Algebra/Trig Warm-up

Name _____

Directions: Read each question carefully and answer in the space provided.

1. Solve for x. Check your solution(s).

$$\frac{x-2}{x+6} = \frac{x+1}{x-3}$$

2. Solve for x. Check your solution(s).

$$\sqrt{x} - \sqrt{x-9} = 1$$

3. Solve the inequality. Give your answer in interval notation.

$$5|x-2|+3>4$$

4. Determine the center and the radius of the circle and sketch the graph.

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

5. Find the slope-intercept form of the equation of the line that goes through $(2, 1)$ and is perpendicular to the line $5x - 7y = 35$.

6. Graph the function. Label your endpoints with their coordinates.

$$f(x) = \begin{cases} |x| & \text{for } x < 2 \\ 4 - x & \text{for } x \geq 2 \end{cases}$$

7. Identify the vertex AND x-intercept(s).

$$y = 2x^2 - 8x + 1$$

8. Find the partial fraction decomposition.

$$\frac{6x - 6}{x^2 - 4x - 5}$$

9. Solve for x. Check your solution(s).

$$\log_3(x) + \log_3(x-6) = 3$$

10. Solve $2^x = 7^{x-3}$. Give an exact solution.

11. Evaluate exactly.

    (a) $\sin 420^\circ$

    (b) $\cos\left(-\frac{3\pi}{4}\right)$

    (c) $\cot(-390^\circ)$

    (d) $\sec\left(\frac{5\pi}{6}\right)$

12. Given $\alpha = 45^\circ$, $b = 42$, and $a = 37$, determine (and state) the number of triangles and solve <u>one</u> existing triangle.

13. Solve the system

$$y = 2x^2 - 2$$
$$x + y = 4$$

algebraically. Then graph both equations on the same coordinate system to support your solution.

14. Use the identity

$$\sin(\alpha - \beta) = \sin\alpha\cos\beta - \cos\alpha\sin\beta$$

to find the exact value of

$$\sin\left(\frac{7\pi}{12}\right).$$

15. In this problem, clearly label the exact values of the coordinates of the x-axis and y-axis for each part (you will receive no credit if this is not done). Graph

$$f(x) = 3\sin(2x + \pi/2)$$

using the following steps.

(a) Sketch at least one cycle of $y = \sin x$. What is the period?

(b) Sketch at least one cycle of $y = \sin 2x$. What is the period?

(c) Sketch at least one cycle of $y = 3\sin(2x)$. What is the amplitude?

(d) Sketch at least one cycle of $y = f(x)$. What is the phase shift?

16. Use the identity

$$\tan\frac{x}{2} = \frac{\sin x}{1+\cos x}$$

to find the exact value of

$$\tan(67.5^\circ).$$

17. Graph $y = \cot x$ in the interval $[-2\pi, 2\pi]$.

18. Solve each system by your method of choice. Determine whether each system is independent, inconsistent, or dependent.

    (a) $3x - y = 3$
    $x + 2y = 1$

    (b) $6x + 2y = 3$
    $y = -3x + 1$

    (c) $5x - 2y = \frac{1}{2}$
    $\frac{1}{5}x - \frac{1}{2}y = 2$

19. Graph the solution set to $x^2 + y^2 \leq 36$ and $y - 2x \geq 4$.