to two decimal places.  ​   |  |  |  | | --- | --- | --- | |  | a. | 286.98 ft | |  | b. | 276.98 ft | |  | c. | 266.98 ft | |  | d. | 246.98 ft | |  | e. | 256.98 ft |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *REFERENCES:* | 6.7.33a | | *QUESTION TYPE:* | Multi-Mode (Multiple choice) | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 6/10/2014 4:24 PM | | *DATE MODIFIED:* | 11/26/2014 2:46 AM | |

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| 21. Find the angle *α* between two nonvertical lines  and . The angle *α* satisfies the equation  ​  ​  where  and  are slopes of  and , respectively.  (Assume that .)  ​  : 5*x* – 4*y* = 5  : *x* + *y* = 1  ​  Round your answer to one decimal place.  ​   |  |  |  | | --- | --- | --- | |  | a. | 83.7º | |  | b. | 84.7º | |  | c. | 85.7º | |  | d. | 86.7º | |  | e. | 87.7º |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *REFERENCES:* | 6.7.43 | | *QUESTION TYPE:* | Multi-Mode (Multiple choice) | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 6/10/2014 4:24 PM | | *DATE MODIFIED:* | 11/26/2014 3:15 AM | |

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| 22. Find the angle between two nonvertical lines  and . The angle  satisfies the equation  ​  ​  where  and  are slopes of  and , respectively.  (Assume that .)  ​  ​  ​  Round your answer to one decimal place.  ​   |  |  |  | | --- | --- | --- | |  | a. | 54.1o | |  | b. | ​53.1o | |  | c. | 55.1o | |  | d. | 52.1o | |  | e. | 56.1o |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *REFERENCES:* | 6.7.44 | | *QUESTION TYPE:* | Multi-Mode (Multiple choice) | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 6/10/2014 4:24 PM | | *DATE MODIFIED:* | 4/10/2015 5:24 AM | |

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| 23. Determine the angle between the diagonal of a cube and the diagonal of its base, as  shown in the figure, where . Round your answer to one decimal place.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | 38.3o | |  | b. | 36.3o | |  | c. | 39.3o | |  | d. | 35.3o | |  | e. | 37.3o |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *REFERENCES:* | 6.7.45 | | *QUESTION TYPE:* | Multi-Mode (Multiple choice) | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 6/10/2014 4:24 PM | | *DATE MODIFIED:* | 4/10/2015 5:34 AM | |

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| 24. Determine the angle between the diagonal of a cube and its edge, as shown in the figure, where . Round your answer to one decimal place.  ​    ​   |  |  |  | | --- | --- | --- | |  | a. | 56.7o | |  | b. | 57.7o | |  | c. | 55.7o | |  | d. | 54.7o | |  | e. | 58.7o  ​ |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *REFERENCES:* | 6.7.46 | | *QUESTION TYPE:* | Multi-Mode (Multiple choice) | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 6/10/2014 4:24 PM | | *DATE MODIFIED:* | 6/16/2015 3:50 AM | |

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| 25. Find the length of the sides of a regular pentagon inscribed in a circle of radius 26 inches. Round your answer to one decimal place.  ​   |  |  |  | | --- | --- | --- | |  | a. | 31.6 in. | |  | b. | 33.6 in. | |  | c. | 30.6 in. | |  | d. | 32.6 in. | |  | e. | 34.6 in. |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *REFERENCES:* | 6.7.47 | | *QUESTION TYPE:* | Multi-Mode (Multiple choice) | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 6/10/2014 4:24 PM | | *DATE MODIFIED:* | 4/10/2015 5:52 AM | |

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| 26. Find the length of the sides of a regular hexagon inscribed in a circle of radius 29 inches.  ​   |  |  |  | | --- | --- | --- | |  | a. | 30 in. | |  | b. | 31 in. | |  | c. | 32 in. | |  | d. | 33 in. | |  | e. | 29 in. |  |  |  | | --- | --- | | *ANSWER:* | e | | *POINTS:* | 1 | | *REFERENCES:* | 6.7.48 | | *QUESTION TYPE:* | Multi-Mode (Multiple choice) | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 6/10/2014 4:24 PM | | *DATE MODIFIED:* | 6/16/2015 3:56 AM | |

