

PRECALCULUS - MATH 2412 - EXAM # 1 SAMPLE- REVIEW. Exam will consist of 33 to 36 chosen from these Questions MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Find the distance between the pair of points.

1) $(5, 4) (-7, -3)$

A) $\sqrt{193}$

B) 84

C) 5

D) $\sqrt{95}$

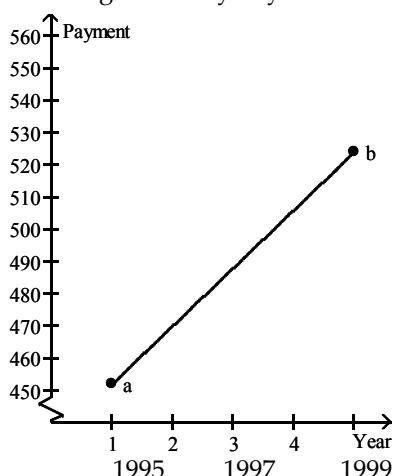
1) _____

Solve.

- 2) The graph shows an idealized linear relationship for the average monthly payments to retirees from 1995 through 1999. Use the midpoint formula to estimate the payment for 1997.

2) _____

Average Monthly Payments to Retiree



$a = \$452; b = \524

A) 488 dollars

B) 500 dollars

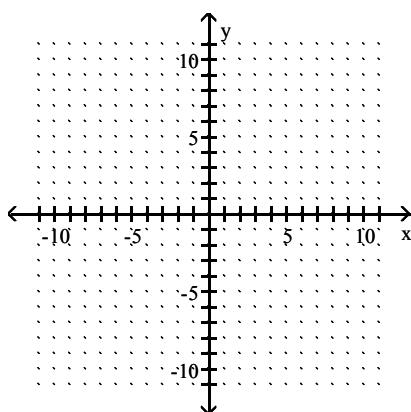
C) 36 dollars

D) 524 dollars

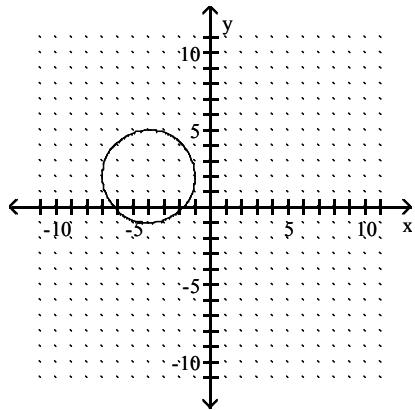
Graph the circle.

3) $(x - 4)^2 + (y - 2)^2 = 9$

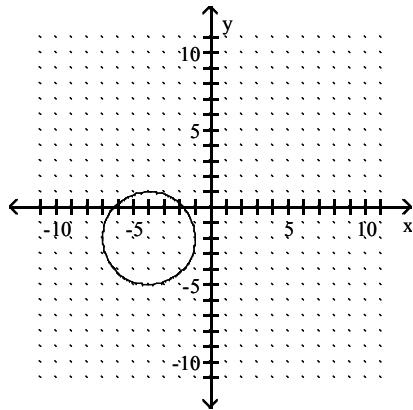
3) _____



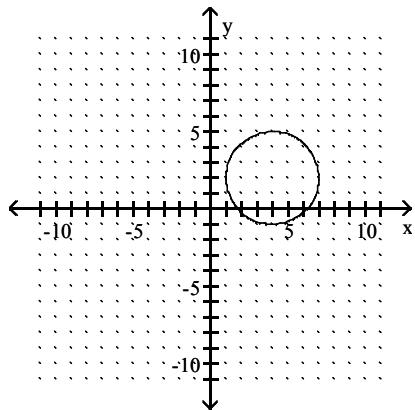
A)



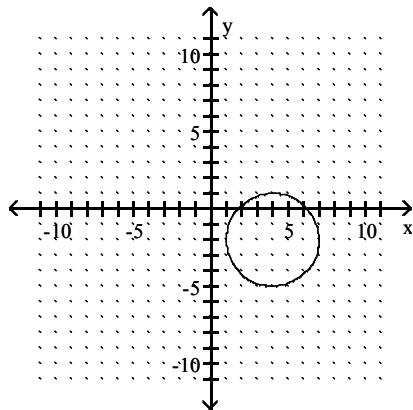
B)



C)



D)

**Find the center and radius of the circle.**

4) $x^2 + y^2 - 10x - 12y + 52 = 0$

A) (6, 5); r = 3

B) (-6, -5); r = 9

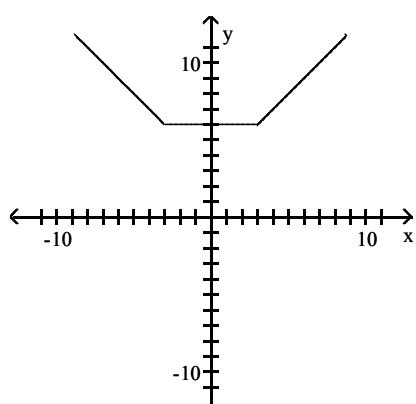
C) (-5, -6); r = 9

D) (5, 6); r = 3

4) _____

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

5)

