

TEST BANK

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Precalculus

FUNCTIONS AND GRAPHS



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Chapter 2

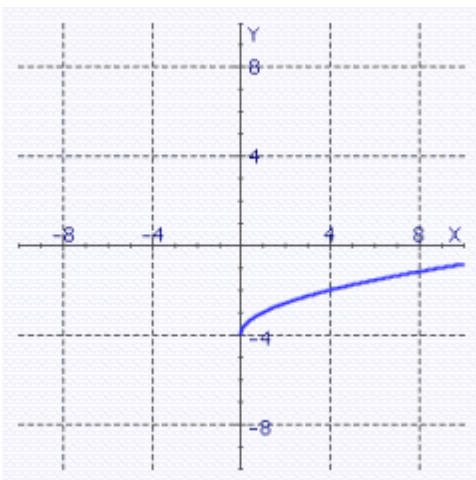
Multiple Choice

Identify the choice that best completes the statement or answers the question.

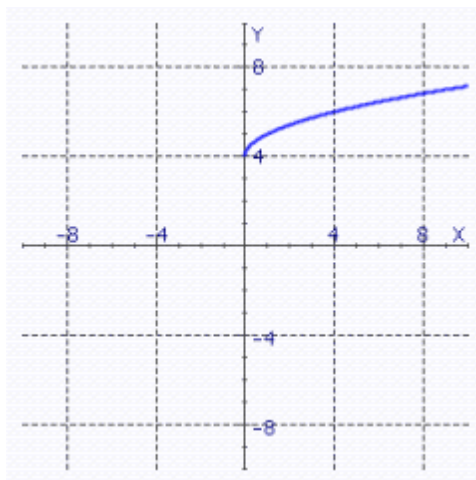
- ___ 1. Find the distance $d(A, B)$ between the points $A(1, -1)$ and $B(8, 1)$.
- a. 7.28
 - b. 6.28
 - c. 6.98
 - d. 7.78
 - e. 7.18
- ___ 2. Find the distance $d(A, B)$ between the points $A(6, 6)$ and $B(6, -4)$.
- a. 6
 - b. 0
 - c. 10
 - d. 4
- ___ 3. Find a formula that expresses the fact that $P(x, y)$ is a distance 2 away from the origin.
- a. $x + y^2 = 2$
 - b. $x^2 + y^2 = 2$
 - c. $x + y = 2$
 - d. $\sqrt{x + y} = 4$
 - e. $\sqrt{x^2 + y^2} = 2$
- ___ 4. Sketch the graph of the equation.

$$y = \sqrt{x} - 4$$

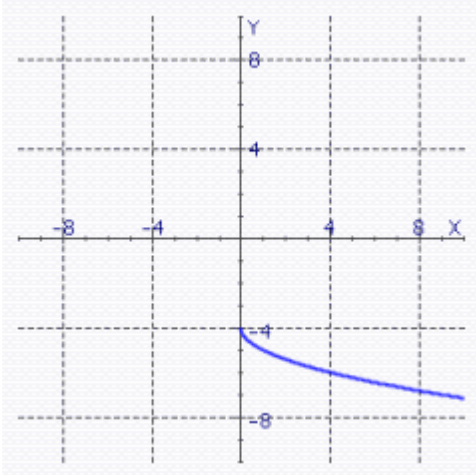
a.



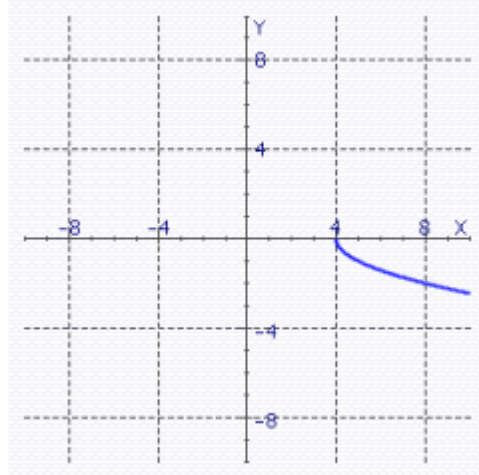
d.