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| 27. Find the distance *y* across the flat sides of a hexagonal nut (see figure).   cm  Round your answer to two decimal places.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | cm | |  | b. | cm | |  | c. | cm | |  | d. | cm | |  | e. | cm |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *REFERENCES:* | 6.7.49 | | *QUESTION TYPE:* | Multi-Mode (Multiple choice) | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 6/10/2014 4:24 PM | | *DATE MODIFIED:* | 4/10/2015 5:58 AM | |

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| 28. Find the lengths of all the unknown members of the truss.  Round your answer to one decimal place.  ​    ​  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *REFERENCES:* | 6.7.51 | | *QUESTION TYPE:* | Multi-Mode (Multiple choice) | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 6/10/2014 4:24 PM | | *DATE MODIFIED:* | 6/16/2015 4:27 AM | |

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| 29. Find a model for simple harmonic motion satisfying the specified conditions.  ​  *Displacement* (*t =* 0): 0  *Amplitude*:*5* centimeters  *Period*: 2 seconds  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *REFERENCES:* | 6.7.53 | | *QUESTION TYPE:* | Multi-Mode (Multiple choice) | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 6/10/2014 4:24 PM | | *DATE MODIFIED:* | 6/16/2015 4:35 AM | |

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| 30. Find a model for simple harmonic motion satisfying the specified conditions.  ​  *Displacement* (*t* = 0): 0  *Amplitude*:*5* meters  *Period*:*10*  seconds  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *REFERENCES:* | 6.7.54 | | *QUESTION TYPE:* | Multi-Mode (Multiple choice) | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 6/10/2014 4:24 PM | | *DATE MODIFIED:* | 6/16/2015 4:34 AM | |

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| 31. For the simple harmonic motion described by the trigonometric function, find the maximum displacement.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *REFERENCES:* | 6.7.57a | | *QUESTION TYPE:* | Multi-Mode (Multiple choice) | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 6/10/2014 4:24 PM | | *DATE MODIFIED:* | 6/16/2015 4:40 AM | |

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| 32. For the simple harmonic motion described by the trigonometric function, find the maximumvalue of *d* when .  ​  Round your answer to nearest whole number.  ​   |  |  |  | | --- | --- | --- | |  | a. | 1 | |  | b. | 10 | |  | c. | 6 | |  | d. | 5 | |  | e. | 0 |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *REFERENCES:* | 6.7.57c | | *QUESTION TYPE:* | Multi-Mode (Multiple choice) | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 6/10/2014 4:24 PM | | *DATE MODIFIED:* | 6/16/2015 4:47 AM | |

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| 33. For the simple harmonic motion described by the trigonometric function, find the frequency per second.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *REFERENCES:* | 6.7.57b | | *QUESTION TYPE:* | Multi-Mode (Multiple choice) | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 6/10/2014 4:24 PM | | *DATE MODIFIED:* | 6/16/2015 5:01 AM | |

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| 34. For the simple harmonic motion described by the trigonometric function, find the least positive value of *t* for which  ​  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *REFERENCES:* | 6.7.57d | | *QUESTION TYPE:* | Multi-Mode (Multiple choice) | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 6/10/2014 4:24 PM | | *DATE MODIFIED:* | 4/10/2015 7:35 AM | |

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| 35. For the simple harmonic motion described by the trigonometric function, find the maximum displacement.  ​    ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *REFERENCES:* | 6.7.58a | | *QUESTION TYPE:* | Multi-Mode (Multiple choice) | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 6/10/2014 4:24 PM | | *DATE MODIFIED:* | 6/16/2015 5:05 AM | |

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| 36. For the simple harmonic motion described by the trigonometric function, find the frequency per second.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | 16  ​ | |  | b. | π  ​ | |  | c. | 12 | |  | d. | 2π | |  | e. | 6 |  |  |  | | --- | --- | | *ANSWER:* | e | | *POINTS:* | 1 | | *REFERENCES:* | 6.7.58b | | *QUESTION TYPE:* | Multi-Mode (Multiple choice) | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 6/10/2014 4:24 PM | | *DATE MODIFIED:* | 6/16/2015 5:06 AM | |

