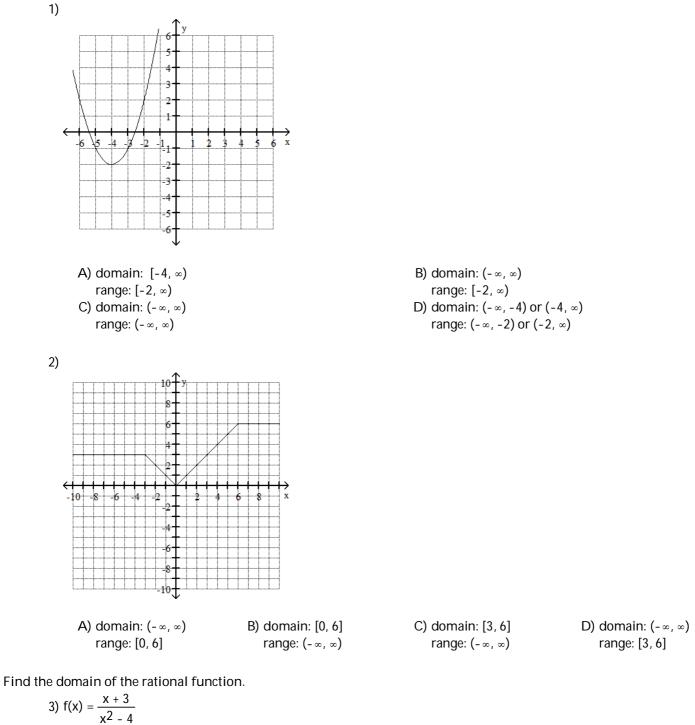
## Pre-Calc

2nd Semester Review Packet - #1

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



A)  $\{x | x \neq -2, x \neq 2, x \neq -3\}$ B) all real numbersC)  $\{x | x \neq -2, x \neq 2\}$ D)  $\{x | x \neq 0, x \neq 4\}$ 

1

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<sup>2</sup> + 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)  $f^{-1}(x) = \sqrt[3]{x} - 2$ 

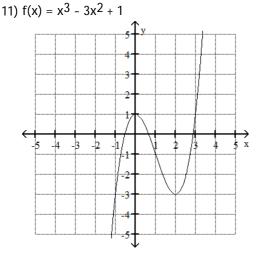
Determine which two functions are inverses of each other.

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

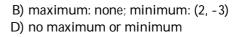
For the given functions f and g, find the indicated composition.

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.



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

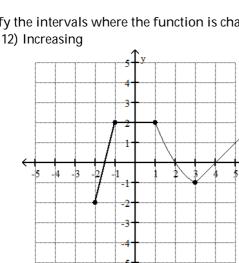


B) rises to the left and falls to the right

D) falls to the left and rises to the right

D) (-1, ∞)

Identify the intervals where the function is changing as requested.



A) (-2, -1) or (3, ∞) B) (-1, 3)

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

C) rises 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)  $\left\{2, -5, \frac{1}{3}\right\}$ 

C) (-2, 1)

Solve the polynomial equation.  $(12) - 4 - 2x^2 - (x^2 - 0)$ 

15) 
$$x^4 - 2x^3 + 6x^2 + 8x - 40 = 0$$
A)  $\{-2, 2, 1 + 4i, 1 - 4i\}$ B)  $\{-2, 2, 1 + 3i, 1 - 3i\}$ C)  $\{2, -2, 1 + \sqrt{3}, 1 - \sqrt{3}\}$ D)  $\{2, -2, 1 + 3i, 1 - 3i\}$ 

16) 
$$f(x) = x^3 + x^2 - 12x$$
  
A)  $x = 0, x = 2, x = 3$   
B)  $x = 0, x = -4, x = 3$ 

17) 
$$4x^2 = -12x - 6$$
  
A)  $\left\{ \frac{-3 - \sqrt{3}}{2}, \frac{-3 + \sqrt{3}}{2} \right\}$   
C)  $\left\{ \frac{-12 - \sqrt{3}}{2}, \frac{-12 + \sqrt{3}}{2} \right\}$ 

18) 
$$f(x) = 2x^3 - x^2 - 12x + 6$$
  
A)  $\{\frac{1}{2}, \sqrt{6}, -\sqrt{6}\}$ 
B)  $\{2, \sqrt{6}, -\sqrt{6}\}$ 
C)  $\{-\frac{1}{2}, \sqrt{6}, -\sqrt{6}\}$ 

