

Math 1550 Final Exam Fall 2015

Calculators are not allowed on this exam. Work all questions completely. Show all work as described in class. Point values for each problem are given in the boxes in the margin. Answer questions in your blue book in order. Copyright 2015 Dept of Mathematics and Statistics, Texas Tech University. Unauthorized reproduction prohibited.

- 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 $f(x) = \frac{3x + 1}{x(x + 2)}$. 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) $\tan(60^\circ)$
 - (b) $\cos\left(\frac{-3\pi}{4}\right)$
 - (c) $\sin^{-1}\left(\frac{-1}{2}\right)$
 - (d) $\sin\left(\tan^{-1}\left(\frac{1}{3}\right)\right)$
- 8 10. Find all values of x in radians, $0 \leq x < 2\pi$, 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 $\cos(x) = \frac{3}{5}$ and $\sin(x) = \frac{-4}{5}$, find $\sin(2x)$.
- 6 13. If θ is an angle in the 4th quadrant and $\cos(\theta) = \frac{5}{13}$, find exact values for
- (a) $\sin(\theta)$
 - (b) $\sec(\theta)$
 - (c) $\cot(\theta)$
- 6 14. If $\mathbf{u} = \langle 1, -2 \rangle$ and $\mathbf{v} = \langle 3, 4 \rangle$, 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 $\frac{6 - 2x}{x(x - 2)}$.