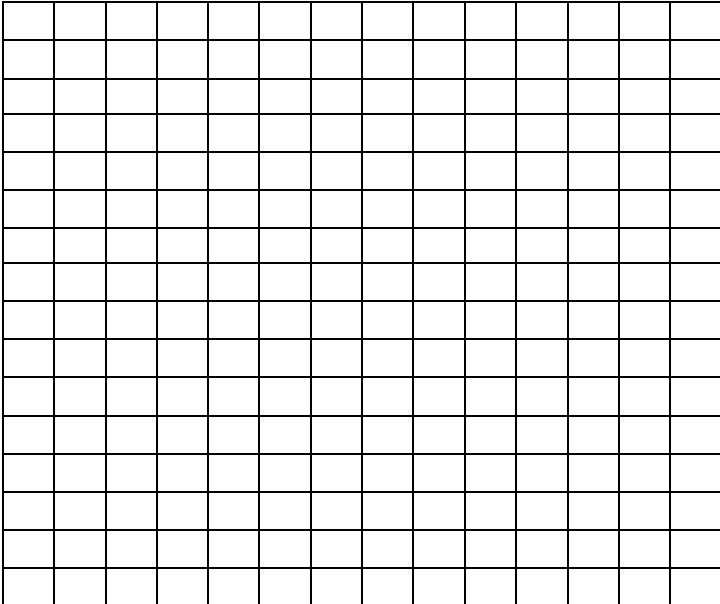


Student Name	Estimated Percentage	Actual MC Score (75)	Actual FR Score (25)	Actual Total Score
Estimate your percentage on this midterm out of 100%. If you are within 3%, you will be given 2 points of extra credit.				

Directions: You must show all work in order to receive full credit.

51. Given the rational function, find the domain, vertical asymptotes, holes, zeros, y-intercept, and horizontal asymptote. If any of these do not exist, write “none.” Sketch an accurate graph of the function based on all of your findings. You may use a calculator to check the accuracy of your graph.

$$g(x) = \frac{2x^2 - 10x + 12}{x^2 - 4}$$

<u>D</u>		<u>GRAPH:</u> 
<u>VA</u>		
<u>Holes</u>		
<u>Zeros</u>		
<u>y-int</u>		
<u>HA</u>		

SPC Midterm Review--On the exam, each problem is worth 1.5 points, so this multiple-choice section is worth 75 points total. This review is identical in format to the midterm exam. Only the actual numerical values are different. The midterm is 50 multiple-choice questions and a single free-response problem. YOU ARE REQUIRED TO BRING A PENCIL FOR THE EXAM SO THAT YOU CAN FILL OUT YOUR SCANTRON.

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Solve the equation.

1) $10y = 3y + 9 + 6y$

A) $y = -9$

B) $y = 90$

C) $y = 9$

D) $y = -90$

1) _____

2) $(y - 5) - (y + 4) = 10y$

A) $y = -\frac{1}{10}$

B) $y = -\frac{1}{8}$

C) $y = -\frac{9}{8}$

D) $y = -\frac{9}{10}$

2) _____

Find the slope of the line through the pair of points.

3) (1, 7) and (5, 9)

A) 2

B) $\frac{1}{2}$

C) $-\frac{1}{2}$

D) $\frac{8}{3}$

3) _____

4) (8, -6) and (5, -6)

A) 4

B) 0

C) $-\frac{12}{13}$

D) Undefined

4) _____

Find a slope-intercept form equation for the line.

5) Through (4, 3), with slope $-\frac{2}{7}$

A) $y = \frac{2}{7}x - \frac{29}{7}$

B) $y = -\frac{2}{7}x + \frac{8}{7}$

C) $y = \frac{2}{7}x + \frac{8}{7}$

D) $y = -\frac{2}{7}x + \frac{29}{7}$

5) _____

6) Through the points (2, 4) and (-2, 7)

A) $y = -\frac{3}{2}x + \frac{11}{2}$

B) $y = -\frac{3}{4}x + \frac{11}{2}$

C) $y = -\frac{3}{4}x + \frac{11}{4}$

D) $y = -\frac{3}{4}x - \frac{11}{2}$

6) _____

Determine the equation of the line described. Put answer in the slope-intercept form, if possible.

