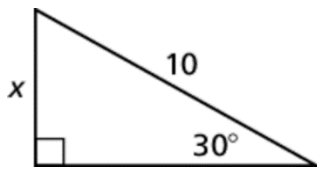**Final Exam S2 Review**   Name _____Per _____
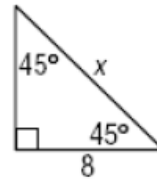
Math 126

1) Find the value of x for the special right triangle. Simplify and leave in radical form if necessary.
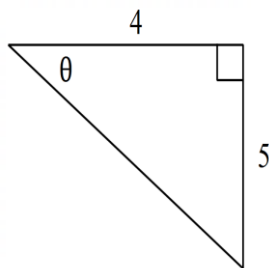
a)

b)

2) Convert $225°$ to radian measure in terms of π.   **3)** Convert $\frac{5\pi}{6}$ to degrees.
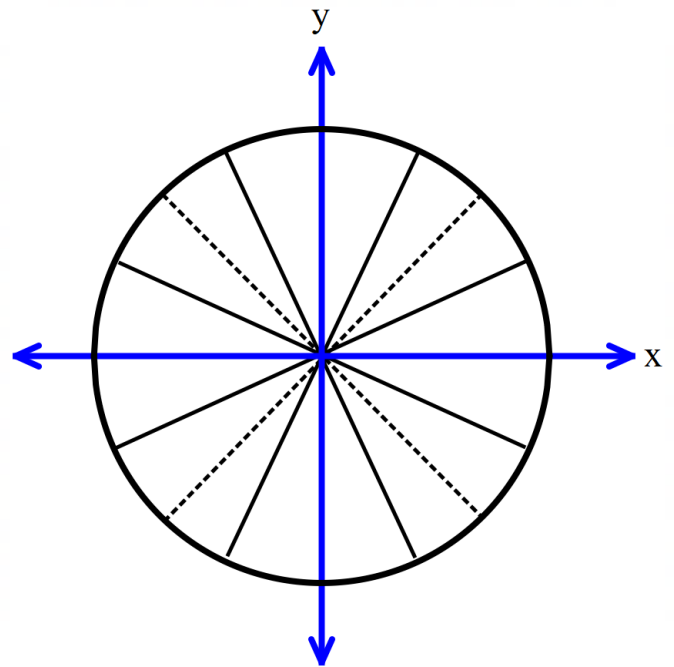
4) Use the diagram shown to find the requested trig ratios.   **5)** Fill out the unit circle (need to know!)

a) $\cos\theta =$ b) $\sin\theta =$ c) $\csc\theta =$

d) $\tan\theta =$ e) $\sec\theta =$ f) $\cot\theta =$

6) Find each requested value, if it exists. Write "undefined" for values that do not exist.
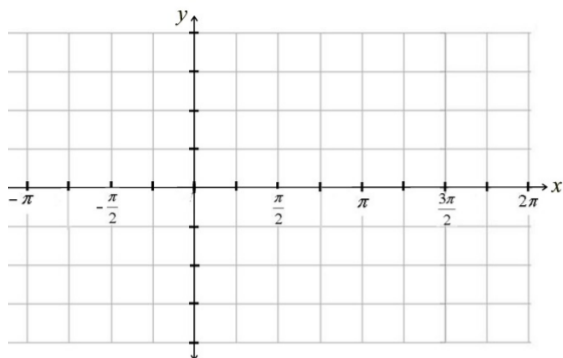   a) $\tan\left(\frac{3\pi}{4}\right)$ b) $\sin\left(-\frac{5\pi}{3}\right)$ c) $\csc(120°)$ d) $\cot\left(\frac{\pi}{3}\right)$
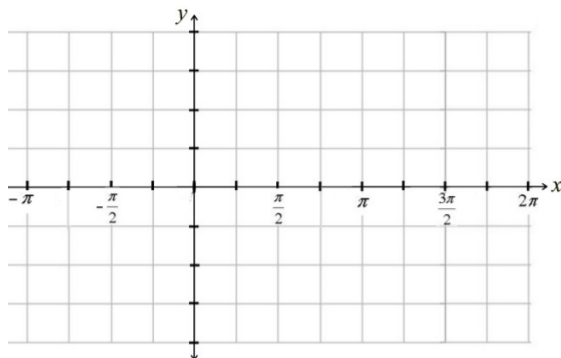
7) Evaluate $tan(180°)$ without using a calculator. Draw a diagram to support your answer.