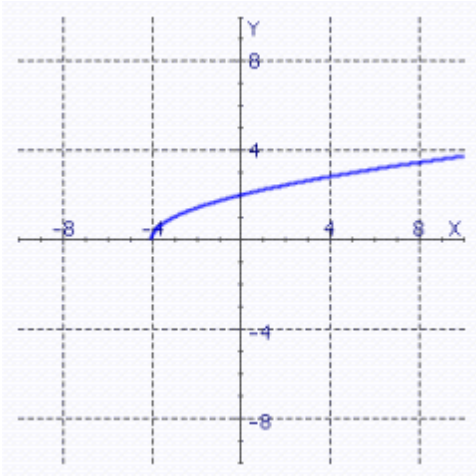
b.



e.



c.



_____ 5. Find an equation of the line that is tangent to the circle $x^2 + y^2 = 25$ at the point $P(3, 4)$.

a. $y = \frac{3}{4}x + \frac{25}{4}$

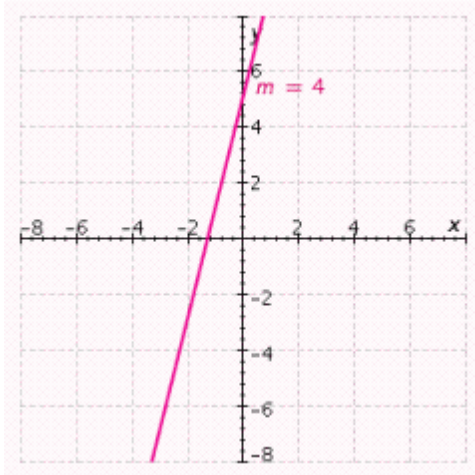
b. $y = -\frac{4}{3}x + \frac{25}{3}$

c. $y = -\frac{3}{4}x + \frac{25}{4}$

d. $y = \frac{3}{4}x - 25$

e. $y = -\frac{3}{4}x + 25$

_____ 6. Find an equation of the line shown in the figure.



- a. $y(x) = -4 + 5x$
- b. $y(x) = -4x + 5$
- c. $y(x) = 4x - 5$
- d. $y(x) = 4x + 5$
- e. $y(x) = 5x + 4$

___ 7. In exercise physiology, aerobic power P is defined in terms of maximum oxygen intake. For altitudes up to 1,800 meters, aerobic power is optimal—that is, 100%. Beyond 1,800 meters, P decreases linearly from the maximum of 100% to a value near 40% at 5,000 meters. Estimate aerobic power at the altitude of 2,400 meters.

- a. 72.5%
- b. 93.8%
- c. 72.6%
- d. 88.3%
- e. 88.75%

___ 8. Find the domain of f .

$$f(x) = \sqrt{x^2 - 9}$$

- a. $[3, \infty)$
- b. $(-\infty, -3] \cup [3, \infty)$
- c. $(-\infty, -3) \cup (3, \infty)$
- d. $(-3, 3)$
- e. $[9, \infty)$

___ 9. Find the domain of f .

$$f(x) = \frac{8}{6x^2 + 18x - 108}$$

- a. $(-\infty, -6] \cup [3, \infty)$

- b. $(-\infty, -6) \cup (3, \infty)$
- c. $(-\infty, -6) \cup (-6, 3) \cup (3, \infty)$
- d. $(-\infty, -7] \cup [7, \infty)$
- e. $(-\infty, -7) \cup (-7, 7) \cup (7, \infty)$

