

ALGEBRA 2/TRIGONOMETRY MIDTERM REVIEW – SPRING 2011

1. Write  $(2x + 1)^2 - (x + 2)^2$  in simplest form.
2. The solution of  $x^2 - 5x = 6$  is...
3. Write  $\frac{a - \frac{1}{a}}{a + 1}$  in simplest form.
4. The sum of  $(3 + \sqrt{12})$  and  $(-5 + \sqrt{27})$  is...
5. Which of the following products is rational?  
a.  $(10 + \sqrt{10})(10 + \sqrt{10})$  b.  $(10 + \sqrt{10})(10 - \sqrt{10})$  c.  $\sqrt{10}(2 + \sqrt{10})$  d.  $10(10 - \sqrt{10})$
6. Rationalize  $\frac{1 - \sqrt{3}}{1 + \sqrt{3}}$ .
7. Which of the following is a one-to-one function when the domain is all real numbers?  
a.  $y = x - 5$  b.  $x^2 + y^2 = 9$  c.  $y = x^2 - 2x + 5$  d.  $y = |x - 4|$
8. Find the roots of the equation  $2x^2 - 5x + 3 = 0$ .
9. Write the expression  $2 \log a + \frac{1}{3} \log b$  as a single logarithmic expression.
10. Express the product  $(3 - 2i)(-1 + i)$  in  $a + bi$  form.
11. Find the solution set of  $|2x - 4| < 3$ .
12. Solve for  $x$ :  $3 + (x + 3)^{\frac{1}{2}} = x$ .
13. Write the equation of a circle if the center is  $C(2,1)$  and one point on the circle is  $A(4,0)$ .
14. Find the roots of  $x^2 + 4x = 6$ .
15. Let  $f(x) = x^2 - x$  and  $g(x) = 5x + 7$ .  
a. Find  $(f \circ g)(-2)$ .  
b. Write  $(f \circ g)(x)$  in simplest form.
16. Find reference angles.  
a.  $107^\circ$  b.  $-150^\circ$  c.  $408^\circ$  d.  $291^\circ$
17. The point  $(9, -13)$  is on the terminal side of angle  $\theta$ . Find:  
a.  $\sin \theta$  b.  $\cos \theta$  c.  $\tan \theta$  d.  $\csc \theta$  e.  $\sec \theta$  f.  $\cot \theta$
18. Find each exact function value. (In rational or radical form. NO ROUNDING.)  
a.  $\sin \frac{\pi}{4}$  b.  $\cos \frac{\pi}{6}$  c.  $\tan 120^\circ$  d.  $\csc 120^\circ$
19. From the top of a building that is 56 feet high, the angle of depression to the base of an adjacent building is  $72^\circ$ . Find, to the nearest foot, the distance between the buildings.
20. Let  $0 \leq \theta < 2\pi$ . For what two values of  $\theta$  is each function value undefined?  
a.  $\tan \theta$  b.  $\csc \theta$  c.  $\sec \theta$  d.  $\cot \theta$