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| 1. The graphs of *f*(*x*) and *g*(*x*) are given. For what values of *x* is *f*(*x*) = *g*(*x*)?  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | 2, 3 | |  | b. | 0 | |  | c. | –1 | |  | d. | –2, 5 | |  | e. | –2, 10 |  |  |  | | --- | --- | | *ANSWER:* | e | |

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| 2. Which of the following functions is neither even nor odd?  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  |  |  |  | | --- | --- | | *ANSWER:* | b | |

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| 3. If the point  is on the graph of an even function, what other point must also be on the graph?  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. | (0, 0) | |  | d. |  | |  | e. | None of these |  |  |  | | --- | --- | | *ANSWER:* | d | |

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| 4. If , evaluate the difference quotient .  ​   |  |  |  | | --- | --- | --- | |  | a. | 2*a* + *h* – 8 | |  | b. | 2*a* – 8 | |  | c. | 2*a* – *h* – 8 | |  | d. | *h* | |  | e. | none of these |  |  |  | | --- | --- | | *ANSWER:* | e | |

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| 5. A box with an open top is to be constructed from a rectangular piece of card board with dimensions *b* = 6 in. by *a* = 25 in. by cutting out equal squares of side *x* at each corner and then folding up the sides as in the figure.  ​  Express the volume *V* of the box as a function of *x.*  ​  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  |  |  |  | | --- | --- | | *ANSWER:* | e | |

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| 6. Find an expression for the function *y* = *f*(*x*) whose graph is the bottom half of the parabola  .  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  |  |  |  | | --- | --- | | *ANSWER:* | a | |

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| 7. A rectangle has perimeter 14 m. Express the area of the rectangle as a function *A*(*l*) of the length *l* of one of its sides.  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  |  |  |  | | --- | --- | | *ANSWER:* | a | |

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| 8. If , find and simplify , where *h* ≠ 0.  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  |  |  |  | | --- | --- | | *ANSWER:* | d | |

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| 9. Find the domain of the function.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  |  |  |  | | --- | --- | | *ANSWER:* | d | |

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| 10. Find the domain and sketch the graph of the function. What is its range?  ​  ​   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | ***D***: (–∞, ∞); ***R***: [–2, ∞) | b. | ***D***: (–∞, ∞); ***R***: (–∞, 0] | |  | c. | ***D***: (–∞, ∞); ***R***: [0, ∞) | d. | ***D***: (–∞, ∞); ***R***: (–∞, ∞) |  |  |  | | --- | --- | | *ANSWER:* | d | |

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| 11. Determine whether the function whose graph is given is even, odd, or neither.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | Even | |  | b. | Neither | |  | c. | Odd |  |  |  | | --- | --- | | *ANSWER:* | c | |

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| 12. Find the domain of the function  ​   |  |  |  | | --- | --- | --- | |  | a. | (–∞, ∞) | |  | b. | [, ∞) | |  | c. |  | |  | d. |  |  |  |  | | --- | --- | | *ANSWER:* | a | |

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| 13. Sandy wishes to have a rectangular garden in her backyard. She has 50 ft of fencing with which to enclose her garden. Letting *x* denote the width of the garden, find a function *f* in the variable *x* that gives the area of the garden.    ​   |  |  |  | | --- | --- | --- | |  | a. | *f*(*x*) = 50*x* – *x*2, 0 < *x* < 25 | |  | b. | *f*(*x*) = 25*x* – *x*2, 0 < *x* < 25 | |  | c. | *f*(*x*) = 50*x* – *x*2, 0 < *x* < 50 | |  | d. | *f*(*x*) = 25*x* – *x*2, 0 < *x* < 50 |  |  |  | | --- | --- | | *ANSWER:* | b | |

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| 14. The graph of the function *f*is given. State the value of *f*(2.7).  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | *f*(2.7) = –40 | |  | b. | *f*(2.7) = –10 | |  | c. | *f*(2.7) = 40 | |  | d. | *f*(2.7) = 0 | |  | e. | *f*(2.7) = 10 |  |  |  | | --- | --- | | *ANSWER:* | c | |

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| 15. The graph shown gives the weight of a certain person as a function of age. Find the age at which the person stopped an exercise program.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | 20 | |  | b. | 54 | |  | c. | 38 | |  | d. | 35 | |  | e. | 70 |  |  |  | | --- | --- | | *ANSWER:* | d | |

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| 16. In the function , what must be the value *d,* if *f*(3) = 1?  ​   |  |  |  | | --- | --- | --- | |  | a. | *d* = 25 | |  | b. | *d*= 23 | |  | c. | *d*= –23 | |  | d. | *d*= –1 | |  | e. | *d*= –25 |  |  |  | | --- | --- | | *ANSWER:* | c | |

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| 17. An open rectangular box with volume 4 m3 has a square base. Express the surface area of the box as a function *S*(*x*) of the length *x* of a side of the base.  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  |  |  |  | | --- | --- | | *ANSWER:* | b | |

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| 18. What is the equation of this graph?  ​  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  |  |  |  | | --- | --- | | *ANSWER:* | e | |