___ 10. Simplify the difference quotient $\frac{f(x+h) - f(x)}{h}$, if $h \neq 0$ for

$$f(x) = x^2 + 4$$

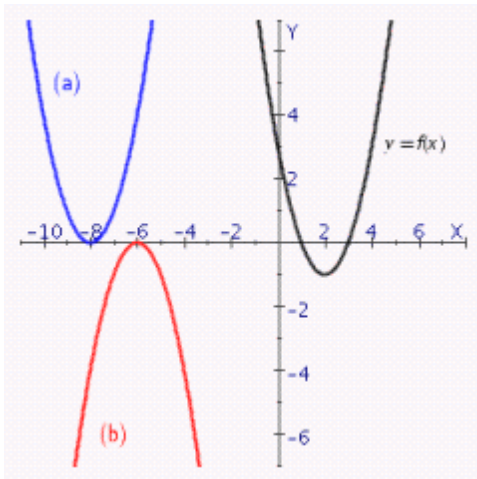
- a. $\frac{f(x+h) - f(x)}{h} = x + h$
- b. $\frac{f(x+h) - f(x)}{h} = 2x$
- c. $\frac{f(x+h) - f(x)}{h} = 2x + h$
- d. $\frac{f(x+h) - f(x)}{h} = 2x + h + 8$
- e. $\frac{f(x+h) - f(x)}{h} = 2x + h^2$

___ 11. If the point $P(3, 1)$ is on the graph of a function f , find the corresponding point on the graph of the function

$$y = -9f(x-2) + 1$$

- a. $(1, -3)$
- b. $(5, 10)$
- c. $(5, -8)$
- d. $(1, -8)$
- e. $(6, -9)$

___ 12. The graph of a function f is shown, together with graphs of two other functions (a) and (b). Use properties of symmetry, shifts, and reflecting to find equations for graphs (a) and (b) in terms of f .



- a. $y = f(x+1) + 10$

- b) $y = f(x + 1) + 8$
- b. a) $y = f(x + 10) + 1$
 b) $y = f(x + 8) - 1$
- c. a) $y = f(x - 8) + 1$
 b) $y = -f(x - 10) - 1$
- d. a) $y = f(x + 1) + 10$
 b) $y = -f(x + 1) + 8$
- e. a) $y = f(x + 10) + 1$
 b) $y = -f(x + 8) + 1$

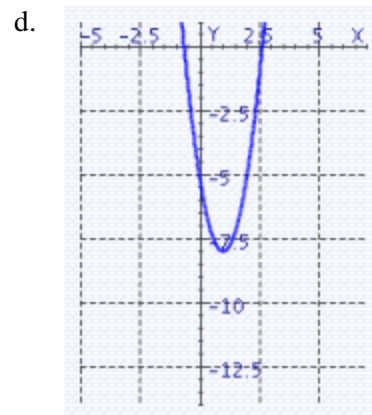
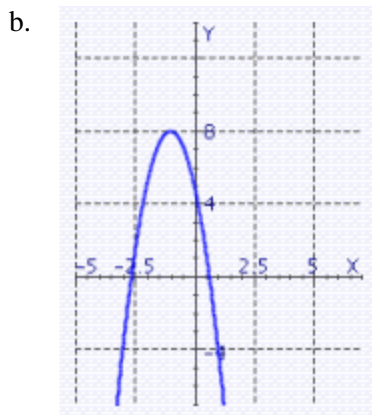
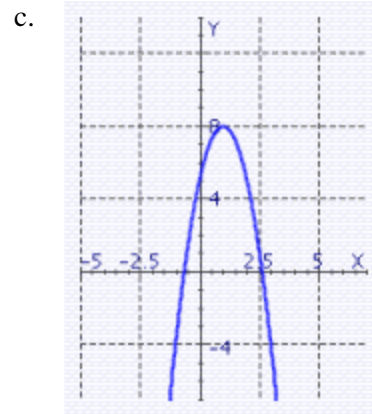
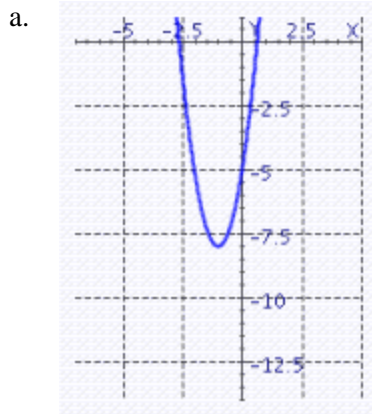
___ 13. Let $y = f(x)$ be a function with domain $D = [-10, -9]$ and range $R = [-10, -7]$. Find the domain D and range R for the function

