Math 1550 Final Exam Fall 2015

6 1. Solve $(x-2)(x+3) > 0$. Write your answer in interval notation.

6 2. Find the center and radius of the circle $x^2 + y^2 - 6y + 5 = 0$.

8 3. Consider the function $f(x) = \dfrac{3x+1}{x(x+2)}$. Find

   (a) Domain of f

   (b) Any vertical asymptotes of f

   (c) Any horizontal asymptotes of f

   (d) A rough sketch of the graph of f

4. A 1 week-old sorghum plant has an average height of 2 inches. A 4 week-old sorghum plant has an average height of 8 inches. Assuming that the growth is linear,

5   (a) Find an equation for the height of an average sorghum plant as a function of time.

2   (b) Use part (a) to predict how tall a 5 week-old plant will be.

4 5. How is the graph of $f(x+2) + 3$ related to the graph of $f(x)$?

6 6. Solve $3^{5x-1} = 3^{x^2+3}$.

6 7. Solve $\log_4(x) + \log_4(x+6) = 2$.

8 8. A ball is thrown into the air. Its height is given by $h(t) = -16t^2 + 32t + 5$. Find the maximum height of the ball and time required to reach it.

8 9. Give exact values for the following

   (a) $\tan(60°)$ (b) $\cos\left(\dfrac{-3\pi}{4}\right)$

   (c) $\sin^{-1}\left(\dfrac{-1}{2}\right)$ (d) $\sin\left(\tan^{-1}\left(\dfrac{1}{3}\right)\right)$

8 10. Find all values of x in radians, $0 \le x < 2\pi$, that satisfy $\cos(x)(2\sin(x) + 1) = 0$.

4 11. Convert the point $(2, \frac{3\pi}{4})$ from polar coordinates to rectangular coordinates.

3 12. If $\cos(x) = \dfrac{3}{5}$ and $\sin(x) = \dfrac{-4}{5}$, find $\sin(2x)$.

6 13. If θ is an angle in the 4th quadrant and $\cos(\theta) = \dfrac{5}{13}$, find exact values for

   (a) $\sin(\theta)$

   (b) $\sec(\theta)$

   (c) $\cot(\theta)$

6 14. If $\mathbf{u} = <1, -2>$ and $\mathbf{v} = <3, 4>$, find

   (a) $\mathbf{u} - 3\mathbf{v}$

   (b) $|\mathbf{v}|$

6 15. Solve the following system:

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

8 16. Find the partial fraction decomposition for $\dfrac{6 - 2x}{x(x - 2)}$.