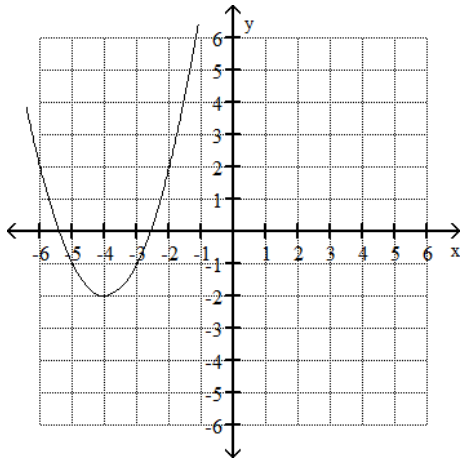


Pre-Calc

2nd Semester Review Packet - #1

Use the graph to determine the function's domain and range.

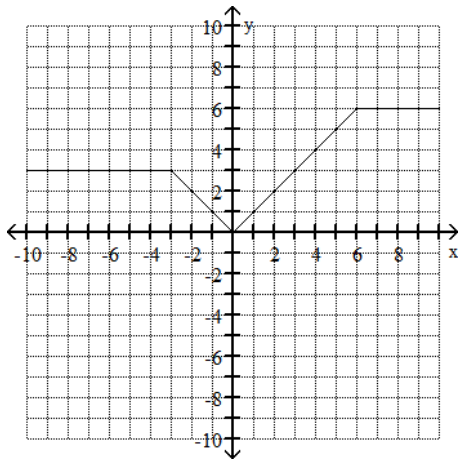
1)



- A) domain: $[-4, \infty)$
range: $[-2, \infty)$
- C) domain: $(-\infty, \infty)$
range: $(-\infty, \infty)$

- B) domain: $(-\infty, \infty)$
range: $[-2, \infty)$
- D) domain: $(-\infty, -4)$ or $(-4, \infty)$
range: $(-\infty, -2)$ or $(-2, \infty)$

2)



- A) domain: $(-\infty, \infty)$
range: $[0, 6]$

- B) domain: $[0, 6]$
range: $(-\infty, \infty)$

- C) domain: $[3, 6]$
range: $(-\infty, \infty)$

- D) domain: $(-\infty, \infty)$
range: $[3, 6]$

Find the domain of the rational function.

3) $f(x) = \frac{x + 3}{x^2 - 4}$

- A) $\{x \mid x \neq -2, x \neq 2, x \neq -3\}$
- C) $\{x \mid x \neq -2, x \neq 2\}$

- B) all real numbers
- D) $\{x \mid x \neq 0, x \neq 4\}$

Solve the problem.

4) The function $P(x) = 0.6x - 73$ models the relationship between the number of pretzels x that a certain vendor sells and the profit the vendor makes. Find $P(800)$, the profit the vendor makes from selling 800 pretzels.

- A) \$480 B) \$407 C) \$727 D) \$553

5) The owner of a video store has determined that the profits P of the store are approximately given by $P(x) = -x^2 + 30x + 73$, where x is the number of videos rented daily. Find the maximum profit to the nearest dollar.

- A) \$225 B) \$450 C) \$298 D) \$523

Find the inverse of the one-to-one function.

6) $f(x) = \frac{4x + 1}{7}$

- A) $f^{-1}(x) = \frac{7x + 1}{4}$ B) $f^{-1}(x) = \frac{7}{4x - 1}$ C) $f^{-1}(x) = \frac{7}{4x + 1}$ D) $f^{-1}(x) = \frac{7x - 1}{4}$

7) $f(x) = \frac{7}{4x + 1}$

- A) $f^{-1}(x) = \frac{7}{4y} - \frac{1}{4}$ B) $f^{-1}(x) = \frac{7}{4x} - \frac{1}{4}$ C) $f^{-1}(x) = \frac{4x + 1}{7}$ D) $f^{-1}(x) = \frac{1}{4} - \frac{7}{4x}$

8) $f(x) = (x + 2)^3$

- A) $f^{-1}(x) = \sqrt[3]{x} - 8$ B) $f^{-1}(x) = \sqrt{x} - 2$ C) $f^{-1}(x) = \sqrt[3]{x} + 2$ D) $f^{-1}(x) = \sqrt[3]{x} - 2$

Determine which two functions are inverses of each other.

9) $f(x) = x^3 - 7$ $g(x) = \sqrt[3]{x - 7}$ $h(x) = x^3 + 7$

- A) $g(x)$ and $h(x)$ B) $f(x)$ and $h(x)$ C) $f(x)$ and $g(x)$ D) None

For the given functions f and g , find the indicated composition.