7) Through (-8, 9), perpendicular to $9x + 5y = -27$

A) $y = \frac{5}{9}x$

B) $y = \frac{9}{5}x - 121$

C) $y = -\frac{5}{9}x - \frac{121}{9}$

D) $y = \frac{5}{9}x + \frac{121}{9}$

7) _____

8) Through $(-9, -5)$, parallel to $-6x + 5y = 59$

A) $y = \frac{6}{5}x + \frac{29}{5}$

B) $y = \frac{9}{5}x + \frac{59}{5}$

C) $y = -\frac{6}{5}x - \frac{29}{5}$

D) $y = \frac{5}{6}x + \frac{5}{6}$

8) _____

Solve the problem.

9) Suppose the sales of a particular brand of appliance satisfy the relationship $S(x) = 70x + 2300$, where $S(x)$ represents the number of sales in year x , with $x = 0$ corresponding to 1982. Find the number of sales in 1998.

A) 3350

B) 6770

C) 6840

D) 3420

9) _____

10) Let $C(x) = 900 + 30x$ be the cost to manufacture x items. Find the average cost per item to produce 80 items. Round to the nearest dollar.

A) \$2480

B) \$41

C) \$2613

D) \$349

10) _____

Solve the equation by factoring.

11) $x^2 - x = 12$

A) $x = 3$ or $x = 4$

B) $x = -3$ or $x = -4$

C) $x = -3$ or $x = 4$

D) $x = 1$ or $x = 12$

11) _____

12) $4x^2 - 35x - 9 = 0$

A) $x = -4$ or $x = 9$

B) $x = -\frac{1}{4}$ or $x = 9$

C) $x = \frac{11}{35}$ or $x = -4$

D) $x = -\frac{1}{4}$ or $x = 4$

12) _____

13) $12x^2 - 4x = 0$

A) $x = \frac{1}{3}$ or $x = 0$

B) $x = 0$

C) $x = \frac{1}{3}$ or $x = -\frac{1}{3}$

D) $x = -\frac{1}{3}$ or $x = 0$

13) _____

Solve the equation using the quadratic formula.

14) $7x^2 + 12x + 1 = 0$

A) $x = \frac{-6 + \sqrt{29}}{14}$ or $x = \frac{-6 - \sqrt{29}}{14}$

B) $x = \frac{-6 + \sqrt{43}}{7}$ or $x = \frac{-6 - \sqrt{43}}{7}$

C) $x = \frac{-6 + \sqrt{29}}{7}$ or $x = \frac{-6 - \sqrt{29}}{7}$

D) $x = \frac{-12 + \sqrt{29}}{7}$ or $x = \frac{-12 - \sqrt{29}}{7}$

14) _____

15) $x^2 - 10x + 2 = 0$

A) $x = 5 - \sqrt{23}$ or $x = 5 + \sqrt{23}$

B) $x = 5$

C) $x = 5 - \sqrt{27}$ or $x = 5 + \sqrt{27}$

D) $x = -5 - \sqrt{23}$ or $x = -5 + \sqrt{23}$

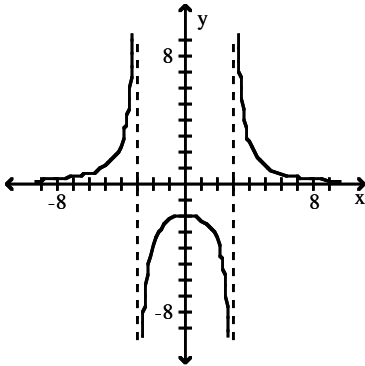
15) _____

Match the equation with the appropriate graph.

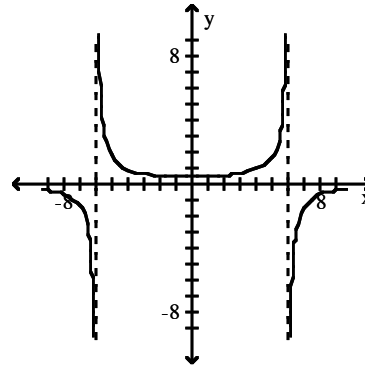
27) $f(x) = \frac{18}{x^2 - 9}$

27) _____

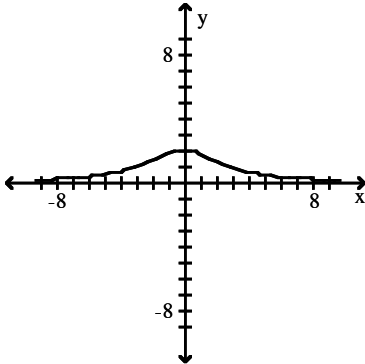
A)



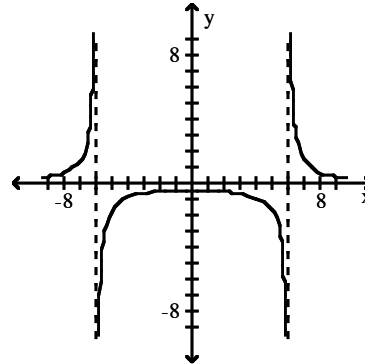
B)



C)



D)



Find the asymptote(s) of the given function.