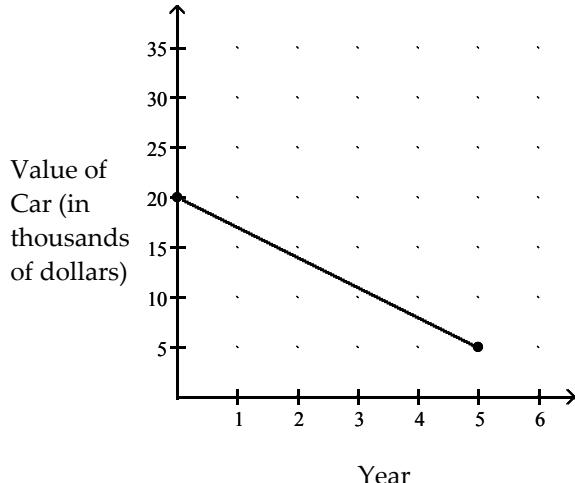


5) _____

A) Increasing [3, ∞); Decreasing [-3, ∞); Constant (-3, 3)B) Increasing [3, ∞); Decreasing $(-\infty, -3]$; Constant [-3, 3]C) Increasing $(-\infty, 3]$; Decreasing $(-\infty, -3]$; Constant (-3, 3)D) Increasing $(-\infty, 3]$; Decreasing [-3, ∞); Constant [-3, 3]

Find the average rate of change illustrated in the graph.

6)



6) _____

- A) $-\$3000.00$ per year B) $\$3000.00$ per year
C) $\$4000.00$ per year D) $-\$4000.00$ per year

Write the equation of the line.

7) Through $(-6, -7)$

parallel to $-2x + 7y = 26$

7) _____

- A) $y = \frac{2}{7}x - \frac{37}{7}$ B) $y = \frac{6}{7}x + \frac{26}{7}$ C) $y = \frac{7}{2}x + \frac{7}{2}$ D) $y = -\frac{2}{7}x + \frac{37}{7}$

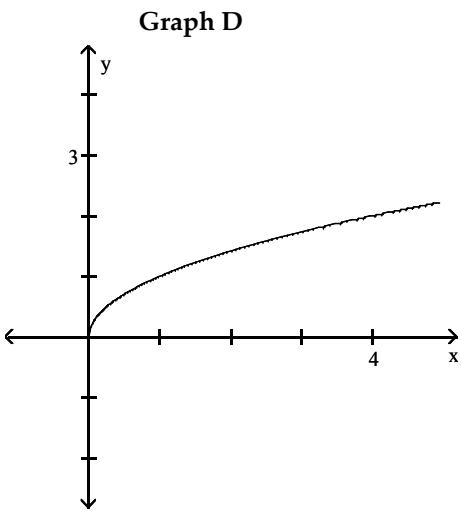
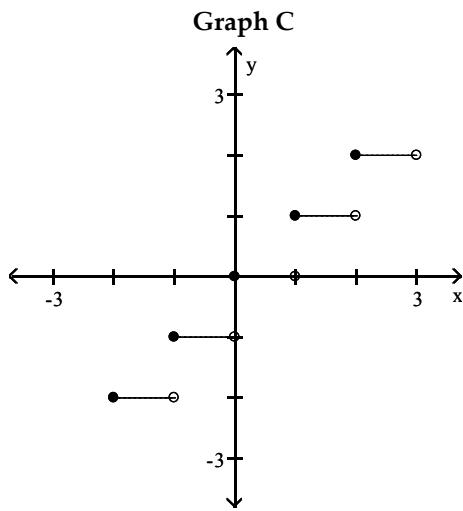
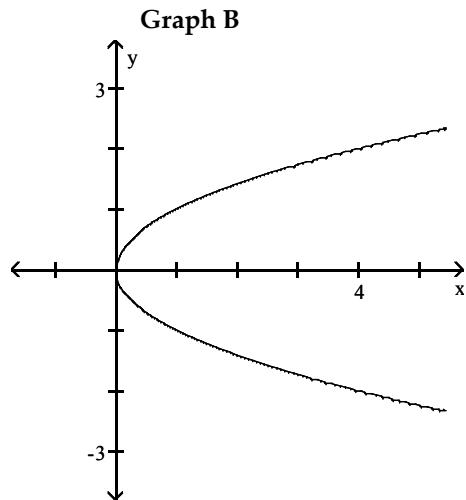
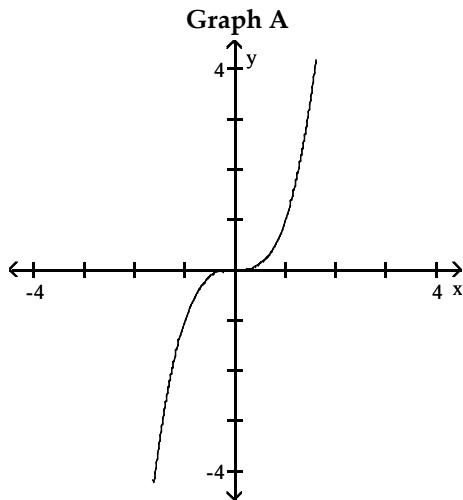
8) Through $(9, -4)$,