$$y = |f(x)|$$

- a. $D = [-10, -9], R = [-7, 10]$
- b. $D = [9, 10], R = [-10, -7]$
- c. $D = [9, 10], R = [-10, 7]$
- d. $D = [9, 10], R = [7, 10]$
- e. $D = [-10, -9], R = [7, 10]$

___ 14. Sketch the graph of the function.

$$f(x) = 3x^2 - 6x - 5$$



___ 15. Find two positive real numbers whose sum is 48 and whose product is a maximum.

- a. 24 and 24
- b. 44 and 4
- c. 2 and 46
- d. 27 and 21
- e. 31 and 17

_____ 16. An object is projected vertically upward with an initial velocity of v_0 ft/sec, and its distance $s(t)$ in feet above the ground after t seconds is given by the formula $s(t) = -16t^2 + v_0t$. If the object hits the ground after 15 seconds, find its initial velocity v_0 in ft/sec.

- a. 209 ft/sec
- b. 226 ft/sec
- c. 17 ft/sec
- d. 240 ft/sec
- e. 256 ft/sec

_____ 17. Find $(f + g)(3)$.

$$f(x) = 8x + 2, \text{ and } g(x) = x^2$$

- a. $(f + g)(3) = 32$
- b. $(f + g)(3) = 33$
- c. $(f + g)(3) = 19$
- d. $(f + g)(3) = 39$
- e. $(f + g)(3) = 35$

_____ 18. Find $(f / g)(5)$.

$$f(x) = -x^2, \text{ and } g(x) = 6x - 2$$

- a. $(f / g)(5) = -\frac{5}{4}$
- b. $(f / g)(5) = -\frac{25}{28}$
- c. $(f / g)(5) = \frac{5}{14}$
- d. $(f / g)(5) = \frac{25}{28}$
- e. $(f / g)(5) = -\frac{5}{14}$

_____ 19. Find the domain of $f \circ g$.

$$f(x) = \sqrt{x+7}, \text{ and } g(x) = \sqrt{x+7}$$

- a. $(-\infty, -7)$

- b. $(-\infty, -7]$
- c. $(-\infty, 7)$
- d. $[-7, \infty)$
- e. $(-7, \infty)$

____ 20. Find the domain of fg .

$$f(x) = \frac{3x}{x-5}, \text{ and } g(x) = \frac{x}{x+1}$$

- a. $(-\infty, -1) \cup (-1, 5) \cup (5, \infty)$
- b. $(-\infty, -1] \cup [5, \infty)$
- c. $(-\infty, 1] \cup [-5, \infty)$
- d. $(-1, 5)$
- e. $(-\infty, 1) \cup (-5, \infty)$

____ 21. Find $(f \circ g)(x)$.

$$f(x) = x^2 - 4x, \text{ and } g(x) = \sqrt{x+9}$$

- a. $(f \circ g)(x) = x + 9 - 4\sqrt{x+9}$
- b. $(f \circ g)(x) = \sqrt{x^2 - 4x}$
- c. $(f \circ g)(x) = \sqrt{x^2 - 4x} + 9$
- d. $(f \circ g)(x) = (x^2 - 4x)\sqrt{x+9}$
- e. $(f \circ g)(x) = \sqrt{x^2 - 4x + 9}$

____ 22. Several values of two functions T and S are listed in the following tables:

t	0	1	2	3
$T(t)$	2	3	1	0

x	0	1	2	3
$S(x)$	1	0	3	2

Find:

$$(S \circ S)(3)$$

- a. $(S \circ S)(3) = 0$
- b. $(S \circ S)(3) = 3$
- c. $(S \circ S)(3) = 2$
- d. $(S \circ S)(3) = 1$
- e. not possible

____ 23. The volume of a conical pile of sand is increasing at a rate of 576π ft³/min, and the height of the pile always equals the radius r of the base. Express r as a function of time t (in minutes), assuming that $r = 0$ when $t = 0$.