28) $h(x) = \frac{(x-2)(x+5)}{x^2 - 9}$ vertical asymptotes(s)

28) _____

A) $x = -2, x = 5$

B) None

C) $x = 2, x = -5$

D) $x = 3, x = -3$

29) $f(x) = \frac{x-8}{x^2 + 7x}$ vertical asymptotes(s)

29) _____

A) $x = 7$

B) $x = -7$

C) $x = 8$

D) $x = 0, x = -7$

30) $h(x) = \frac{7x^2}{7x^2 - 5}$ horizontal asymptotes(s)

30) _____

A) $y = \sqrt{5}$

B) $y = 1$

C) None

D) $y = 5$

31) $g(x) = \frac{x+3}{x^2 - 1}$ horizontal asymptotes(s)

31) _____

A) $y = 0$

B) $y = 1$

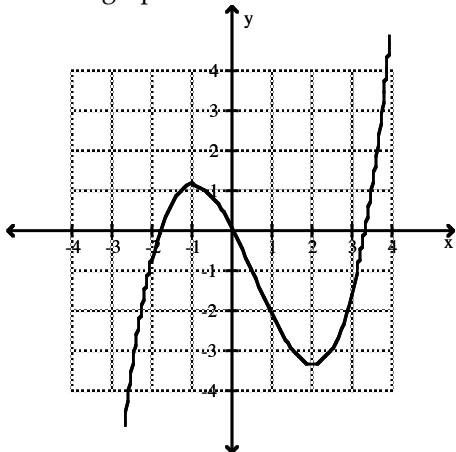
C) $y = -3$

D) None

Solve the problem.

32) Use the graph of f to estimate the local maximum and local minimum.

32) _____

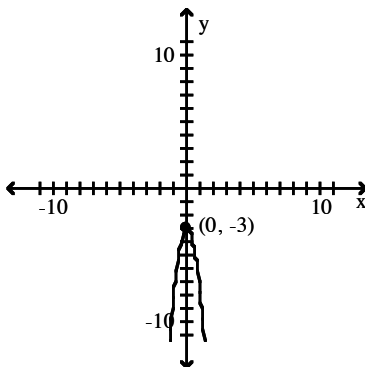


- A) Local maximum: approx. 1.17; local minimum: approx. -3.33
- B) No local maximum; no local minimum
- C) Local maximum: ∞ ; local minimum: $-\infty$
- D) Local maximum: -1; local minimum: 2

Determine the intervals on which the function is increasing, decreasing, and constant.

33)

33) _____



- A) Increasing on $(0, \infty)$; Decreasing on $(-\infty, 0)$
- B) Increasing on $(-\infty, 0)$; Decreasing on $(-\infty, 0)$
- C) Increasing on $(\infty, 0)$; Decreasing on $(0, -\infty)$
- D) Increasing on $(-\infty, 0)$; Decreasing on $(0, \infty)$

Divide $f(x)$ by $d(x)$, and write a summary statement in the form indicated.

34) $f(x) = x^2 - 2x + 6$; $d(x) = x - 3$ (Write answer in fractional form)

34) _____

A) $\frac{f(x)}{(x-3)} = (x+1) + \frac{3}{(x-3)}$

B) $\frac{f(x)}{(x-3)} = (x-3) + \frac{9}{(x-3)}$

C) $\frac{f(x)}{(x-3)} = (x-3) + \frac{3}{(x-3)}$

D) $\frac{f(x)}{(x-3)} = (x+1) + \frac{9}{(x-3)}$

35) $f(x) = x^3 - 3$; $d(x) = x + 4$ (Write answer in fractional form)

35) _____

A) $\frac{f(x)}{(x+4)} = (x^2 + 4x + 16) + \frac{-64}{(x+4)}$

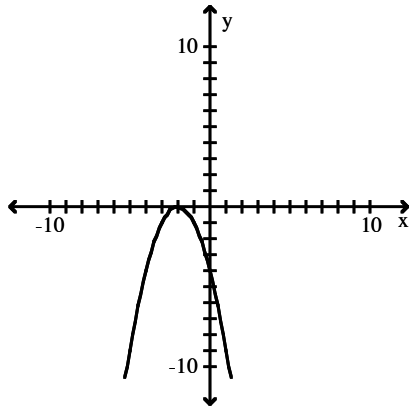
B) $\frac{f(x)}{(x+4)} = (x^2 - 4x + 16) + \frac{-67}{(x+4)}$

C) $\frac{f(x)}{(x+4)} = (x^2 - 4x + 16) + \frac{-64}{(x+4)}$

D) $\frac{f(x)}{(x+4)} = (x^2 + 4x + 16) + \frac{-67}{(x+4)}$

Match the function with the graph.