perpendicular to $-5x - 4y = -29$

8) _____

- A) $y = -\frac{4}{5}x - \frac{56}{5}$ B) $y = \frac{4}{5}x - \frac{56}{5}$ C) $y = \frac{4}{5}x$ D) $y = \frac{5}{4}x - 56$

Refer to the following graphs to determine an appropriate response.



- 9) Which one is the graph of $y = [[x]]$? What is the value of y when $x = 1.5$?

A) Graph D; 1

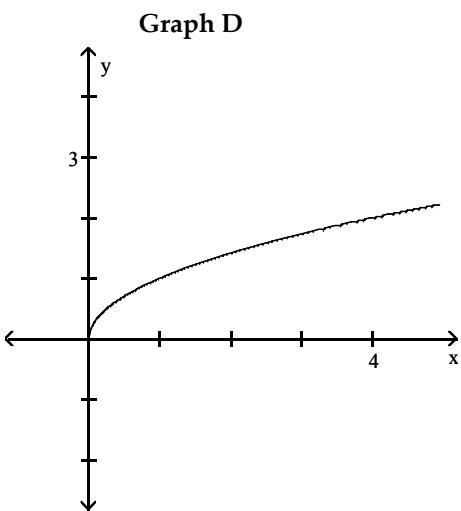
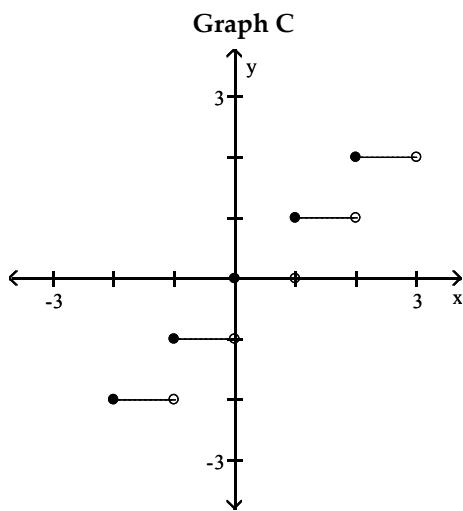
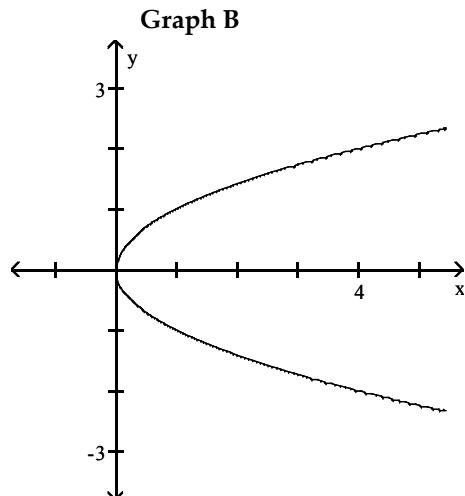
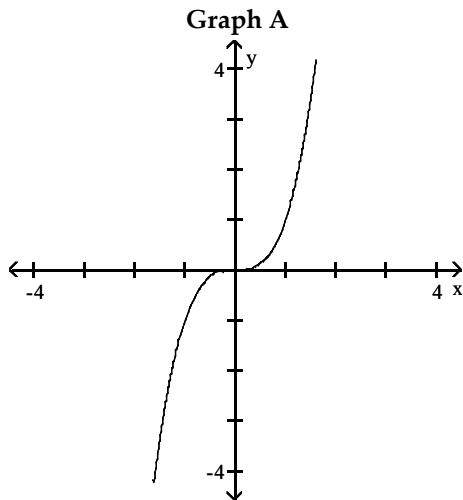
B) Graph A; 2.25

C) Graph B; 2.25

D) Graph C; 1

9) _____

Refer to the following graphs to determine an appropriate response.