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| 19. Find *a*, such that the function  has the domain .  ​   |  |  |  | | --- | --- | --- | |  | a. | *a* = –9 | |  | b. | *a* = | |  | c. | *a* = – | |  | d. | *a* = 9 | |  | e. | *a* = 3 |  |  |  | | --- | --- | | *ANSWER:* | d | |

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| 20. Determine whether *f*is even, odd, or neither.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | neither | |  | b. | odd | |  | c. | even |  |  |  | | --- | --- | | *ANSWER:* | c | |

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| 21. Find the domain.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | (0, 3) | |  | b. | (–∞, 0] | |  | c. | (–3, ∞] | |  | d. | [0, 3] | |  | e. | [0, ∞) |  |  |  | | --- | --- | | *ANSWER:* | d | |

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| 22. Find the range of the function.  ​  *y* = 4 + cos *x*  ​   |  |  |  | | --- | --- | --- | |  | a. | (–∞, ∞) | |  | b. | ​(2, ∞) | |  | c. | ​[–1, 1] | |  | d. | ​(–1, 3) | |  | e. | ​[3, 5] |  |  |  | | --- | --- | | *ANSWER:* | e | |

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| 23. Find the domain of the function.  ​     |  |  | | --- | --- | | *ANSWER:* | ​  ​  ​ | |

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| 24. Determine whether  *f*is even, odd, or neither.  ​     |  |  | | --- | --- | | *ANSWER:* | even | |

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| 25. Find the domain of the function.  ​     |  |  | | --- | --- | | *ANSWER:* | [–5, 5] | |

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| 26. Find the range of the function.  ​     |  |  | | --- | --- | | *ANSWER:* | 0 ≤ *​h*​(*​x*​) ≤ 6 | |

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| 27. The graphs of *f*(*x*) and *g*(*x*) are given.  a) For what values of *x* is *f*(*x*) = *g*(*x*)?  b) Find the values of *f*(–1) and *g*(12).  ​  ​   |  |  | | --- | --- | | *ANSWER:* | a) 2, 6 b)  ​  ​  ​  ​ | |

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| 28. A spherical balloon with radius *r* inches has volume .  Find a function that represents the amount of air required to inflate the balloon from a radius of *r* inches to a radius of *r* + 7 inches.  ​   |  |  | | --- | --- | | *ANSWER:* | ​  ​  ​  ​  ​  ​  ​ | |

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| 29. If  ​  find  *f* (–3),  *f* (0), and *f* (4).     |  |  | | --- | --- | | *ANSWER:* | *f* (–3) = 16,  *f* (0) = 7,  *f* (4) = 2. | |

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| 30. Refer to the graph of the function  *f* in the following figure.  ​  ​  **a.** Find *f* (0).  **b.** Find the value of *x* for which (i) *f*(*x*) = 1 and (ii)  *f*(*x*) = 0.  **c.** Find the domain and range of *f*.  ​  ​  ​   |  |  | | --- | --- | | *ANSWER:* | **a.** 0  **b.** (**i**) 1 (**ii**) 0, 2  **c.** ***D***: [0, 3], ***R***: [–3, 1] | |

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| 31. Determine whether the function is even, odd, or neither.  ​  ​   |  |  | | --- | --- | | *ANSWER:* | Neither | |

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| 32. The following figure shows a portion of the graph of a function  *f* defined on the interval [–1, 1]. Sketch the complete graph of  *f* if it is known  *f* is odd.  ​   |  |  | | --- | --- | | *ANSWER:* |  | |

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| 33. By cutting away identical squares from each corner of a rectangular piece of cardboard and folding up the resulting flaps, an open box can be made. If the cardboard is 18 in. long and 9 in. wide and the square cutaways have dimensions of *x* in. by *x* in., find a function that gives the volume of the resulting box.  ​   |  |  | | --- | --- | | *ANSWER:* |  | |

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| 34. Use the vertical line test to determine whether the curve is the graph of a function of *x*.  ​   |  |  | | --- | --- | | *ANSWER:* | Yes | |

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| 35. Find the domain and sketch the graph of the function. What is its range?  ​  ​   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | ***D***: (–∞, ∞); ***R***: [–1, ∞) | b. | ***D***: (–∞, ∞); ***R***: (–∞, 0] | |  | c. | ***D***: (–∞, ∞); ***R***: [0, ∞) | d. | ***D***: (–∞, ∞); ***R***: (–∞, ∞) |  |  |  | | --- | --- | | *ANSWER:* | d | |

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| 36. Sketch the graph of the function.  ​   |  |  | | --- | --- | | *ANSWER:* |  | |

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| 37. The graph of a function *g* is given. On what interval(s) is *g* increasing?     |  |  | | --- | --- | | *ANSWER:* |  | |

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| 38. Determine whether the statement is true or false.    If  and *f* is a decreasing function, then .   |  |  |  | | --- | --- | --- | |  | a. | True | |  | b. | False |  |  |  | | --- | --- | | *ANSWER:* | False | |

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| 39. Let  *f* be the function whose graph is given. Find the interval where the function is decreasing.       |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  |  |  |  | | --- | --- | | *ANSWER:* | a | |