36)



A) $g(x) = -x^2 + 2$

C) $g(x) = -x^2 - 2$

B) $g(x) = (x - 2)^2$

D) $g(x) = -(x + 2)^2$

36) _____

Divide using synthetic division, and write a summary statement in fraction form.

37) $\frac{2x^3 + 3x^2 + 4x - 10}{x + 1}$

A) $2x^2 + 5x + 9 + \frac{-1}{x + 1}$

C) $2x^2 + 5x + 9 + \frac{1}{x + 1}$

B) $2x^2 + x + 3 + \frac{13}{x + 1}$

D) $2x^2 + x + 3 + \frac{-13}{x + 1}$

37) _____

38) $\frac{3x^5 + 4x^4 + 2x^2 - 1}{x + 2}$

A) $3x^4 - 2x^3 + 4x^2 + 6 + \frac{-13}{x + 2}$

C) $3x^4 + 2x^3 + 4x^2 + 8x + \frac{-15}{x + 2}$

B) $3x^4 - 2x^3 + 6x^2 - 12 + \frac{23}{x + 2}$

D) $3x^4 - 2x^3 + 4x^2 - 6x + 12 + \frac{-25}{x + 2}$

38) _____

Use the Rational Zeros Theorem to write a list of all potential rational zeros

39) $f(x) = 2x^3 - 5x^2 + 7x - 17$

A) $\pm 1, \pm 17, \pm 1/2, \pm 17/2$

C) $\pm 1, \pm 2, \pm 17$

B) $\pm 1, \pm 1/17, \pm 2, \pm 2/17$

D) $\pm 1, \pm 2, \pm 17, \pm 17/2$

39) _____

Find all rational zeros.

40) $f(x) = x^3 - 8x^2 + 9x + 18$

A) -3, -6, 1

B) -4, -7, 1

C) 4, 7, -1

D) 3, 6, -1

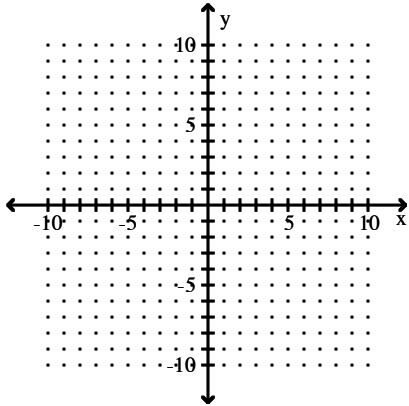
40) _____

Graph the piecewise-defined function.

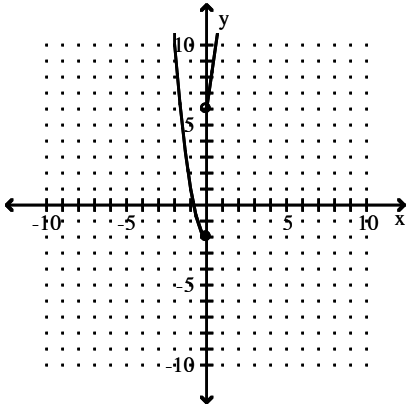
41)

$$y(x) = \begin{cases} 7x + 6, & \text{if } x < 0 \\ 2x^2 - 2, & \text{if } x \geq 0 \end{cases}$$

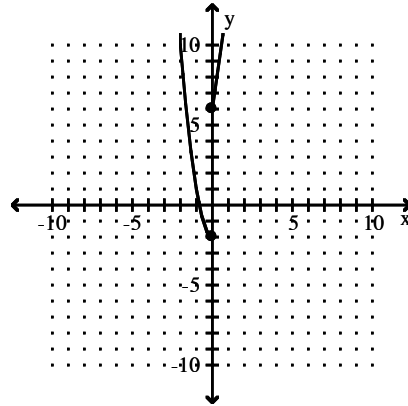
41) _____



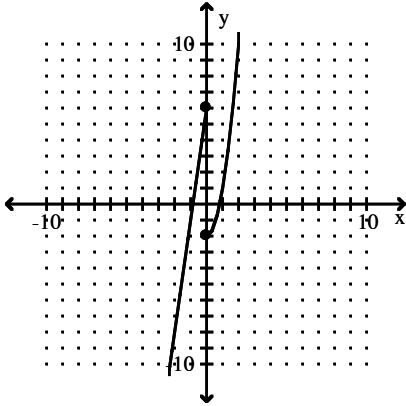
A)



