Name: _____

Write all of your responses on these exam pages. If you need extra space please use the backs of the pages. Show all your work, answers without supporting justification will not receive credit. Keep your answers in exact form. **No calculation devices allowed.**

1. (*10 Points*): Solve the following by completing the square.

$$3x^2 - 8x - 7 = 0$$

2. (*10 Points*): Solve the inequality and express the solution in terms of intervals.

$$\frac{|3x-4|}{3}+5>10$$

3. (*10 Points*): Find the point-slope, slope-intercept, and general forms of the equation of the line that passes through the points $(-1, 7)$ and $(3, 2)$.

4. (*10 Points*): Use the quadratic formula to find the zeros of f and find the maximum or minimum value of $f(x)$ where

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

5. (*15 Points*): Find all values of x such that $f(x) > 0$ and all x such that $f(x) < 0$, express your answers in interval notation.

$$f(x) = x^4 - 11x^2 + 28$$

6. (*15 Points*): Find all solutions of the equation.

$$x^3 - 6x^2 + 3x + 10 = 0$$

7. (*10 Points*): Find the quotient and remainder if $2x^3 + x - 5$ is divided by $x^2 + x + 1$.

8. (*15 Points*): Given the function,

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

Find all asymptotes, intercepts, and holes. Also determine where the graph crosses any horizontal asymptotes.

9. (*10 Points*): Solve the equation,

$$8^{2x} \cdot \left(\frac{1}{4}\right)^{x-2} = 4^{-x} \cdot \left(\frac{1}{2}\right)^{2-x}$$

10. (*15 Points*): Solve the equation,

$$\log_2(x+1) + \log_2(x-3) = 3$$

11. (*10 Points*): Write the expression as one logarithm.

$$7\log_5(x) - 3\log_5(4x-5) + \frac{1}{3}\log_5(x+1)$$

12. (*10 Points*): Verify the following identity,

$$\frac{\sec(x) - \cos(x)}{\tan(x)} = \sin(x)$$

13. (*15 Points*): Verify the following identity,

$$\tan\left(x + \frac{3\pi}{4}\right) = \frac{\tan(x) - 1}{1 + \tan(x)}$$

14. (*10 Points*): Find the exact values of the following,

(a) $\tan(\pi/6)$

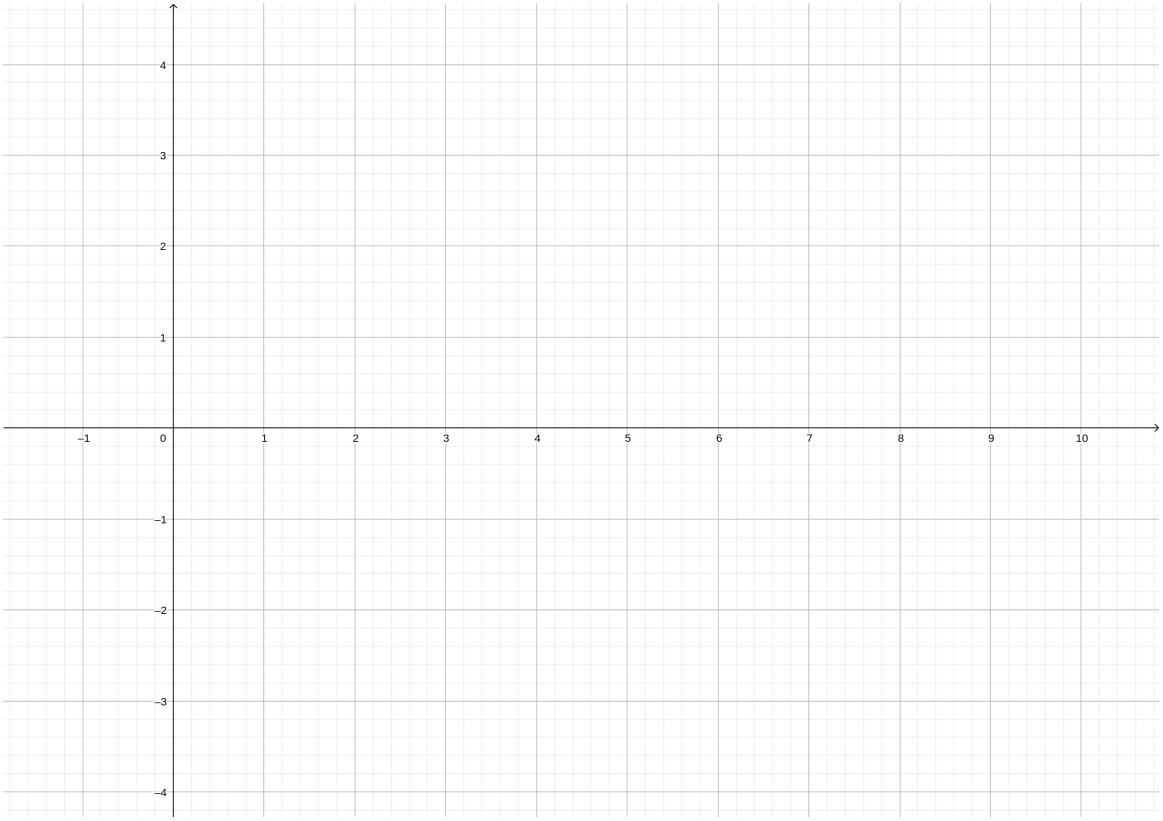
(b) $\cos(-5\pi/6)$

(c) $\sec(\pi/4)$

(d) $\cot(\pi/6)$

15. (*10 Points*): Find the amplitude, the period, and the phase shift and sketch the graph of,

$$f(x) = 3\cos\left(2x + \frac{\pi}{2}\right)$$



16. (*10 Points*): Find all solutions of the equation,

$$2\cos^2(x)\sin(x) - 2\sin(x) + \cos^2(x) - 1 = 0$$

17. (*15 Points*): Find the exact values of,

(a) $\sin\left(\frac{\pi}{12}\right)$ (b) $\cos\left(\frac{\pi}{12}\right)$ (c) $\tan\left(\frac{\pi}{12}\right)$

Note that $\frac{\pi}{12} = \frac{\pi}{3} - \frac{\pi}{4}$.