

Precalculus with Limits (Larson 2nd ed.) Chapter 1 Mid-Term Exam Review

Multiple Choice

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

1. Find the distance between the two points $(-5, 8)$ and $(19, 53)$.

a. 153 b. 99 c. 102 d. 51 e. 48

2. Find the midpoint between the two points $(2, 7)$ and $(4, -19)$.

a. $(3, -6)$ b. $(-1, -13)$ c. $(-1, -6)$ d. $(3, -13)$ e. $(6, -6)$

3. Write the standard form of the equation of the circle with the given characteristics.

center: $(3, 1)$; radius: 4

a. $(x-1)^2 + (y-3)^2 = 4$ b. $(x-1)^2 + (y-3)^2 = 16$ c. $(x+3)^2 + (y+1)^2 = 16$
d. $(x-3)^2 + (y-1)^2 = 16$ e. $(x+1)^2 + (y+3)^2 = 4$

4. Write the standard form of the equation of the circle with the given characteristics.

center: $(-4, 4)$; solution point: $(-2, -6)$

a. $(x-4)^2 + (y+4)^2 = 80$ b. $(x-4)^2 + (y+4)^2 = 104$
c. $(x+4)^2 + (y-4)^2 = 104$ d. $(x-4)^2 + (y-4)^2 = 8$ e. $(x+4)^2 + (y+4)^2 = 80$

5. Find the center and radius of the circle $x^2 + y^2 = 144$.

a. center: $(0, 0)$, radius: 10 b. center: $(-1, -1)$, radius: 12 c. center: $(0, 0)$, radius: 12
d. center: $(-1, 1)$, radius: 10 e. center: $(-12, -10)$, radius: 12

6. Find the center and radius of the circle $(x-4)^2 + (y-9)^2 = 49$.

a. center: $(4, 9)$, radius: 49 b. center: $(9, 4)$, radius 7 c. center: $(4, 9)$, radius 7
d. center: $(-4, -9)$, radius 7 e. center: $(-4, -9)$, radius 49

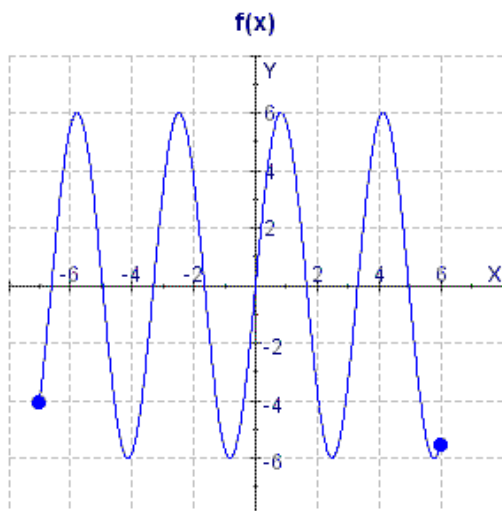
7. What is the domain of the function $f(x) = \frac{7}{4x+12}$?

a. $(-\infty, -3] \cup [-3, \infty)$ b. $(-\infty, \infty)$ c. $(-\infty, -4] \cup [-4, \infty)$ d. $(-\infty, -3) \cup (-3, \infty)$ e. $(-\infty, -4) \cup (-4, \infty)$

8. What is the domain of the function $f(x) = \frac{x+6}{x^2-9}$?

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

9. What is the domain and range of the function that is graphed below?



- a. Domain: $(-7, 6)$, Range: $[-6, 6]$
- b. Domain: $(-\infty, \infty)$, Range: $[-6, 6]$
- c. Domain: $[-7, 6]$, Range: $[-6, 6]$
- d. Domain: $[-7, 6]$, Range: $(-\infty, \infty)$
- e. Domain: $[-6, 6]$, Range: $[-7, 6]$

10. What is the average rate of change of the function $f(x) = 3x - 7$ between $x = 2$ and $x = 3$?

- a. 0
- b. 4
- c. 2
- d. 6
- e. 3

11. What is the average rate of change of the function $f(t) = t^2 - 3t$ between $t = -4$ and $t = -3$?

- a. -10
- b. -2
- c. -4
- d. -8
- e. -7

12. Suppose the graph of f is given. Describe how the graph of the function can be obtained from the graph of f .

$$y = 4f(x + 5) - 3$$

- a. Shift the graph of $y = f(x)$ to the right 4 units, stretch vertically by a factor of 5, and then shift downward 3 units.
- b. Shift the graph of $y = f(x)$ to the left 4 units, stretch vertically by a factor of 5, and then shift downward 3 units.
- c. Shift the graph of $y = f(x)$ to the right 5 units, stretch vertically by a factor of 4, and then shift downward 3 units.
- d. Shift the graph of $y = f(x)$ to the left 5 units, stretch vertically by a factor of 4, and then shift upward 3 units.
- e. Shift the graph of $y = f(x)$ to the left 5 units, stretch vertically by a factor of 4, and then shift downward 3 units.