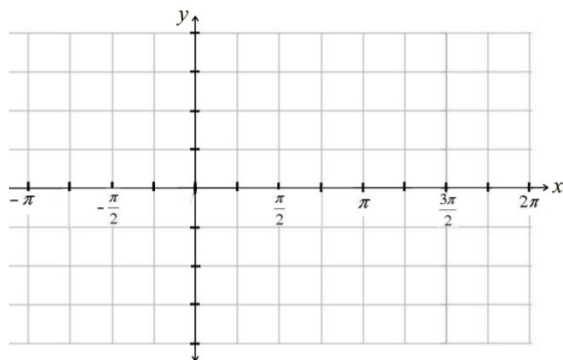**#8 – 11: Graph each function. Identify the amplitude and transformations of $g(x)$.**

8) $f(x) = \sin x$
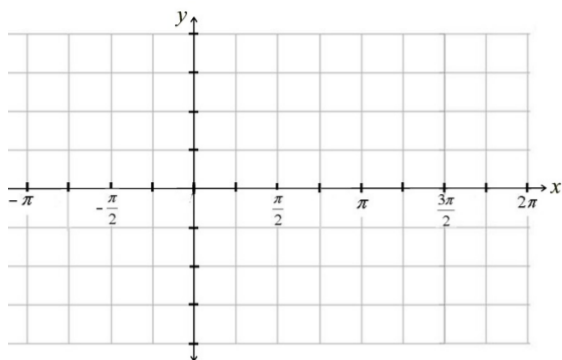
$g(x) = 3 \sin x$

9) $f(x) = \cos x$

$g(x) = -\cos x$

10) $f(x) = \cos x$

$g(x) = 2 \cos x - 1$

11) $f(x) = \sin x$

$g(x) = \sin(x + \frac{\pi}{2})$

#23 – 28: Solve each system.

23) $\begin{cases} x + y = 4 \\ y = -3x \end{cases}$

24) $\begin{cases} 8x + 8y = 136 \\ -3x + 4y = 12 \end{cases}$

25) $\begin{cases} x + y + z = 6 \\ x - y + 5z = 8 \\ 2x + y + z = 4 \end{cases}$
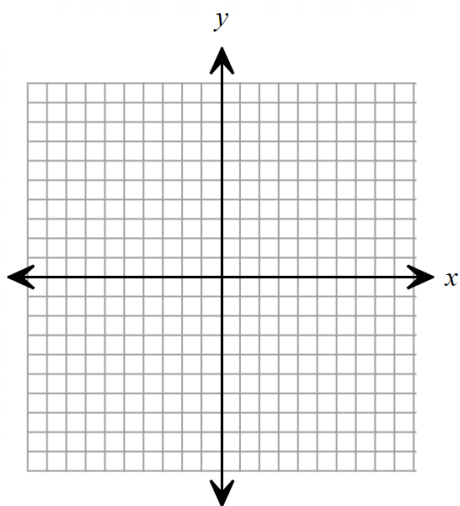
26) $\begin{cases} x + y + z = 0 \\ x - y + 5z = 28 \\ 3x + y + z = -2 \end{cases}$

27) $\begin{cases} x - y = -1 \\ y = x^2 + 1 \end{cases}$

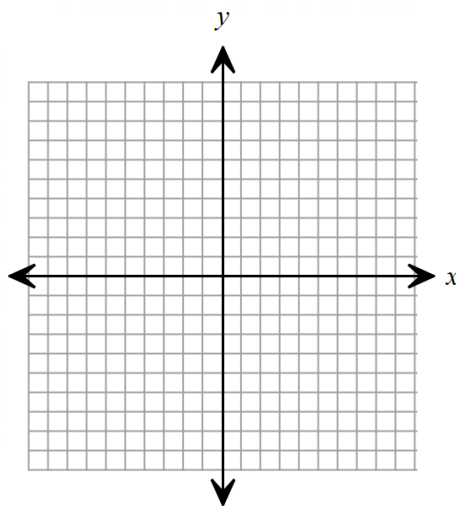**28)** $\begin{cases} 4x - y = -21 \\ x^2 - y = 0 \end{cases}$

29) Joe spent $61 purchasing 5 new books. Paperbacks cost $8 and hardcover books cost $15. Write a system for the situation. How many of each kind did he buy?