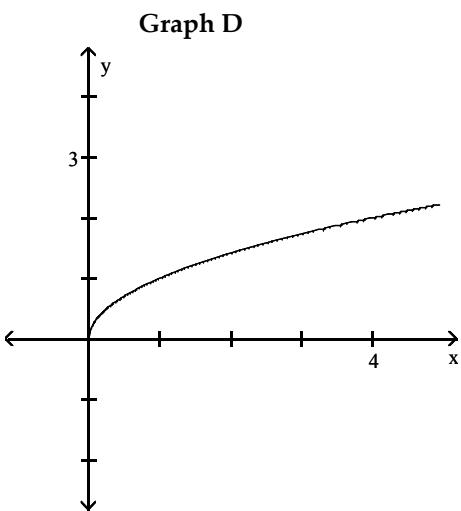
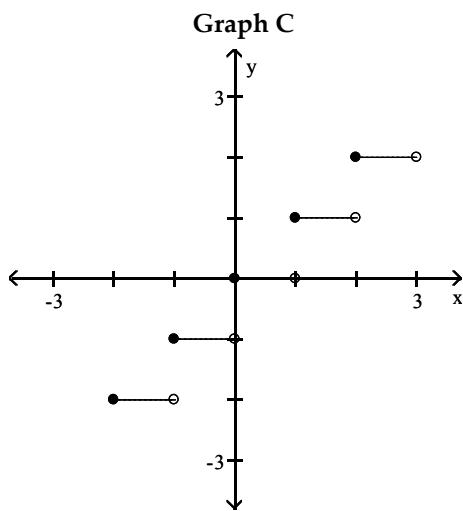
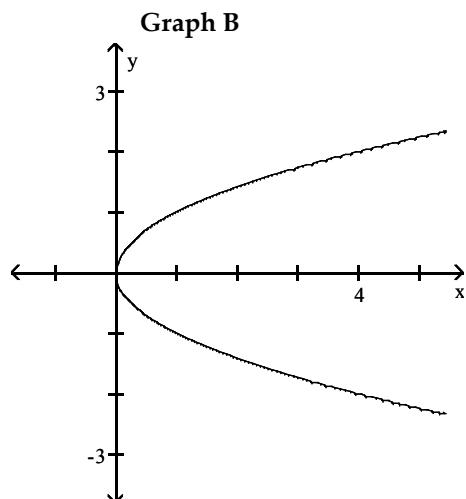
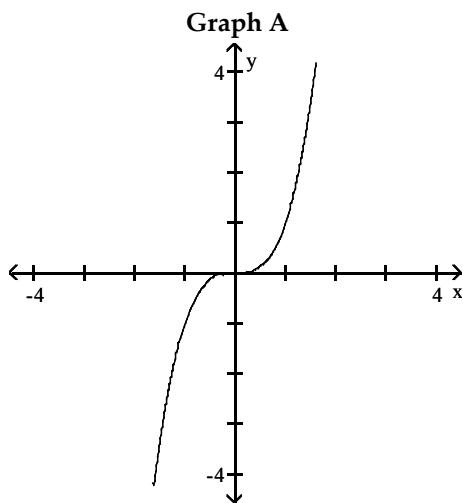


- 10) Which one is the graph of $y = \sqrt{x}$? What is its domain?

- A) Graph A; $(-\infty, \infty)$
B) Graph D; $[0, \infty)$
C) Graph C; $\{-2, -1, 0, 1, 2\}$
D) Graph B; $[0, \infty)$

10) _____

Refer to the following graphs to determine an appropriate response.