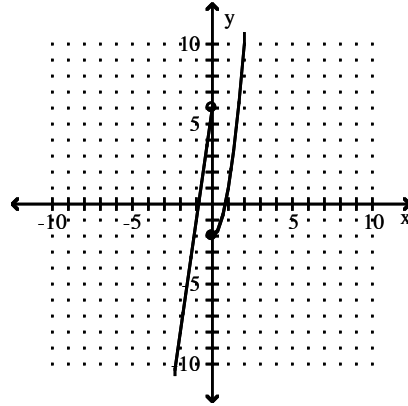
B)



C)



D)



State the domain of the rational function.

$$42) f(x) = \frac{x - 3}{x^2 + 6x}$$

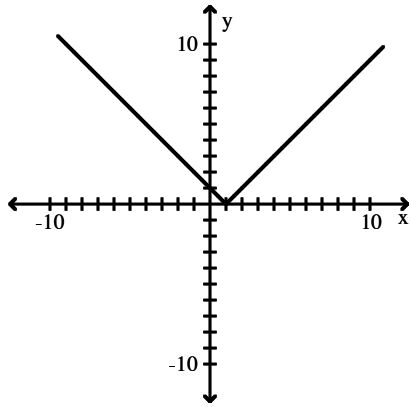
42) _____

- A) $(-\infty, -6) \cup (-6, \infty)$
- C) $(-\infty, 6) \cup (6, \infty)$

- B) $(-\infty, -6) \cup (-6, 0) \cup (0, \infty)$
- D) $(-\infty, 3) \cup (3, \infty)$

Match the function with the graph.

43)



A) $y = |x| - 1$

B) $y = |x + 1|$

C) $y = |x - 1|$

D) $y = |x - 1| + 3$

43) _____

Write the terms for the partial fraction decomposition of the rational function. Do not solve for the constants.

44) $\frac{x + 2}{x(x^2 + 4x - 32)}$

A) $\frac{A_1}{x} + \frac{A_2}{x + 8} + \frac{A_3}{x - 4}$

B) $\frac{A_1}{x + 8} + \frac{A_2}{x - 4}$

C) $\frac{A_1}{x} + \frac{Bx + C}{x^2 + 4x - 32}$

D) $\frac{A_1}{x} + \frac{A_2}{x + 8} + \frac{A_3}{(x - 4)^2}$

44) _____

Find the partial fraction decomposition.

45) $\frac{3}{x^2 + 4x + 3} = \frac{A}{x + 3} + \frac{B}{x + 1}$

A) $A = \frac{3}{2}, B = \frac{3}{2}$

B) $A = \frac{3}{2}, B = -\frac{3}{2}$

C) $A = -\frac{3}{2}, B = \frac{3}{2}$

D) $A = -\frac{3}{2}, B = -\frac{3}{2}$

45) _____

46) $\frac{5x - 2}{x^3 - 4x} = \frac{A}{x} + \frac{B}{x + 2} + \frac{C}{x - 2}$

A) $A = \frac{1}{2}, B = 1, C = -\frac{3}{2}$

B) $A = -\frac{1}{2}, B = \frac{3}{2}, C = 1$

C) $A = \frac{1}{2}, B = -\frac{3}{2}, C = 1$

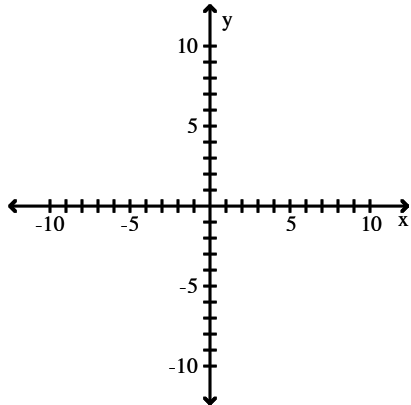
D) $A = -\frac{1}{2}, B = 1, C = \frac{3}{2}$