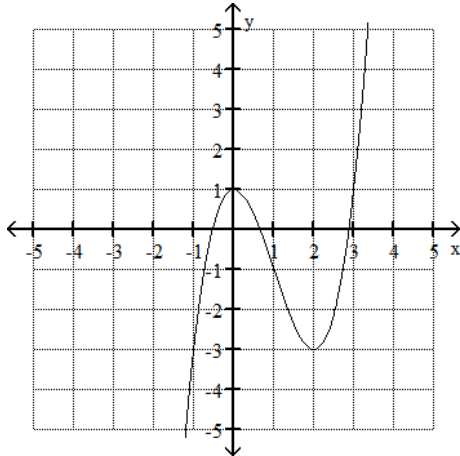
10) $f(x) = \frac{5}{x + 2}$, $g(x) = \frac{2}{5x}$

$(f \circ g)(x)$

- A) $\frac{5x}{2 + 10x}$ B) $\frac{25x}{2 + 10x}$ C) $\frac{25x}{2 - 10x}$ D) $\frac{2x + 4}{25x}$

Use the graph of the given function to find any relative maxima and relative minima.

11) $f(x) = x^3 - 3x^2 + 1$

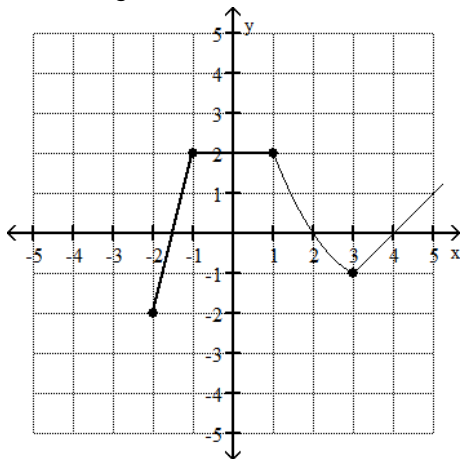


- A) maximum: (0, 1); minimum: (2, -3)
- C) maximum: (0, 1); minimum: none

- B) maximum: none; minimum: (2, -3)
- D) no maximum or minimum

Identify the intervals where the function is changing as requested.

12) Increasing



- A) (-2, -1) or (3, ∞)
- B) (-1, 3)
- C) (-2, 1)
- D) (-1, ∞)

Determine the end behavior of the polynomial function.

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

- A) falls to the left and falls to the right
- B) rises to the left and falls to the right
- C) rises to the left and rises to the right
- D) falls to the left and rises to the right

Solve the problem.

14) Solve the equation $3x^3 - 20x^2 + 23x + 10 = 0$ given that 2 is a zero of $f(x) = 3x^3 - 20x^2 + 23x + 10$.

- A) $\left\{2, -1, \frac{5}{3}\right\}$
- B) $\left\{2, 1, -\frac{5}{3}\right\}$
- C) $\left\{2, 5, -\frac{1}{3}\right\}$
- D) $\left\{2, -5, \frac{1}{3}\right\}$

Solve the polynomial equation.

15) $x^4 - 2x^3 + 6x^2 + 8x - 40 = 0$

A) $\{-2, 2, 1 + 4i, 1 - 4i\}$

C) $\{2, -2, 1 + \sqrt{3}, 1 - \sqrt{3}\}$

B) $\{-2, 2, 1 + 3i, 1 - 3i\}$

D) $\{2, -2, 1 + 3i, 1 - 3i\}$

16) $f(x) = x^3 + x^2 - 12x$

A) $x = 0, x = 2, x = 3$

B) $x = 0, x = -4, x = 3$

C) $x = 2, x = 3$

D) $x = -4, x = 3$

17) $4x^2 = -12x - 6$

A) $\left\{\frac{-3 - \sqrt{3}}{2}, \frac{-3 + \sqrt{3}}{2}\right\}$

C) $\left\{\frac{-12 - \sqrt{3}}{2}, \frac{-12 + \sqrt{3}}{2}\right\}$

B) $\left\{\frac{-3 - \sqrt{15}}{2}, \frac{-3 + \sqrt{15}}{2}\right\}$

D) $\left\{\frac{-3 - \sqrt{3}}{8}, \frac{-3 + \sqrt{3}}{8}\right\}$

18) $f(x) = 2x^3 - x^2 - 12x + 6$

A) $\left\{\frac{1}{2}, \sqrt{6}, -\sqrt{6}\right\}$

B) $\{2, \sqrt{6}, -\sqrt{6}\}$

C) $\left\{-\frac{1}{2}, \sqrt{6}, -\sqrt{6}\right\}$

D) $\{-2, \sqrt{6}, -\sqrt{6}\}$

Simplify using properties of exponents.