13. Use $f(x) = 2x - 8$ and $g(x) = 4 - x^2$ to evaluate $f(g(-1))$.

- a. -2
- b. 6
- c. -28
- d. -7
- e. -96

14. Is the line through points $P(0, 5)$ and $Q(-1, 8)$ parallel to the line through points $R(3, 3)$ and $S(5, -1)$? Explain.

- a. No, the lines have unequal slopes.
- b. Yes; the lines are both vertical.
- c. Yes; the lines have equal slopes.
- d. No, one line has slope, the other has no slope.

15. Which two lines are parallel?

I. $5y = -3x - 5$

II. $5y = -1 - 3x$

III. $3y - 2x = -1$

a. I and II

b. I and III

c. II and III

d. No two of the lines are parallel.

16. Is the line through points $P(0, -9)$ and $Q(2, -8)$ perpendicular to the line through points $R(1, 4)$ and $S(3, 3)$? Explain.

a. Yes; their slopes are equal.

c. No; their slopes are not opposite reciprocals.

b. Yes; their slopes have product -1

d. No; their slopes are not equal.

17. A man is running around a circular track 200 m in circumference. An observer uses a stopwatch to time each lap, obtaining the data in the table as follows:

What was the man's average speed (rate) between 68 s and 168 s?

a. 4 m/s

b. 1.82 m/s

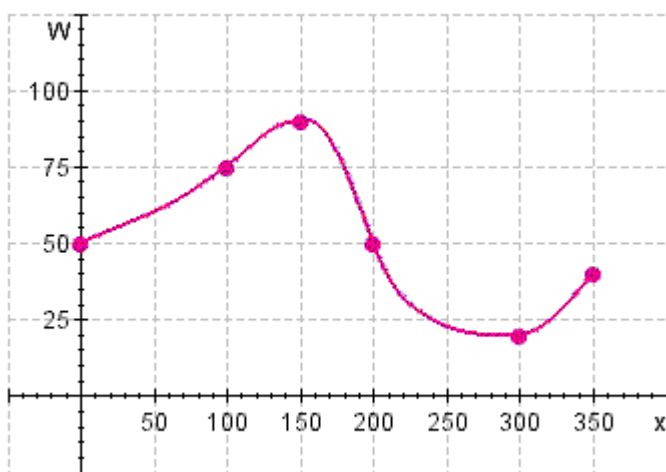
c. 3 m/s

d. 8m/s

e. 5 m/s

Time (s)	Distance (m)
30	200
68	400
114	600
168	800
230	1000
300	1200
378	1400

18. The graph shows the depth of water W in a reservoir over a one-year period, as a function of the number of days x since the beginning of the year. What was the average rate of change in W between $x = 100$ and $x = 200$?



a. -0.35

b. -0.245

c. -0.2

d. -0.26

e. -0.25

19. If $g(x) = 2x + 1$, find an equation for $g^{-1}(x)$.

a. $g^{-1}(x) = \frac{1}{2}x + 1$

b. $g^{-1}(x) = \frac{1}{2}x + \frac{1}{2}$

c. $g^{-1}(x) = \frac{1}{2}x - \frac{1}{2}$

d. $g^{-1}(x) = -\frac{1}{2}x - 1$

e. $g^{-1}(x) = \frac{1}{2}x - 1$

20. What is the distance between the center of the circle $(x - 1)^2 + (y + 4)^2 = 16$ the vertex of the parabola $y - 4 = (x - 1)^2$?

a. 4

b. 6

c. 2

d. 8

e. 10

Short Answer

21. Evaluate the function, $q(x) = \frac{-2x}{3x+5}$, at the specified value of the independent variable and then simplify.

$$q(y-3)$$

22. Find the domain of the function.

$$q(s) = \frac{8s}{s-6}$$

23. Describe the sequence of transformations from the related common function $f(x) = x^3$ to g .

$$g(x) = 4(x-4)^3$$

24. Describe the sequence of transformations from the related common function $f(x) = \sqrt{x}$ to g .

$$g(x) = -\sqrt{x} + 6$$

25. Write an equation for the function that is described by the following characteristics:

the shape of $f(x) = x^2$, but moved eight units down, two units to the left, and then reflected in the x -axis

