NAME: _____

Instructions: The exam questions are closely related to the homework and to the examples shown in class. Make sure you review your WeBWorK assignments.
For more practice and to start preparing for the departmental comprehensive final exam, get a copy of the Final Exam Review Sheet at
http://www.citytech.cuny.edu/mathematics/docs/review/MAT1275FinalReview.pdf

1. Find the exact value of $\sin(3\pi/2)$.

2. Find the exact value of $\cos(\pi/6)$.

3. Find $\tan(20°)$. Approximate your answer to at least 4 decimal places.

4. Given a $30 - 60 - 90$ triangle with hypotenuse 1, find the shorter leg and the longer leg. Give exact answers.

5. Given a $45 - 45 - 90$ triangle with hypotenuse 1, find the legs. Give exact answers.

6. Given a $30 - 60 - 90$ triangle with longer leg 9, find the shorter leg and the hypotenuse. Give exact answers.

7. Given the angle $\theta = 315°$:

   (a) Draw angle θ.

   (b) In which quadrant is the terminal side of θ?

   (c) Convert θ into radian measure.

   (d) Find the reference angle of θ in degrees.

   (e) Find the coordinates of the point where θ intersects the unit circle. Give the exact answer.

8. Solve the following system.
$$\begin{pmatrix} x^2 - y^2 = 3 \\ 2x + y^2 = 5 \end{pmatrix}$$

9. Suppose that $\tan\theta = \frac{12}{5}$ and that $\sin(\theta) < 0$. Find the remaining five trigonometric functions. (First find x, y, r).

10. Consider the right triangle ABC ($C = 90°$). If $a = 18$ and $b = 14$, find angle A. Express your answer to the nearest tenth of a degree. (Recall that a denotes the side opposite to angle A, and b denotes the side opposite to angle B.)

11. Consider the right triangle ABC ($C = 90°$). If $A = 39°$ and $b = 17$, find the hypotenuse. Express your answer accurate to at least three decimal places. (Recall that b denotes the side opposite to angle B.)

12. Prove the identity $\dfrac{1}{\cos(x)} - \dfrac{1}{\sec(x)} = \sin(x)\tan(x)$.

13. Evaluate $\log_3 \frac{1}{81}$ without using a calculator.

14. Solve $5^{2x+1} = 25$. Give the exact answer.

15. Solve $7^x = 63$ (round the answer to the nearest tenth).

16. Evaluate $\log_4(64\sqrt[5]{4})$ without using a calculator. Show your work.

17. Write $3\log x - 7\log y + 11\log z$ as a single logarithm.

Answers

1) -1; 2) $\sqrt{3}/2$; 3) .3640; 4) $1/2, \sqrt{3}/2$; 5) $\sqrt{2}/2, \sqrt{2}/2$; 6) $3\sqrt{3}, 6\sqrt{3}$

7) b) 4; c) $7\pi/4$; d) $45°$; e) $(\sqrt{2}/2, -\sqrt{2}/2)$

8) $(-4, \sqrt{13}), (-4, -\sqrt{13}), (2, 1), (2, -1)$

9) $\sin(\theta) = -12/13$, $\cos(\theta) = -5/13$, $\csc(\theta) = -13/12$, $\sec(\theta) = -13/5$, $\cot(\theta) = 5/12$

10) $A = 52.1°$

11) 21.8750

12) This is problem 10c) in the final exam review sheet and a step by step solution is given there. See http://www.citytech.cuny.edu/mathematics/docs/review/MAT1275FinalReview.pdf

13) -4; 14) $x = \frac{1}{2}$; 15) 2.1; 16) $\frac{16}{5}$; 17) $\log\left(\frac{x^3 z^{11}}{y^7}\right)$