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| 37. For the simple harmonic motion described by the trigonometric function, find the maximum displacement.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. |  | |  | c. | ​ | |  | d. |  | |  | e. |  |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *REFERENCES:* | 6.7.59a | | *QUESTION TYPE:* | Multi-Mode (Multiple choice) | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 6/10/2014 4:24 PM | | *DATE MODIFIED:* | 6/16/2015 5:09 AM | |

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| 38. For the simple harmonic motion described by the trigonometric function, find the frequency per second.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *REFERENCES:* | 6.7.59b | | *QUESTION TYPE:* | Multi-Mode (Multiple choice) | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 6/10/2014 4:24 PM | | *DATE MODIFIED:* | 6/16/2015 5:12 AM | |

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| 39. A point on the end of a tuning fork moves in simple harmonic motion described by  ​  ​  Find ω given that the tuning fork for middle C has a frequency 270 of vibrations per second.  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *REFERENCES:* | 6.7.61 | | *QUESTION TYPE:* | Multi-Mode (Multiple choice) | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 6/10/2014 4:24 PM | | *DATE MODIFIED:* | 6/16/2015 6:05 AM | |

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| 40. A ball that is bobbing up and down on the end of a spring has a maximum displacement of 3 inches. Its motion (in ideal conditions) is modeled by  ​  where *y* is measured in feet and *t* is the time in seconds.  What is the period of the oscillations?  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  |  |  |  | | --- | --- | | *ANSWER:* | e | | *POINTS:* | 1 | | *REFERENCES:* | 6.7.63b | | *QUESTION TYPE:* | Multi-Mode (Multiple choice) | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 6/10/2014 4:24 PM | | *DATE MODIFIED:* | 6/16/2015 6:08 AM | |

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| 41. Determine whether the statement is true or false.  ​  N 24 E means 30 degrees north of east.  ​   |  |  |  | | --- | --- | --- | |  | a. | True | |  | b. | False |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *REFERENCES:* | 6.7.70 | | *QUESTION TYPE:* | Multi-Mode (Multiple choice) | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 6/10/2014 4:24 PM | | *DATE MODIFIED:* | 4/13/2015 4:51 AM | |

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| 42. Determine whether the statement is true or false.  ​  The Leaning Tower of Pisa is not vertical, but if you know the angle of elevation *θ* to the top of the tower when you stand 20 feet away from it, you can find its height *h* using the formula  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | False | |  | b. | True |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *REFERENCES:* | 6.7.69 | | *QUESTION TYPE:* | Multi-Mode (Multiple choice) | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 6/10/2014 4:24 PM | | *DATE MODIFIED:* | 4/13/2015 4:52 AM | |

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| 43. If   and , determine the value of *b*. Round to two decimal places.   |  |  |  | | --- | --- | --- | |  | a. | 6.24 | |  | b. | 3.18 | |  | c. | 3.57 | |  | d. | 7.86 | |  | e. | 13.74 |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *REFERENCES:* | 6.7.7 | | *QUESTION TYPE:* | Multi-Mode (Multiple choice) | | *HAS VARIABLES:* | True | | *LEARNING OBJECTIVES:* | PREC.LARS.16.253 - Find a third triangle given two pieces | | *DATE CREATED:* | 6/10/2014 4:24 PM | | *DATE MODIFIED:* | 6/16/2015 6:11 AM | |

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| 44. If  and , determine the value of B. Round to two decimal places.   |  |  |  | | --- | --- | --- | |  | a. | 68.55o  ​ | |  | b. | 66.87o  ​ | |  | c. | 28.13o  ​ | |  | d. | 21.45o  ​ | |  | e. | 23.13o  ​ |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *REFERENCES:* | 6.7.10 | | *QUESTION TYPE:* | Multi-Mode (Multiple choice) | | *HAS VARIABLES:* | True | | *LEARNING OBJECTIVES:* | PREC.LARS.16.253 - Find a third triangle given two pieces | | *DATE CREATED:* | 6/10/2014 4:24 PM | | *DATE MODIFIED:* | 6/16/2015 6:11 AM | |