B) 
$$\left\{ \frac{-3 - \sqrt{15}}{2}, \frac{-3 + \sqrt{15}}{2} \right\}$$
  
D)  $\left\{ \frac{-3 - \sqrt{3}}{8}, \frac{-3 + \sqrt{3}}{8} \right\}$ 

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

Simplify using properties of exponents.	
19) (4x <sup>3/4</sup> )(4x <sup>1/2</sup> )	

A) 16x <sup>5/4</sup>	B) 16x <sup>3/4</sup>	C) 16x <sup>5/3</sup>	D) 16x <sup>1/2</sup>
20) $\frac{12x^{2/3}}{4x^{1/4}}$ A) $3x^{1/12}$	B) 3x <sup>5/3</sup>	C) 8x1/12	D) 3x <sup>5/12</sup>
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) $\left\{ \frac{7}{5 \ln 1} \right\}$	в) {е <sup>7/5</sup> }	C) $\left\{\frac{e^7}{5}\right\}$	D) $\left\{ \ln \frac{7}{5} \right\}$

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

B) {<sup>3</sup>√2}

24)  $\log_2 3 + \log_2 x = 1$ A)  $\{\frac{3}{2}\}$ 

D) {1/3}

	25) 2log x = log 400 A) {10}	B) {20}	C) {±20}	D) {-20}		
	26) In (x - 6) + In (x + 1) = In (x - A) {-3}	15) B) {3}	C) {3, -3}	D) Ø		
Solve	e.					
	<ul> <li>27) An endangered species of fish has a population that is decreasing exponentially (A = A<sub>0</sub>e<sup>kt</sup>). The population 5 years ago was 1700. Today, only 900 of the fish are alive. Once the population drops below 100, the situation will be irreversible. When will this happen, according to the model? (Round to the nearest whole year.)</li> <li>A) 18 years from today</li> <li>B) 16 years from today</li> <li>C) 19 years from today</li> <li>D) 17 years from today</li> </ul>					
	28) The population of a particular country was 30 million in 1981; in 1992, it was 39 million. The exponential growth function A = 30e <sup>kt</sup> describes the population of this country t years after 1981. Use the fact that 11 years after 1981 the population increased by 9 million to find k to three decimal places.					
	A) 0.034	B) 0.642	C) 0.200	D) 0.024		
	29) The value of a particular investment follows a pattern of exponential growth. In the year 2000, you invested money in a money market account. The value of your investment t years after 2000 is given by the exponential growth model A = 1800e <sup>0.057t</sup> . By what percentage is the account increasing each year?					
	A) 6.1%	B) 6.4%	C) 6.3%	D) 5.7%		
Solve the system by the substitution method. 30) $-2x - y = -38$ $y = x^2 - 10$						
	A) {(-8, 54), (6, 26)}	B) {(8, 54), (-6, 26)}	C) {(8, 54), (6, 26)}	D) {(-8, 74), (6, 46)}		
Solve the system by the addition method. 31) $2x^2 + y^2 = 17$						
	$3x^2 - 2y^2 = -6$ A) {(2, 3), (2, -3), (-2, 3), (-2, 3), (-2, 3), (-2, 3)} C) {(2, -3), (-2, 3)}	2, -3)}	B) {(1, 3), (1, -3), (-1, 3), D) {(1, 3), (-1, -3)}	(-1, -3)}		
	Let x represent one number and let y represent the other number. Use the given conditions to write a system of nonlinear equations. Solve the system and find the numbers.					

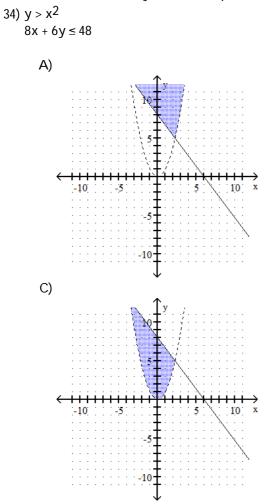
32) The difference between the squares of two numbers is 96. Twice the square of the second number subtracted from the square of the first number is 92. Find the numbers.