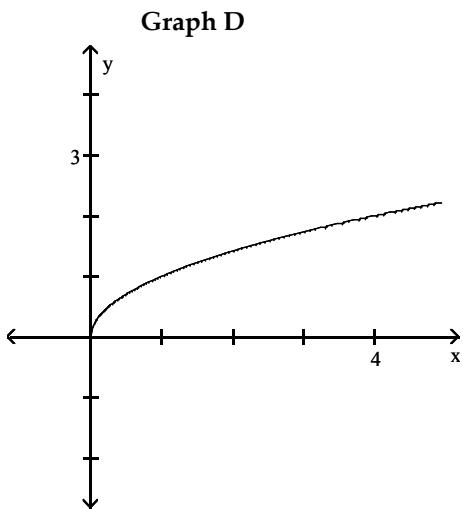
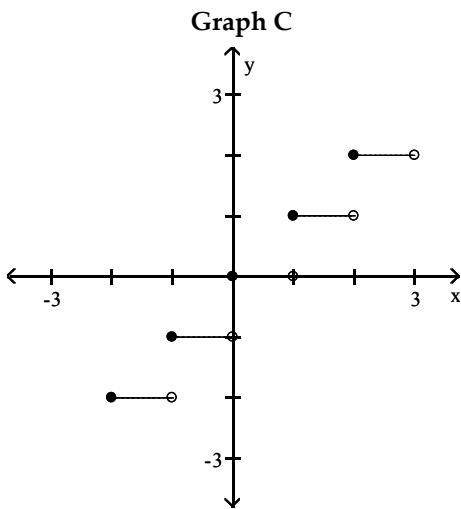
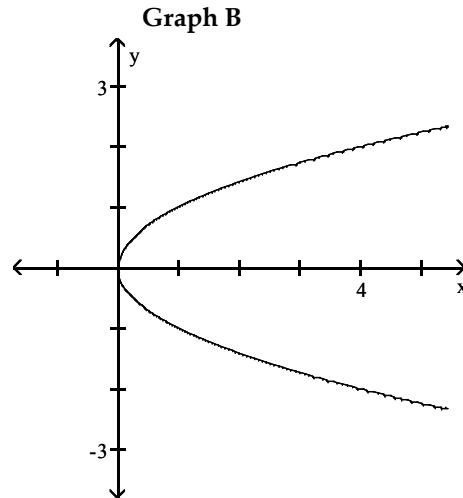
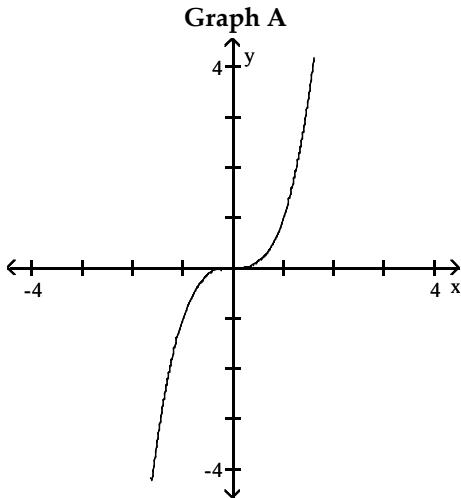


- 11) Which is not the graph of a function? What is its equation?

- A) Graph C; $y = \sqrt{x}$
B) Graph A; $y = x$
C) Graph B; $x = y^2$
D) Graph D; $y = [[x]]$

11) _____

Refer to the following graphs to determine an appropriate response.



- 12) Which one is the graph of $y = x^3$? What is its range?

A) Graph D; $[0, \infty)$ B) Graph C; $[-2, 2]$
C) Graph B; $(-\infty, \infty)$ D) Graph A; $(-\infty, \infty)$

Find the requested value.

13) $f(-4)$ for $f(x) = \begin{cases} 6x, & \text{if } x \leq -1 \\ x - 2, & \text{if } x > -1 \end{cases}$

A) 2 B) -24 C) 24 D) -6

Determine if the function is even, odd, or neither.

12)

13)

7

Perform the requested operation or operations.

16) $f(x) = \sqrt{2x + 3}$, $g(x) = \sqrt{16x - 4}$

16) _____

Find $(fg)(x)$.

A) $(2x + 3)(16x - 4)$

C) $(\sqrt{2x + 3})(\sqrt{16x - 4})$

B) $(2x + 3)(4x - 2)$

D) $(4x - 2)(\sqrt{2x + 3})$

17) $f(x) = 9x^2 - 7x$, $g(x) = x^2 - 3x - 28$

17) _____

Find $\left(\frac{f}{g}\right)(x)$.

A) $\frac{9x - 7}{-3}$

B) $\frac{9 - x}{28}$

C) $\frac{9x}{x + 1}$

D) $\frac{9x^2 - 7x}{x^2 - 3x - 28}$

18) $f(x) = 4x^2 + 5x + 7$, $g(x) = 5x - 3$

18) _____

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

A) $4x^2 + 25x + 32$

B) $20x^2 + 25x + 38$

C) $20x^2 + 25x + 32$

D) $4x^2 + 5x + 4$

19) $f(x) = 4 - 4x$, $g(x) = -9x + 4$

19) _____

Find $(f + g)(x)$.

A) $5x + 8$

B) $-5x$

C) $-9x + 4$

D) $-13x + 8$

Find the domain and range of the indicated function.

20) Find the domain and range of $(fg)(x)$ when $f(x) = \sqrt{4x + 4}$ and $g(x) = \sqrt{3x - 6}$.

20) _____

A) Domain: $(2, \infty)$; range: $(0, \infty)$

B) Domain: $[-2, \infty)$; range: $(-\infty, \infty)$

C) Domain: $[2, \infty)$; range: $(-\infty, \infty)$

D) Domain: $[2, \infty)$; range: $[0, \infty)$

Compute and simplify the difference quotient $\frac{f(x + h) - f(x)}{h}$, $h \neq 0$.