19) $(4x^{3/4})(4x^{1/2})$

A) $16x^{5/4}$

B) $16x^{3/4}$

C) $16x^{5/3}$

D) $16x^{1/2}$

20) $\frac{12x^{2/3}}{4x^{1/4}}$

A) $3x^{1/12}$

B) $3x^{5/3}$

C) $8x^{1/12}$

D) $3x^{5/12}$

Solve the equations.

21) $4(7 - 3x) = \frac{1}{16}$

A) $\left\{\frac{1}{4}\right\}$

B) $\{4\}$

C) $\{-3\}$

D) $\{3\}$

22) $e^{3x} = 7$

A) $\left\{\frac{\ln 7}{3}\right\}$

B) $\{3 \ln 7\}$

C) $\left\{\frac{7}{3}e\right\}$

D) $\left\{\frac{\ln 3}{7}\right\}$

23) $9 + 5 \ln x = 16$

A) $\left\{\frac{7}{5 \ln 1}\right\}$

B) $\{e^{7/5}\}$

C) $\left\{\frac{e^7}{5}\right\}$

D) $\left\{\ln \frac{7}{5}\right\}$

24) $\log_2 3 + \log_2 x = 1$

A) $\left\{\frac{3}{2}\right\}$

B) $\{\sqrt[3]{2}\}$

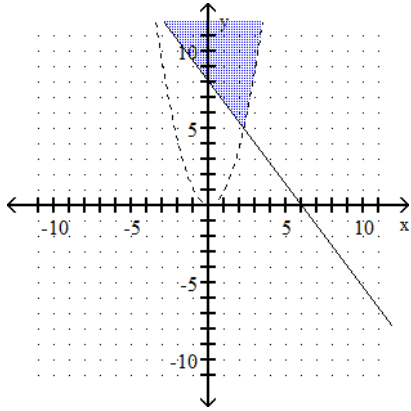
C) $\left\{\frac{2}{3}\right\}$

D) $\left\{\frac{1}{3}\right\}$

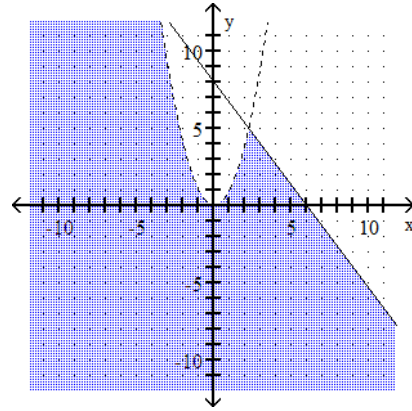
Graph the solution set of the system of inequalities or indicate that the system has no solution.

$$34) \begin{cases} y > x^2 \\ 8x + 6y \leq 48 \end{cases}$$

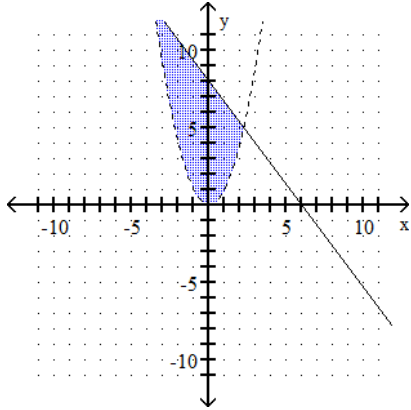
A)



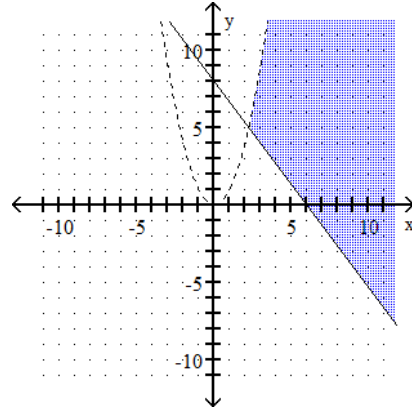
B)



C)

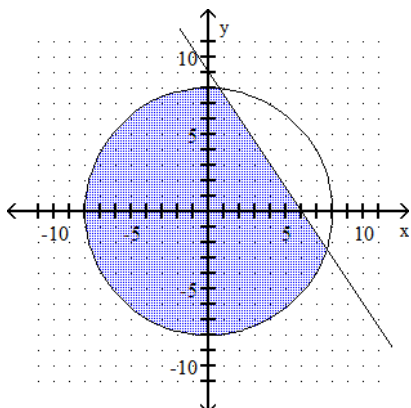


D)