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| 45. Find the altitude of the isosceles triangle shown below if  and  . Round your answer to two decimal places.   |  |  |  | | --- | --- | --- | |  | a. | 5.12 centimeters | |  | b. | 6.25 centimeters | |  | c. | 3.13 centimeters | |  | d. | 2.46 centimeters | |  | e. | 1.38 centimeters |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *REFERENCES:* | 6.7.15 | | *QUESTION TYPE:* | Multi-Mode (Multiple choice) | | *HAS VARIABLES:* | True | | *LEARNING OBJECTIVES:* | PREC.LARS.16.254 - Find altitude of isosceles triangle given two parts of the triangle | | *DATE CREATED:* | 6/10/2014 4:24 PM | | *DATE MODIFIED:* | 6/16/2015 6:13 AM | |

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| 46. The angle of elevation of the sun is 26o. Find the length, *l*, of a shadow cast by a tree that is 38 feet tall. Round your answer to two decimal places.   |  |  |  | | --- | --- | --- | |  | a. | feet | |  | b. | feet | |  | c. | feet | |  | d. | feet | |  | e. | feet |  |  |  | | --- | --- | | *ANSWER:* | e | | *POINTS:* | 1 | | *REFERENCES:* | 6.7.19 | | *QUESTION TYPE:* | Multi-Mode (Multiple choice) | | *HAS VARIABLES:* | True | | *LEARNING OBJECTIVES:* | PREC.LARS.16.255 - Application: Angle of elevation | | *DATE CREATED:* | 6/10/2014 4:24 PM | | *DATE MODIFIED:* | 4/13/2015 5:17 AM | |

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| 47. After leaving the runway, a plane's angle of ascent is 17o and its speed is 280 feet per second. How many minutes will it take for the airplane to climb to a height of 11,000 feet? Round your answer to two decimal places.  ​   |  |  |  | | --- | --- | --- | |  | a. | 1.72 minutes | |  | b. | 1.19 minutes | |  | c. | 2.24 minutes | |  | d. | 0.65 minutes | |  | e. | 0.68 minutes |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *REFERENCES:* | 6.7.34b | | *QUESTION TYPE:* | Multi-Mode (Multiple choice) | | *HAS VARIABLES:* | True | | *LEARNING OBJECTIVES:* | PREC.LARS.16.256 - Application: Angle of ascent | | *DATE CREATED:* | 6/10/2014 4:24 PM | | *DATE MODIFIED:* | 4/13/2015 5:35 AM | |

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| 48. A plane is 52 miles west and 46 miles north of an airport. The pilot wants to fly directly to the airport. What bearing should the pilot take? Answer should be given in degrees and minutes.   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *REFERENCES:* | 6.7.36b | | *QUESTION TYPE:* | Multi-Mode (Multiple choice) | | *HAS VARIABLES:* | True | | *LEARNING OBJECTIVES:* | PREC.LARS.16.257 - Find bearings | | *DATE CREATED:* | 6/10/2014 4:24 PM | | *DATE MODIFIED:* | 4/13/2015 5:57 AM | |

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| 49. A land developer wants to find the distance across a small lake in the middle of his proposed development. The bearing from *A* to *B* is . The developer leaves point *A* and travels 74 yards perpendicular to  to point *C.* The bearing from *C* to point *B* is . Determine the distance, *AB*, across the small lake. Round distance to nearest yard.   |  |  |  | | --- | --- | --- | |  | a. | 169 yards | |  | b. | 114 yards | |  | c. | 139 yards | |  | d. | 154 yards | |  | e. | 121 yards |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *REFERENCES:* | 6.7.41 | | *QUESTION TYPE:* | Multi-Mode (Multiple choice) | | *HAS VARIABLES:* | True | | *LEARNING OBJECTIVES:* | PREC.LARS.16.258 - Find distance using surveying bearings | | *DATE CREATED:* | 6/10/2014 4:24 PM | | *DATE MODIFIED:* | 4/13/2015 6:00 AM | |

