

Pre-Calculus Quarter 1 Assessment Review

Name _____

1. describe all transformations on the graph of $y = -1(x + 3)^2 - 2$

2. Solve the following system of equations:

$$4x + 2y = 22$$

$$2x + 6y = 26$$

3. Solve the following system of equations:

$$x + y + z = 3$$

$$2x - 6y + 4z = -14$$

$$x - 3z = 9$$

4. Find the roots of $y = x^3 + 3x^2 - 6x - 8$

5. graph $y > -x^2 + 4$

6. describe the following as even or odd:

$$f(x) = 3x^4 - 3x^2 - 1$$

$$g(x) = -4x^3 + 8x$$

7. solve $x^2 - 2 = 2x$

8. find the following given $h(x) = \frac{3x - 4}{x^2}$

$$h(x - 1) =$$

$$h(-2) =$$

9. For each of the following questions, create 4 order pairs and draw a picture that satisfies the criteria:

	Ordered pairs	Picture
f(x) that is a function		
h(x) that is not a function		
g(x) that is the inverse of f(x)		
j(x) that is an even function		

10. state the equation of the line that passes through (-2, 3) and (1, -3) in slope-intercept form and point slope form using (-2, 3).

Use $g(x) = \frac{x+2}{(x-1)(x+1)}$ to answer questions 11-12

11. graph and state any asymptotes on g(x)

12. State any extreme values of g(x)

13. A company is planning to make cylindrical boxes. A band that is 12 cm in length will be wrapped around the box as shown in the diagram to the left. Given that the volume of the cylinder can be found with $V(x) = \pi r^2 h$ where r is the radius and h is the height, what radius maximizes the volume of the box?

Pre-Calculus Quarter 1 Assessment Review

Name Key

1. describe all transformations on the graph of $y = -1(x + 3)^2 - 2$ ← move 2 down
 ↑ flip
 ↑ move 3 left

2. Solve the following system of equations:

$$\begin{aligned} 4x + 2y &= 22 \\ 2[2x + 6y &= 26] \end{aligned}$$

$$\begin{aligned} 4x + 2y &= 22 \\ -4x - 12y &= -52 \\ \hline -10y &= -30 \\ y &= 3 \end{aligned}$$

$$\begin{aligned} 2x + 6(3) &= 26 \\ 2x + 18 &= 26 \\ 2x &= 8 \\ x &= 4 \end{aligned}$$

(4, 3)

3. Solve the following system of equations:

$$\begin{aligned} x + y + z &= 3 \\ 2x - 6y + 4z &= -14 \\ x - 3z &= 9 \\ x &= 9 + 3z \end{aligned}$$

$$\begin{aligned} 2(9 + 3z) - 6y + 4z &= -14 \\ 18 + 6z - 6y + 4z &= -14 \\ -6y + 10z &= -32 \\ -6(-6 - 4z) + 10z &= -32 \\ 36 + 24z + 10z &= -32 \\ 34z &= -68 \\ z &= -2 \end{aligned}$$

$$\begin{aligned} 9 + 3z + y + z &= 3 \\ y + 4z &= -6 \\ y &= -6 - 4z \\ y &= -6 - 4(-2) \\ y &= 2 \end{aligned}$$

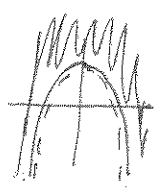
$$\begin{aligned} x &= 9 + 3(-2) \\ x &= 3 \end{aligned}$$

(3, 2, -2)

4. Find the roots of $y = x^3 + 3x^2 - 6x - 8$

-4 -1 2

5. graph $y > -x^2 + 4$



6. describe the following as even or odd:

$$f(x) = 3x^4 - 3x^2 - 1$$

2 → 35
-2 → 35
Even

$$g(x) = -4x^3 + 8x$$

2 → -16
-2 → 16
odd

7. solve $x^2 - 2 = 2x$

$$x = -0.73 \text{ \& } 2.73$$

8. find the following given $h(x) = \frac{3x-4}{x^2}$

$h(x-1) =$

$h(-2) =$

$$\frac{3(x-1)-4}{(x-1)^2} = \frac{3x-7}{(x-1)^2}$$

$$\frac{3(-2)-4}{(-2)^2} = \frac{-6-4}{4} = \frac{-10}{4} = -2.5$$

$$\frac{3x-7}{x^2-2x+1}$$

9. For each of the following questions, create 4 order pairs and draw a picture that satisfies the criteria:

	Ordered pairs	Picture
f(x) that is a function	(0,1) (1,2) (2,3) (3,4)	
h(x) that is <u>not</u> a function	(0,1) (1,2) (0,-1) (1,-2)	
g(x) that is the inverse of f(x)	(1,0) (2,1) (3,2) (4,3) reverse the x and y values of f(x)	
j(x) that is an even function	(-2,2) (-1,1) (1,1) (2,2)	

10. state the equation of the line that passes through (-2, 3) and (1, -3) in slope-intercept form and point slope form using (-2, 3).

$$\begin{matrix} x & y & & x & y \\ -2 & 3 & & 1 & -3 \end{matrix}$$

$$\frac{3 - (-3)}{-2 - 1} = \frac{6}{-3} = -2$$

$$y - y_1 = m(x - x_1)$$

$$y - 3 = -2(x + 2)$$

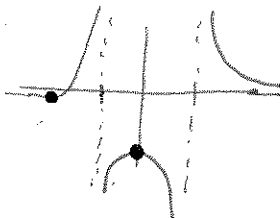
$$y - 3 = -2x - 4$$

$$y = -2x - 1$$

Use $g(x) = \frac{x+2}{(x-1)(x+1)}$ to answer questions 11-12

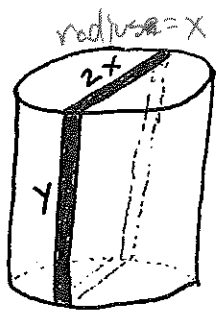
11. graph and state any asymptotes on g(x)

at
 $x > 1$ or $x = -1$



12. State any extreme values of g(x)

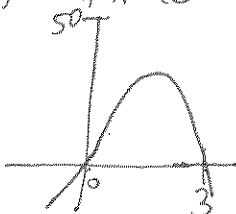
max at $x = (-2.268, -1.866)$
min at $(-3.732, -1.133)$



13. A company is planning to make cylindrical boxes. A band that is 12 cm in length will be wrapped around the box as shown in the diagram to the left. Given that the volume of the cylinder can be found with $V(x) = \pi r^2 h$ where r is the radius and h is the height, what radius maximizes the volume of the box?

Perim
 $y + 2x + y + 2x = 12$
 $4x + 2y = 12$
 $y = 6 - 2x$

$V(x) = \pi r^2 h$
 $V(x) = \pi x^2 (6 - 2x)$



Max at
 $x = 2$ $y = 2$

Volume = 25.13