26. Find $(f+g)(x)$ when $f(x) = 2x^2 - 2x + 7$ and $g(x) = 4x^2 - 2x + 9$.

27. Find $(f/g)(x)$ when $f(x) = x^2 + 7x$ and $g(x) = -2 - x$.

28. Evaluate the indicated function for $f(x) = x^2 - 3$ and $g(x) = x + 7$. Find $(fg)(1)$.

29. Find $g \circ f$ when $f(x) = x - 3$ and $g(x) = x^2$

30. Find $f \circ g$ when $f(x) = -2x + 7$ and $g(x) = x + 2$

31. Evaluate $g(n-5)$ if $g(x) = \frac{x^2 - 6}{2x}$.

32. Given $f(x) = x^2 + 3$ and $g(x) = \frac{x+5}{x}$. Find $(g \circ f)(4)$.

[Hint: $(g \circ f)(4) = g(f(4))$]

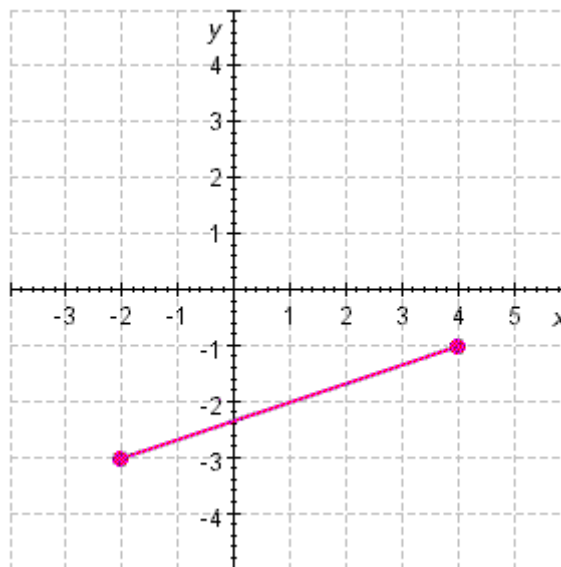
33. Find the inverse function of f .

$$f(x) = x^5 + 2$$

34. A pair of points is graphed.

(a) Find the distance between them.

(b) Find the midpoint of the segment that joins them.



35. Find the domain of the function.

$$h(x) = \sqrt{8x - 7}$$

36. Find the domain of the function.

$$k(x) = \frac{\sqrt{x+5}}{x-1}$$

37. Use $f(x) = 2x - 6$ and $g(x) = 5 - x^2$ to evaluate the expression.

(a) $f(g(1)) =$ _____ (b) $g(f(1)) =$ _____

38. Use $f(x) = 2x - 5$ and $g(x) = 12 - x^2$ to evaluate the expression.

(a) $(f \circ f)(-1) =$ _____ (b) $(g \circ g)(4) =$ _____

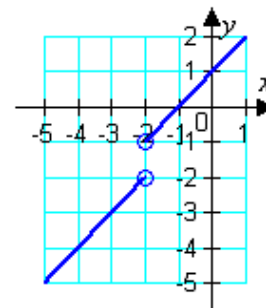
39. Find the domain and range of the **inverse** of each function.

a. $y = \sqrt{3x+1}$

b. $\sqrt{5x-15}$

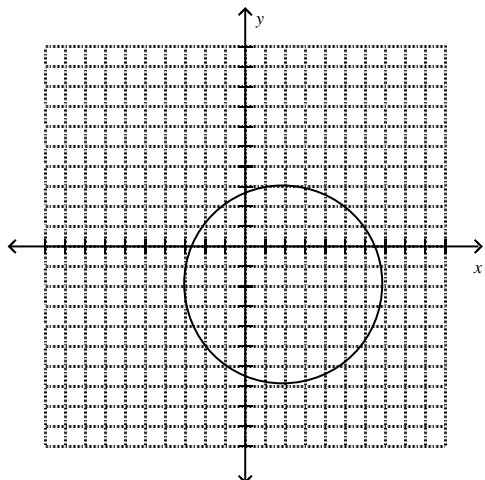
40. Is $\triangle PQR$, with vertices at $P(3, 3)$, $Q(2, -2)$, and $R(0, 1)$, a right triangle?

41. Use the graph of the function to find the domain and range of f .

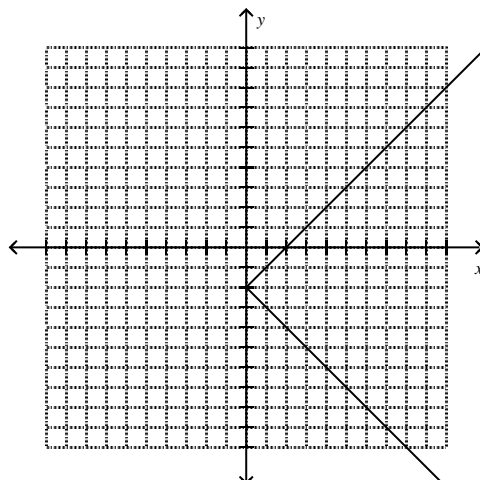


42-43. Use the graph to determine the domain and range of the relation, and state whether the relation is a function.