21) $l(x) = 6 - 4x^3$

21) _____

A) $-4(3x^2 + 3xh + h^2)$

B) $-18x^2$

C) $-4(3x^2 - 3x - h)$

D) $-4(x^2 - xh - h^2)$

Find the indicated composite for the pair of functions.

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

22) _____

A) $16x^2 + 16x + 31$

B) $4x^2 + 16x + 17$

C) $16x^2 + 16x + 17$

D) $4x^2 + 4x - 1$

Consider the function h as defined. Find functions f and g so that $(f \circ g)(x) = h(x)$.

23) $h(x) = |4x + 2|$

23) _____

A) $f(x) = -|x|$, $g(x) = 4x + 2$

B) $f(x) = x$, $g(x) = 4x + 2$

C) $f(x) = |x|$, $g(x) = 4x + 2$

D) $f(x) = |-x|$, $g(x) = 4x - 2$

Solve.

24) In a lab experiment 14 grams of acid were produced in 39 minutes and 17 grams in 41 minutes. Let y be the grams produced in x minutes.

24) _____

A) $y = x + 25$

B) $2y = 3x + 25$

C) $2y = 3x - 89$

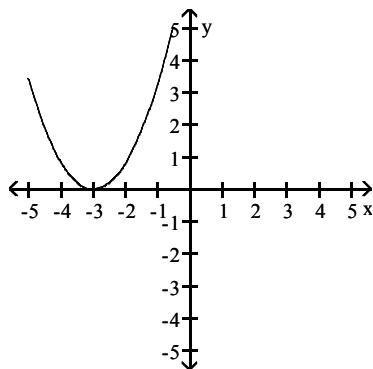
D) $2y = 3x + 89$

Given the equation or other information for a parabola, find the matching description or graph.

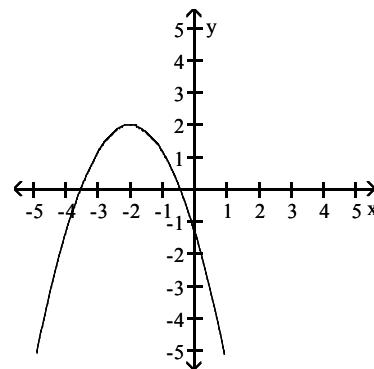
25) $f(x) = ax^2 + bx + c$,

$a < 0; b^2 - 4ac < 0$

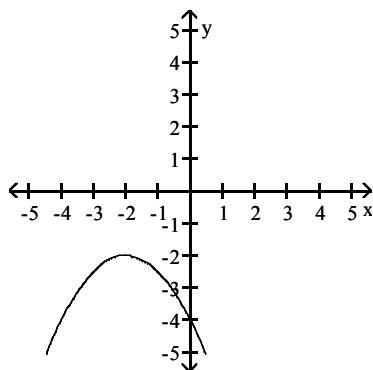
A)



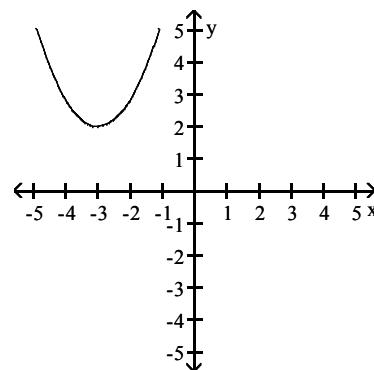
B)



C)



D)



25) _____

Use synthetic division to perform the division.

26) $\frac{x^3 - 1}{x - 1}$

26) _____

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

B) $x^2 + x + 1$

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

D) $x^3 + x^2 + x + 1$

Express the polynomial in the form $P(x) = (x - k)Q(x) + r$ for the given value of k .

27) $P(x) = 3x^3 - x^2 + 2x + 6; k = -1$

27) _____

A) $P(x) = (x + 1) \cdot (3x^2 - 4x + 6) + 0$

B) $P(x) = (x - 1) \cdot (3x^2 + 2x) + 6$

C) $P(x) = (x + 1) \cdot (3x^2 + 2x) + 6$

D) $P(x) = (x + 1) \cdot (3x^2 - 4x + 2) + 8$

For the polynomial, one zero is given. Find all others.

28) $P(x) = x^3 - 3x^2 + 7x - 5; 1$

28) _____

A) $1 + 2i, 1 - 2i$

B) $1 + \sqrt{5}i, 1 - \sqrt{5}i$

C) $1 + \sqrt{5}, 1 - \sqrt{5}$

D) $-1 + 2i, -1 - 2i$

Give all possible rational zeros for the following polynomial.