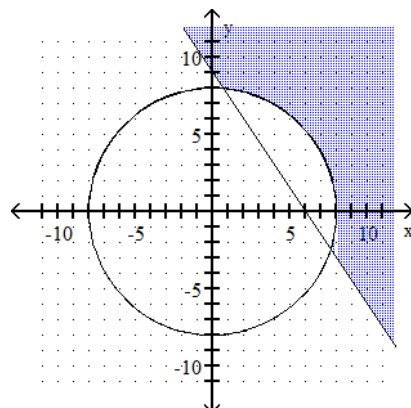


35) $x^2 + y^2 \leq 64$
 $9x + 6y \leq 54$

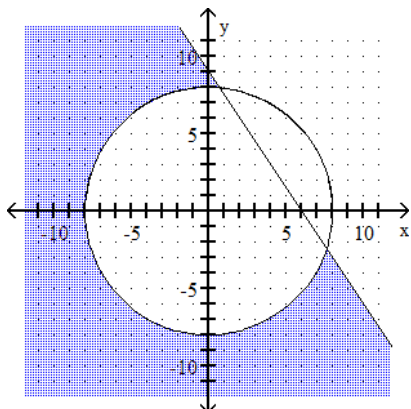
A)



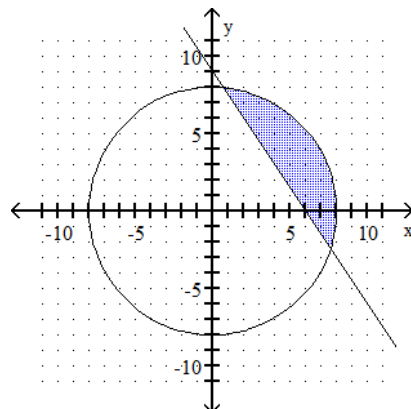
B)



C)



D)



Convert the equation to the standard form for an ellipse by completing the square on x and y.

36) $16x^2 + 4y^2 + 64x - 8y + 4 = 0$

A) $\frac{(x - 1)^2}{4} + \frac{(y + 2)^2}{16} = 1$

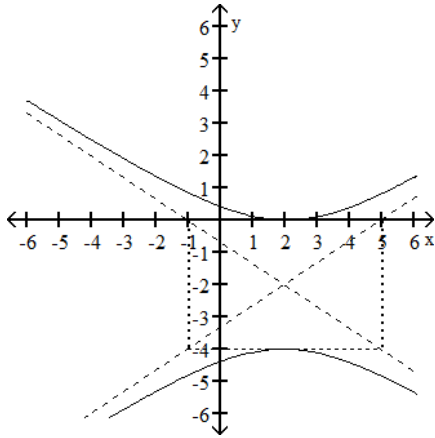
B) $\frac{(x + 2)^2}{16} + \frac{(y - 1)^2}{4} = 1$

C) $\frac{(x + 2)^2}{4} + \frac{(y - 1)^2}{16} = 1$

D) $\frac{(x - 2)^2}{4} + \frac{(y + 1)^2}{16} = 1$

Find the standard form of the equation of the hyperbola.

37)



A) $\frac{(y+2)^2}{4} - \frac{(x-2)^2}{9} = 1$

B) $\frac{(x-2)^2}{9} - \frac{(y+2)^2}{4} = 1$

C) $\frac{(y+2)^2}{9} - \frac{(x-2)^2}{4} = 1$

D) $\frac{(x-2)^2}{4} - \frac{(y+2)^2}{9} = 1$

Find the standard form of the equation of the parabola using the information given.

38) Focus: $(-3, 8)$; Directrix: $y = 0$

A) $(x+3)^2 = 16(y-4)$

B) $(y-4)^2 = 16(x+3)$

C) $(y+3)^2 = 16(x-4)$

D) $(x-4)^2 = 16(y+3)$

Write the equation in terms of a rotated $x'y'$ -system using θ , the angle of rotation. Write the equation involving x' and y' in standard form.

39) $5x^2 - 6xy + 5y^2 - 8 = 0$; $\theta = 45^\circ$

A) $\frac{x'^2}{4} + 2y'^2 = 1$

B) $\frac{x'^2}{4} + \frac{y'^2}{4} = 1$

C) $x'^2 + 4y'^2 = 1$

D) $\frac{x'^2}{4} + y'^2 = 1$

Eliminate the parameter t . Find a rectangular equation for the plane curve defined by the parametric equations.