46) _____

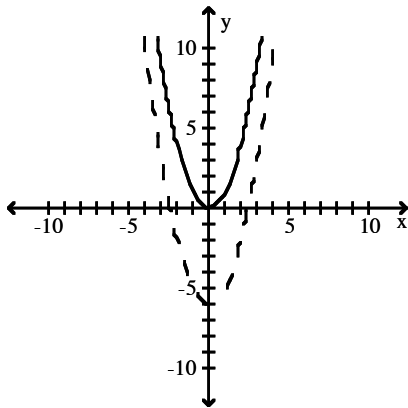
Sketch the graph of y_1 as a solid line or curve. Then sketch the graph of y_2 as a dashed line or curve by one or more of these: a vertical and/or horizontal shift of the graph y_1 , a vertical stretch or shrink of the graph of y_1 , or a reflection of the graph of y_1 across an axis.

47) $y_1 = x^2$; $y_2 = x^2 - 6$

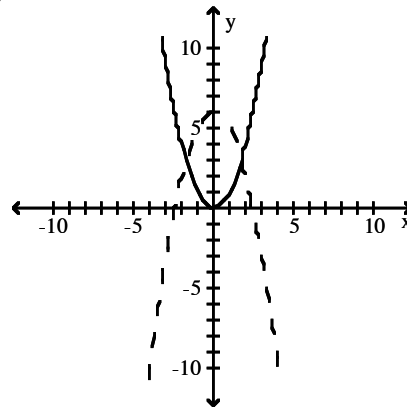
47) _____



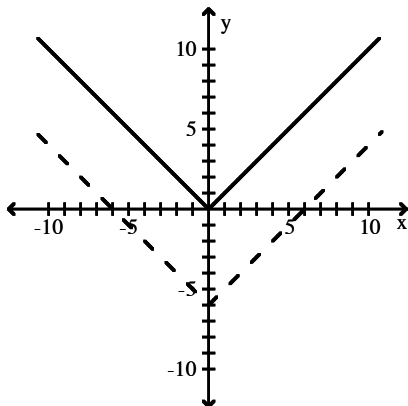
A)



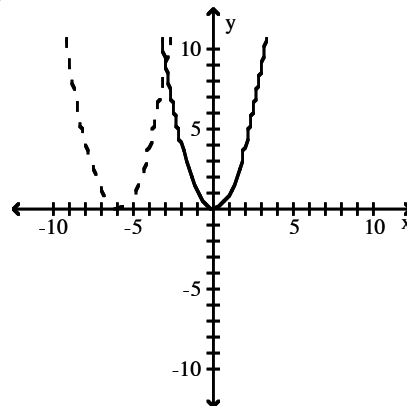
B)



C)



D)



Describe how the graph of $y=x^2$ can be transformed to the graph of the given equation.

48) $y = (x - 19)^2 + 7$

48) _____

- A) Shift the graph of $y = x^2$ up 19 units and then right 7 units.
- B) Shift the graph of $y = x^2$ left 19 units and then up 7 units.
- C) Shift the graph of $y = x^2$ left 19 units and then down 7 units.
- D) Shift the graph of $y = x^2$ right 19 units and then up 7 units.

49) $y = (x + 5)^2$

A) Shift the graph of $y = x^2$ right 5 units.

C) Shift the graph of $y = x^2$ up 5 units.

B) Shift the graph of $y = x^2$ down 5 units.

D) Shift the graph of $y = x^2$ left 5 units.

49) _____

Fill in the blanks to complete the statement.

50) The graph of $y = -\sqrt{x + 5}$ can be obtained from the graph of $y = \sqrt{x}$ by shifting horizontally ? units to the ? and reflecting across the ?-axis. 50) _____

A) 5; right; x

B) -5; left; x

C) 5; left; x

D) 5; left; y

Answer Key

Testname: SPC_MIDTERM_REVIEW_SY1314

- 1) C
- 2) D
- 3) B
- 4) B
- 5) D
- 6) B
- 7) D
- 8) A
- 9) D
- 10) B
- 11) C
- 12) B
- 13) A
- 14) C
- 15) A
- 16) A
- 17) A
- 18) B
- 19) A
- 20) C
- 21) D
- 22) C
- 23) D
- 24) B
- 25) C
- 26) B
- 27) A
- 28) D
- 29) D
- 30) B
- 31) A
- 32) A
- 33) D
- 34) D
- 35) B
- 36) D
- 37) D
- 38) D
- 39) A
- 40) D
- 41) D
- 42) B
- 43) C
- 44) A
- 45) C
- 46) C
- 47) A
- 48) D
- 49) D
- 50) C