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| 50. If the sides of a rectangular solid are as shown, and , determine the angle, *θ*, between the diagonal of the base of the solid and the diagonal of the solid. Round answer to two decimal places.   |  |  |  | | --- | --- | --- | |  | a. | 21.91o | |  | b. | 24.09o | |  | c. | 17.21o | |  | d. | 26.28o | |  | e. | 19.86o |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *REFERENCES:* | 6.7.45 | | *QUESTION TYPE:* | Multi-Mode (Multiple choice) | | *HAS VARIABLES:* | True | | *LEARNING OBJECTIVES:* | PREC.LARS.16.259 - Angle inside a solid using Pythagorean theorem and arctan | | *DATE CREATED:* | 6/10/2014 4:24 PM | | *DATE MODIFIED:* | 4/13/2015 6:10 AM | |

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| 51. If  and  , determine the value of A. Round to two decimal places.   |  |  |  | | --- | --- | --- | |  | a. | 48.19o  ​ | |  | b. | 56.31o  ​ | |  | c. | 33.69o  ​ | |  | d. | 41.81o  ​ | |  | e. | 53.19o  ​ |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multi-Mode (Multiple choice) | | *HAS VARIABLES:* | True | | *LEARNING OBJECTIVES:* | PREC.LARS.16.253 - Find a third triangle given two pieces | | *DATE CREATED:* | 6/10/2014 4:24 PM | | *DATE MODIFIED:* | 6/16/2015 6:19 AM | |

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| 52. If   and  , determine the value of *c*. Round to two decimal places.   |  |  |  | | --- | --- | --- | |  | a. | 8.17 | |  | b. | 11.65 | |  | c. | 13.59 | |  | d. | 4.21 | |  | e. | 3.61 |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multi-Mode (Multiple choice) | | *HAS VARIABLES:* | True | | *LEARNING OBJECTIVES:* | PREC.LARS.16.253 - Find a third triangle given two pieces | | *DATE CREATED:* | 6/10/2014 4:24 PM | | *DATE MODIFIED:* | 6/16/2015 6:19 AM | |

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| 53. Find the altitude of the isosceles triangle shown below if   and  . Round answer to two decimal places.   |  |  |  | | --- | --- | --- | |  | a. | 33.18 meters | |  | b. | 6.23 meters | |  | c. | 9.98 meters | |  | d. | 16.59 meters | |  | e. | 9.42 meters |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multi-Mode (Multiple choice) | | *HAS VARIABLES:* | True | | *LEARNING OBJECTIVES:* | PREC.LARS.16.254 - Find altitude of isosceles triangle given two parts of the triangle | | *DATE CREATED:* | 6/10/2014 4:24 PM | | *DATE MODIFIED:* | 6/16/2015 6:20 AM | |

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| 54. A granular substance such as sand naturally settles into a cone-shaped pile when poured from a small aperture. Its height depends on the humidity and adhesion between granules. The angle of elevation of a pile, *θ*, is called the angle of repose. If the height of a pile of sand is 11 feet and its diameter is approximately 34 feet, determine the angle of repose. Round answer to nearest degree.   |  |  |  | | --- | --- | --- | |  | a. | 29o | |  | b. | 30o | |  | c. | 31o | |  | d. | 32o | |  | e. | 33o |  |  |  | | --- | --- | | *ANSWER:* | e | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multi-Mode (Multiple choice) | | *HAS VARIABLES:* | True | | *LEARNING OBJECTIVES:* | PREC.LARS.16.252 - Use inverse functions to solve for theta | | *DATE CREATED:* | 6/10/2014 4:24 PM | | *DATE MODIFIED:* | 4/13/2015 6:22 AM | |

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| 55. After leaving the runway, a plane's angle of ascent is 17o and its speed is 278 feet per second. How many minutes will it take for the airplane to climb to a height of 11,500 feet? Round answer to two decimal places.   |  |  |  | | --- | --- | --- | |  | a. | 0.69 minutes | |  | b. | 2.36 minutes | |  | c. | 0.72 minutes | |  | d. | 1.25 minutes | |  | e. | 1.81 minutes |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multi-Mode (Multiple choice) | | *HAS VARIABLES:* | True | | *LEARNING OBJECTIVES:* | PREC.LARS.16.256 - Application: Angle of ascent | | *DATE CREATED:* | 6/10/2014 4:24 PM | | *DATE MODIFIED:* | 4/13/2015 6:23 AM | |