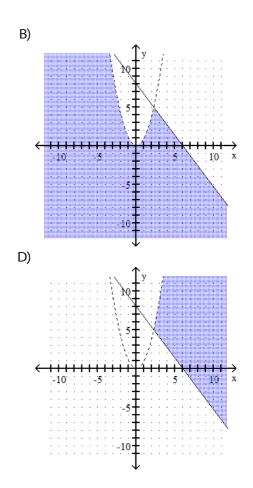
A) 10 and 2; -10 and -2	B) 10 and 2; -10 and 2; 10 and -2; -10 and -2
C) 10 and 2; -10 and 2; 10 and -2	D) 10 and 2

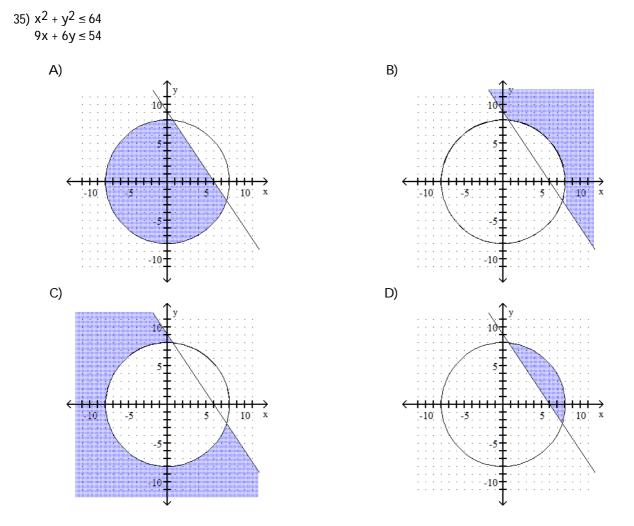
33) Find the dimensions of a rectangle whose perimeter is 32 feet and whose area is 39 square feet.

A) 2 feet by 12 feet	B) 4 feet by 12 feet	C) 2 feet by 14 feet	D) 3 feet by 13 feet
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Graph the solution set of the system of inequalities or indicate that the system has no solution.



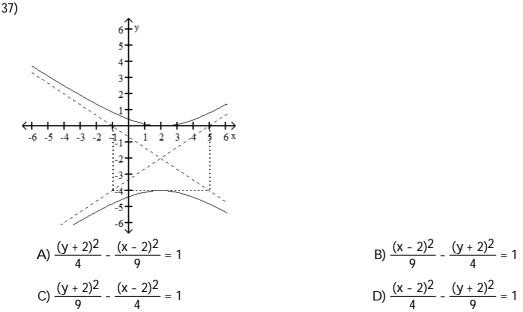




Convert the equation to the standard form for an ellipse by completing the square on x and y.

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.



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

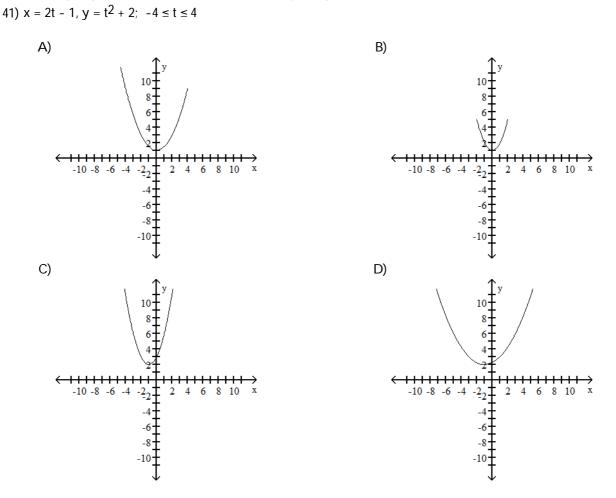
Write the equation in terms of a rotated x'y'-system using  $\theta$ , the angle of rotation. Write the equation involving x' and y' in standard form.

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) 
$$x = 2t - 1$$
,  $y = t^2 + 7$ ;  $-4 \le t \le 4$   
A)  $y = -\frac{1}{2}x + 30$ ;  $-6 \le x \le 4$   
B)  $y = \frac{1}{4}x^2 + \frac{1}{2}x + \frac{29}{4}$ ;  $-9 \le x \le 7$   
C)  $y = x^2 + 1$ ;  $-2 \le x \le 2$   
D)  $y = \frac{1}{2}x^2 + 1$ ;  $-6 \le x \le 4$ 

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



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<sub>1</sub>, and common difference, d.

42) Find a <sub>20</sub> when a <sub>1</sub> = 2	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<sub>1</sub>, and common ratio, r.

43) Find $a_{12}$ when $a_1 = -3$ , $r = -2$ .			
A) 6144	B) 6148	C) -12,288	D) -25
 ne indicated sum. 44) Find the sum of the first 70 terr	ms of the arithmetic sequence	: -14182226	
A) -10,640	B) -10,635	C) -294	D) -10,780
45) Find the sum of the first 11 terr	ms of the geometric sequence:	4, -8, 16, -32, 64,	
A) 2739	В) 2730	C) 2732	D) 2726

F

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, ye	ou decide to deposit \$2500 ir	nto an IRA at the end of each	n 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	