30) Graph the system $\begin{cases} y \geq (x + 1)^2 - 3 \\ y < x + 5 \end{cases}$

31) Graph the system $\begin{cases} y < \frac{1}{8}x^2 + 2 \\ y \leq -\frac{1}{2}x + 3 \end{cases}$

32) Multiple Choice: The matrix $\begin{bmatrix} 1 & 3 & -1 & 4 \\ 0 & 1 & 6 & 2 \\ 0 & 0 & 0 & 0 \end{bmatrix}$ has:

    A. One solution   C. No solution

    B. Infinitely many solutions   D. cannot be determined

33) Using Gaussian Elimination, find the solution to the system:

$$\begin{bmatrix} 1 & 1 & -3 & 4 \\ 2 & 1 & -1 & 2 \\ 3 & 2 & -4 & 6 \end{bmatrix}$$

#34 – 39: Perform the indicated operation, if possible, using the matrices below:

Let $\quad A = \begin{bmatrix} 2 & 7 \\ 1 & -1 \end{bmatrix} \quad B = \begin{bmatrix} 1 & 0 \\ -2 & 3 \end{bmatrix} \quad C = \begin{bmatrix} -4 & -2 & -3 \\ 1 & -3 & 6 \end{bmatrix} \quad D = \begin{bmatrix} 2 & 0 \\ -1 & 4 \\ -3 & 1 \end{bmatrix} \quad E = \begin{bmatrix} 2 & -2 & -1 \\ 3 & -1 & 5 \end{bmatrix}$

$\quad\quad Z = \begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix} \quad\quad I = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$

34) $2C - E$ **35)** $B + A$ **36)** AB

37) $A + Z$ **38)** AI **39)** BA

40) Find the value of y below:

$$\begin{bmatrix} 4 - t & 6 \\ 10 & -3 \end{bmatrix} = \begin{bmatrix} -5 & 6 \\ 10 & 8y + 2 \end{bmatrix}$$

41) Identify the center and radius for $(x - 4)^2 + (y + 1)^2 = 25$

42) Write the equation of the circle in standard form: $x^2 + 10x + y^2 - 6y + 8 = 0$

#43 – 45: Identify the type of conic shown.
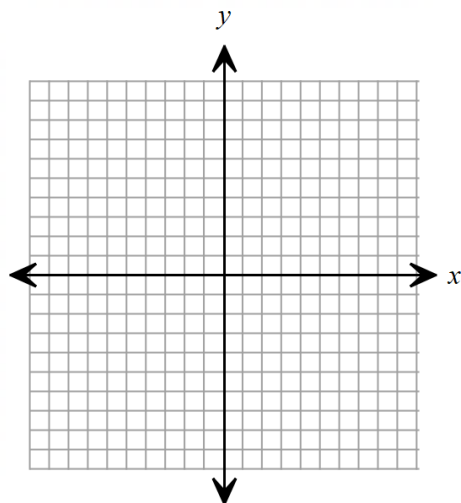
43) $x = (y + 1)^2 - 6$

44) $\frac{x^2}{9} + \frac{(y+1)^2}{16} = 1$

45) $\frac{y^2}{16} - \frac{(x-2)^2}{9} = 1$

46) Identify the vertex, domain, and range for #43.

47) Identify the center, vertices, and co-vertices for #44.

48) Graph #45.

#49 – 51: Write the first four terms of each sequence.

49) $a_n = 4n - 2$

50) $a_1 = 32$
$a_n = a_{n-1} - 4$

51) $a_n = 2(4)^n$

52) There are 20 seats in the first row of the stadium, 24 seats in the second row, 28 seats in the third row, and so on. How many total students can be seated in the first 60 rows?

53) Evaluate:

$$\sum_{i=1}^{4} 3i + 5$$

54) Find the infinite sum:

$$\sum_{n=1}^{\infty} 6 \cdot (0.4)^{n-1}$$

55) In how many ways can a President and Vice President be selected from a club with 20 people?

56) In how many ways can the letters in the word DAMONTE be re-arranged?