29) $P(x) = -2x^4 + 2x^3 + 5x^2 + 18$

29) _____

A) $\pm 1, \pm 1/2, \pm 2, \pm 3, \pm 6, \pm 9, \pm 18$

B) $\pm 1, \pm 2, \pm 1/2, \pm 1/3, \pm 1/6, \pm 1/9, \pm 1/18$

C) $\pm 1, \pm 2, \pm 3, \pm 6, \pm 9, \pm 18$

D) $\pm 1, \pm 1/2, \pm 2, \pm 3, \pm 3/2, \pm 6, \pm 9, \pm 9/2, \pm 18$

Find all rational zeros and factor f(x).

30) $f(x) = x^3 - 7x^2 - 4x + 28$

- A) 3, 8, -2; $f(x) = (x - 3)(x - 8)(x + 2)$
- C) -2, -7, 2; $f(x) = (x + 2)(x + 7)(x - 2)$

30) _____

- B) -3, -8, 2; $f(x) = (x + 3)(x + 8)(x - 2)$
- D) 2, 7, -2; $f(x) = (x - 2)(x - 7)(x + 2)$

Find the zeros of the polynomial function and state the multiplicity of each.

31) $f(x) = 4(x + 9)^2(x - 9)^3$

- A) 4, multiplicity 1; 9, multiplicity 1; -9, multiplicity 1
- B) -9, multiplicity 2; 9, multiplicity 3
- C) 4, multiplicity 1; -9, multiplicity 3; 9, multiplicity 3
- D) -9, multiplicity 3; 9, multiplicity 2

31) _____

Find a polynomial of degree 3 with real coefficients that satisfies the given conditions.

32) Zeros of -2, 1, 0 and $P(2) = 16$

- A) $P(x) = 2x^3 + 2x^2 - 4x$
- C) $P(x) = 2x^3 - 2x^2 - 4x$
- B) $P(x) = 2x^2 + 2x - 4$
- D) $P(x) = 2x^3 + 6x^2 - 4x$

32) _____

Find a polynomial of lowest degree with only real coefficients and having the given zeros.

33) $2 + i, 4$

- A) $f(x) = x^3 - 8x^2 + 21x - 20$
- C) $f(x) = x^3 - 4x^2 - (3 - 4i)x + 12 + 16i$
- B) $f(x) = x^3 + 9x^2 + 20x + 20$
- D) $f(x) = x^3 + 8x^2 + 21x + 20$

33) _____

Use Descartes' Rule of Signs to determine the possible number of positive real zeros and the possible number of negative real zeros for the function.

34) $9x^8 + 7x^6 + 4x^4 + 2x^2 + 2 = 0$

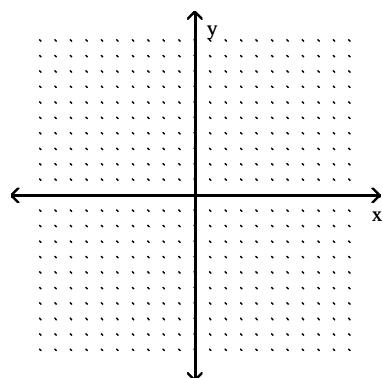
- A) Positive (4), negative (0)
- C) Positive (0), negative (4)
- B) Positive (0), negative (0)
- D) Positive (4), negative (4)

34) _____

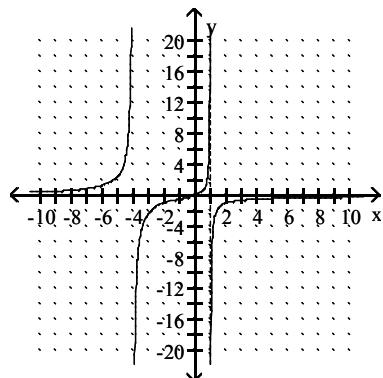
Sketch the graph of the rational function.

$$35) f(x) = \frac{3x}{(x - 1)(x + 4)}$$

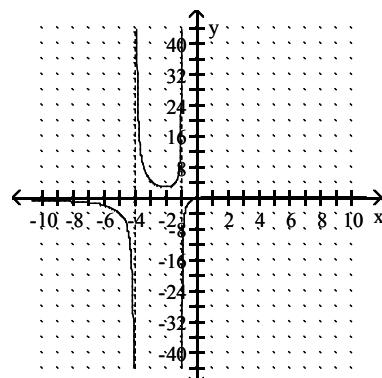
35) _____



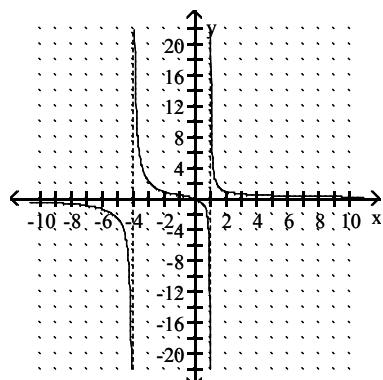
A)