40) $x = 2t - 1$, $y = t^2 + 7$; $-4 \leq t \leq 4$

A) $y = -\frac{1}{2}x + 30$; $-6 \leq x \leq 4$

B) $y = \frac{1}{4}x^2 + \frac{1}{2}x + \frac{29}{4}$; $-9 \leq x \leq 7$

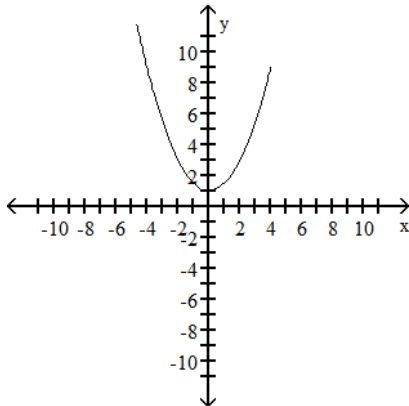
C) $y = x^2 + 1$; $-2 \leq x \leq 2$

D) $y = \frac{1}{2}x^2 + 1$; $-6 \leq x \leq 4$

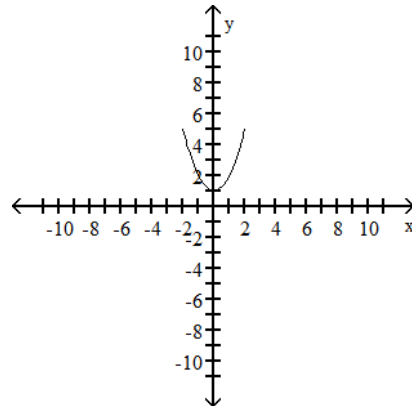
Use point plotting to graph the plane curve described by the given parametric equations.

41) $x = 2t - 1, y = t^2 + 2; -4 \leq t \leq 4$

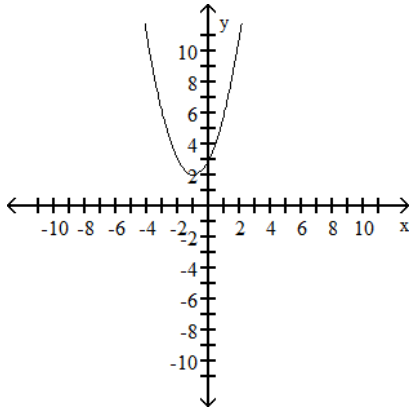
A)



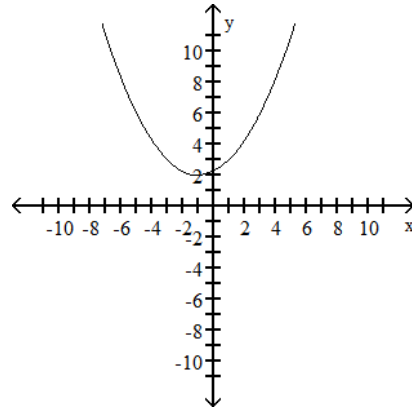
B)



C)



D)



Use the formula for the general term (the nth term) of an arithmetic sequence to find the indicated term of the sequence with the given first term, a_1 , and common difference, d .

42) Find a_{20} when $a_1 = 24, d = -4$.

- A) -52 B) -56 C) 100 D) -76

Use the formula for the general term (the nth term) of a geometric sequence to find the indicated term of the sequence with the given first term, a_1 , and common ratio, r .

43) Find a_{12} when $a_1 = -3, r = -2$.

- A) 6144 B) 6148 C) -12,288 D) -25

Find the indicated sum.

44) Find the sum of the first 70 terms of the arithmetic sequence: $-14, -18, -22, -26, \dots$

- A) -10,640 B) -10,635 C) -294 D) -10,780

45) Find the sum of the first 11 terms of the geometric sequence: $4, -8, 16, -32, 64, \dots$

- A) 2739 B) 2730 C) 2732 D) 2726

Find the sum of the infinite geometric series, if it exists.

46) $\sum_{i=1}^{\infty} 5(-0.3)^{i-1}$

A) $\frac{50}{13}$

B) $\frac{50}{7}$

C) $-\frac{50}{13}$

D) $-\frac{50}{7}$

47) $3 + \frac{3}{4} + \frac{3}{16} + \frac{3}{64} + \dots$

A) $\frac{15}{4}$

B) 4

C) $\frac{3}{4}$

D) does not exist

Solve the problem. Round to the nearest dollar if needed.

48) To save for retirement, you decide to deposit \$2500 into an IRA at the end of each year for the next 35 years. If the interest rate is 8% per year compounded annually, find the value of the IRA after 35 years.

A) \$430,792

B) \$11,982,075

C) \$396,567

D) \$34,463