- a. $r = 12\sqrt[3]{t}$
- b. $r = \sqrt[3]{576\pi t}$
- c. $r = \sqrt[3]{12t}$
- d. $r = 576\pi\sqrt[3]{t}$
- e. $r = 576\sqrt[3]{\pi t}$

____ 24. Find a composite function form for y if:

$$y = 4 + \sqrt{x^2 + 3}$$

- a. $u = x^2, y = 4 + \sqrt[3]{u}$
- b. $u = x^2 + 3, y = \sqrt[4]{u}$
- c. $u = x^2 + 3, y = 4 + u$
- d. $u = x^2 + 3, y = \sqrt{u}$
- e. $u = x^2 + 3, y = 4 + \sqrt{u}$

____ 25. Find $(g \circ f)(x)$

$$f(x) = 6x - 7, \quad g(x) = 4x^2 - x + 2$$

- a. $(g \circ f)(x) = 24x^2 - 6x + 5$
- b. $(g \circ f)(x) = 24x^2 - 7x + 2$
- c. $(g \circ f)(x) = 24x^3 - 34x^2 + 7x + 14$
- d. $(g \circ f)(x) = 144x^2 - 342x + 205$
- e. $(g \circ f)(x) = 4x^2 - 7x + 9$

Chapter 2

Answer Section

MULTIPLE CHOICE

1. ANS: A	PTS: 1	MSC: scat12.03.01.4.09am
2. ANS: C	PTS: 1	MSC: scat12.03.01.4.12am
3. ANS: E	PTS: 1	MSC: scat12.03.01.4.25m
4. ANS: A	PTS: 1	MSC: scat12.03.02.4.19m
5. ANS: C	PTS: 1	MSC: scat12.03.03.4.50m
6. ANS: D	PTS: 1	MSC: scat12.03.03.4.46m
7. ANS: E	PTS: 1	MSC: scat12.03.03.4.60m
8. ANS: B	PTS: 1	MSC: scat12.03.04.4.24m
9. ANS: C	PTS: 1	MSC: scat12.03.04.4.26m
10. ANS: C	PTS: 1	MSC: scat12.03.04.4.49m
11. ANS: C	PTS: 1	MSC: scat12.03.05.4.29m
12. ANS: E	PTS: 1	MSC: scat12.03.05.4.43m
13. ANS: E	PTS: 1	MSC: scat12.03.05.4.63hm
14. ANS: D	PTS: 1	MSC: scat12.03.06.4.22cm
15. ANS: A	PTS: 1	MSC: scat12.03.06.4.43m
16. ANS: D	PTS: 1	MSC: scat12.03.06.4.42am
17. ANS: E	PTS: 1	MSC: scat12.03.07.4.01am
18. ANS: B	PTS: 1	MSC: scat12.03.07.4.02dm
19. ANS: E	PTS: 1	MSC: scat12.03.07.4.05cm
20. ANS: A	PTS: 1	MSC: scat12.03.07.4.07bm
21. ANS: A	PTS: 1	MSC: scat12.03.07.4.21am
22. ANS: B	PTS: 1	MSC: scat12.03.07.4.38m
23. ANS: A	PTS: 1	MSC: scat12.03.07.4.47m
24. ANS: E	PTS: 1	MSC: scat12.03.07.4.56m
25. ANS: D	PTS: 1	MSC: scat12.03.07.4.16bm