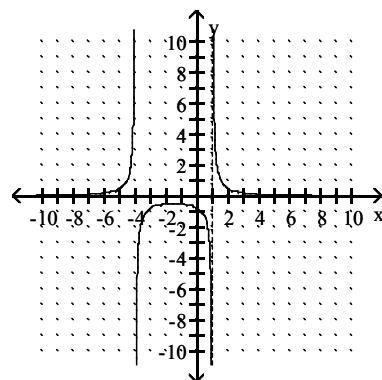
B)



C)



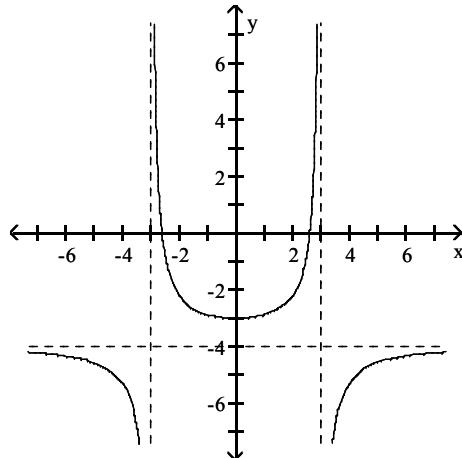
D)



Use the graph to answer the question.

- 36) Find the horizontal and vertical asymptotes of the rational function graphed below.

36) _____



- A) Horizontal: none; vertical: $x = \pm 3$
B) Horizontal: $y = -4$; vertical: $x = \pm 3$
C) Horizontal: $y = 0$; vertical: $x = \pm 3$
D) Horizontal: $y = \pm 3$; vertical: $x = -4$

Give the domain and range for the rational function. Use interval notation.

37) $f(x) = \frac{1}{(x-3)^2} + 5$

37) _____

- A) Domain: $(-\infty, -3) \cup (-3, \infty)$; Range: $(-\infty, 5)$
B) Domain: $(-\infty, 3) \cup (3, \infty)$; Range: $(-\infty, 0) \cup (0, \infty)$
C) Domain: $(-\infty, 3) \cup (3, \infty)$; Range: $(5, \infty)$
D) Domain: $(-\infty, 5) \cup (5, \infty)$; Range: $(0, \infty)$

Answer the question

38) How can the graph of $f(x) = \frac{1}{x-3} + 7$ be obtained from the graph of $y = \frac{1}{x}$?

38) _____

- A) By making a horizontal shift of 7 units to the left and a vertical shift of 3 units down
B) By making a horizontal shift of 7 units to the right and a vertical shift of 3 units up
C) By making a horizontal shift of 3 units to the left and a vertical shift of 7 units up
D) By making a horizontal shift of 3 units to the right and a vertical shift of 7 units up

Determine which of the rational functions given below has the following feature(s).

39) x-intercepts: -1 and -4, y-intercept: $\frac{1}{4}$, vertical asymptote: $x = 4$, horizontal asymptote: $y = 1$

39) _____

- A) $f(x) = \frac{(x+1)(x+4)}{(x-4)^2}$
B) $f(x) = \frac{(x-1)(x-4)}{(x+4)}$
C) $f(x) = \frac{(x-1)(x-4)}{(x+4)^2}$
D) $f(x) = \frac{(x+1)(x+4)}{(x-4)}$

Give the equation of the oblique asymptote, if any.

40) $f(x) = \frac{x^2 + 9x - 6}{x - 8}$

40) _____

- A) $y = x + 17$
B) $y = x + 1$
C) $x = y + 17$
D) None

Write the partial fraction decomposition of the rational expression.

$$41) \frac{x-3}{(x-5)(x-4)}$$

41) _____

A) $\frac{-1}{x-5} + \frac{2}{x-4}$

B) $\frac{2}{x-5} + \frac{1}{x-4}$

C) $\frac{2}{x-5} + \frac{-1}{x-4}$

D) $\frac{1}{x-5} + \frac{-2}{x-4}$

Write the form of the partial fraction decomposition of the rational expression. It is not necessary to solve for the constants.

$$42) \frac{3x-1}{(x+5)(x+7)^2}$$

42) _____

A) $\frac{A}{x+5} + \frac{B}{x+7} + \frac{C}{x+7} + \frac{D}{(x+7)^2}$

B) $\frac{A}{x+5} + \frac{B}{x+7} + \frac{C}{x+7} + \frac{Dx+E}{(x+7)^2}$

C) $\frac{A}{x+5} + \frac{B}{x+7} + \frac{C}{(x+7)^2}$

D) $\frac{A}{x+5} + \frac{B}{x+7} + \frac{Cx+D}{(x+7)^2}$

Answer Key

Testname: PRECALCULUS - EXAM 1 REVIEW - FALL 2010

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