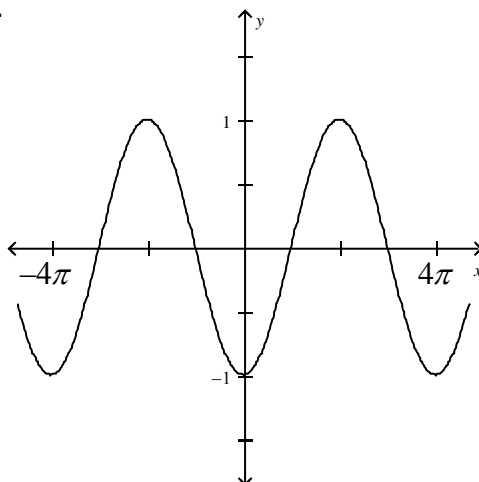
42.



43.



44. Use the graph to determine the domain and range of the function and state whether the function has an inverse.



45. Given $f(x) = x^2 + 7$ and $g(x) = \frac{x-4}{x}$. Find $(g \circ f)(-1)$.

[Hint: $(g \circ f)(4) = g(f(4))$]

46. Are the lines parallel, perpendicular, or neither?

a. $y = 4x + 5$

b. $2x + y = 2$

c. $3x - 5y = 3$

d. $4x - 3y = 36$

$y = -\frac{1}{4}x + 5$

$2x + y = 5$

$-5x - 13y = 8$

$3x + 4y = 20$

47. A rock is dropped off the edge of a cliff. After 2 seconds, the rock fell 25 ft. After 4 seconds the rock fell 65 ft from the edge. What is the average rate of falling per second?

48. Find each of the following given that $f(x) = x^2 + 1$ and $g(x) = x - 4$.

a. $(f + g)(2)$

b. $(f - g)(2)$

c. $(fg)(2)$

d. $(f/g)(2)$

Chapter 1 Mid Term Exam Review

2011-2012

Answer Section

MULTIPLE CHOICE

- | | | | | | |
|-------|-------|-------|-------|-------|-------|
| 1. D | 2. A | 3. D | 4. C | 5. C | 6. C |
| 7. D | 8. A | 9. C | 10. E | 11. A | 12. E |
| 13. A | 14. A | 15. A | 16. C | 17. A | 18. E |
| 19. C | 20. D | | | | |

SHORT ANSWER

21. $\frac{-2y+6}{3y-4}$ 22. all real numbers $s \neq 6$
23. horizontal shift 4 units right; then vertical stretch by a factor of 4
24. reflection in the x-axis; then vertical shift 6 units up
25. $g(x) = -(x+2)^2 - 8$ 26. $(f+g)(x) = 6x^2 - 4x + 16$
27. $(f/g)(x) = \frac{x^2+7x}{-2-x}, x \neq -2$ 28. -16
29. $(g \circ f)(x) = x^2 - 6x + 9$ 30. $(f \circ g)(x) = -2x + 3$ 31. $\frac{x^2 - 10x + 19}{2x - 10}$
32. $\frac{24}{19}$ 33. $f^{-1}(x) = \sqrt[5]{x-2}$ 34. $2\sqrt{10}; (1, -2)$
35. $\left[\frac{7}{8}, \infty\right)$ 36. $[-5, 1) \cup (1, \infty)$ 37. 2; -11 38. -19; -4
39. domain: $[0, \infty)$, range: $[-\frac{1}{3}, \infty)$ 40. Yes 41. domain: $(-\infty, -2) \cup (-2, \infty)$
domain: $[0, \infty)$, range: $[3, \infty)$ range: $(-\infty, -2) \cup (-1, \infty)$
42. Domain: $[-3, 7]$ 43. Domain: $[0, \infty)$
Range: $[-7, 3]$ Range: $(-\infty, \infty)$
No, it fails the vertical line test. No, it fails the vertical line test.
44. Domain: $(-\infty, \infty)$ 45. $\frac{1}{2}$
Range: $[-1, 1]$
No, it is not one-to-one. It fails the horizontal line test and does not have an inverse.
46. a. perpendicular b. parallel c. neither d. perpendicular
47. 20 ft/sec 48. a. 3 b. 7 c. -10 d. -5/2