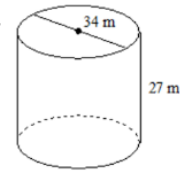
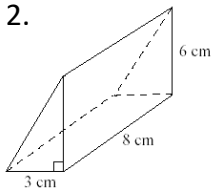
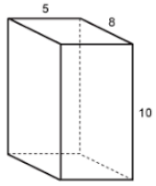
**Unit 11 Assignments** **Secondary 3 Honors**

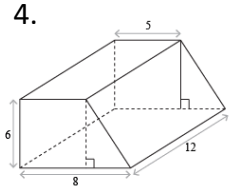
## Assignment #11-1

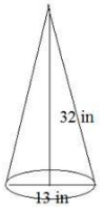
Find the volume of each figure. Show work and include units with your answer.

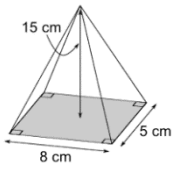
1. 


2. 

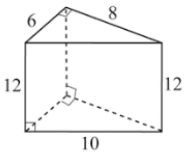

3. 

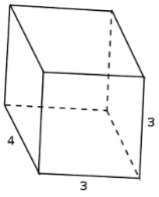

4. 

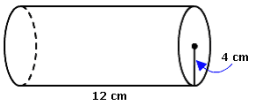

5. 

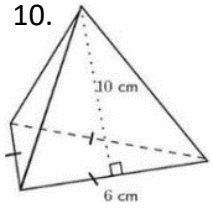

6. 

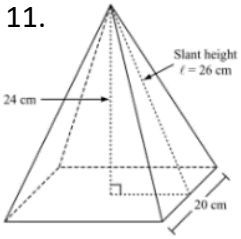

Find the surface area of each figure. Show work and include units with your answer.

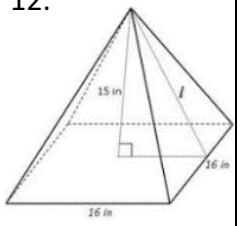
7. 


8. 

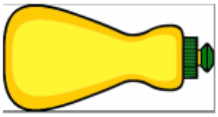

9. 


10. 


11. 


12. 

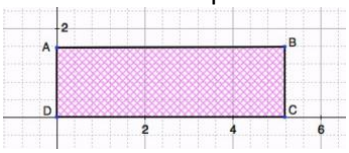

For each of the following solids, draw the two-dimensional shape that would be revolved around the x-axis to generate it.

13. 

14. 

15. 

16. Name something in your house that would be shaped like the solid of revolution formed , if the figure below were rotated around the x-axis.




For problems 17-19, use $f(x) = 3x - 1$, $g(x) = x^2 + 2$, and $h(x) = \sqrt{3x^2} + 4$

17. $f(3) + g(5)$ 18. $f(x) \cdot g(x)$ 19. $g(f(x))$

Convert the following to vertex form by completing the square.

20. $f(x) = x^2 - 8x + 10$ 21. $f(x) = 3x^2 + 12x + 7$

22. Convert the following quadratic function to standard form ($f(x) = ax^2 + bx + c$)

$f(x) = -\frac{1}{3}(x - 3)^2 + 7$

23. Factor $4x^2 + 12x - 40$

24. Graph $f(x) = -x^3(x - 1)^3(x + 2)^2$ ***WITHOUT A CALCULATOR!!***

## Assignment #11-2

***Draw a sketch that illustrates a system whose equations are the graphs described with the number of points of intersection given. (There may be more than one way to do this.)***

1. A line and a circle; no points
2. A line and a circle; two points
3. A parabola and a circle; two points
4. A parabola and a line; one point
5. Two circles; two points
6. A line and a circle; one points

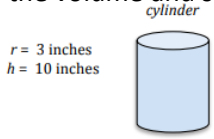
***Solve the systems using substitution. Write answers as ordered pairs. Work must be shown. NO Decimals.***

7. $\begin{cases} x^2 - x = y \\ y = x \end{cases}$
8. $\begin{cases} y = x^2 + 6x \\ 12x = 3y \end{cases}$
9. $\begin{cases} y = x^2 + 6x + 9 \\ x + y = 3 \end{cases}$
10. $\begin{cases} 2x^2 + 4y^2 = 4 \\ x = 4y \end{cases}$

***Solve the systems using elimination. Write answers as ordered pairs. Work must be shown. NO Decimals.***

11. $\begin{cases} 3x^2 + 2y^2 = 12 \\ x^2 + 2y^2 = 4 \end{cases}$
12. $\begin{cases} 2x^2 + 3y^2 = 6 \\ x^2 + 3y^2 = 3 \end{cases}$
13. $\begin{cases} 5x^2 - 2y^2 = -13 \\ 3x^2 + 4y^2 = 39 \end{cases}$
14. $\begin{cases} x^2 + y^2 = 4 \\ x^2 - y = 2 \end{cases}$
15. $\begin{cases} -2x^2 + y^2 = -6 \\ x^2 - y = 3 \end{cases}$
16. $\begin{cases} 6x^2 + y^2 = 9 \\ 3x^2 + 4y^2 = 36 \end{cases}$

17. Find the volume and surface area of




18. Find the **exact value** of the following trig ratios. **NO CALCULATORS.**
    a. $\sin 135°$ b. $\cos(-240°)$ c. $\tan 330°$

---

## Assignment #11-3

**Bookwork: p. 433 3-54 (Multiples of 3 only)**

**Additional Problems:**

1. Find the other five trigonometric functions for an angle if $\sin\theta = \frac{5}{13}$ and $\frac{\pi}{2} \le \theta < \pi$.
2. Given $f(x) = x^{\frac{4}{3}}$, find $f(-8)$ without a calculator.
3. Find the reference angle for $244°$.
4. Given $\Delta ABC$ with $A = 32°, B = 55°, and\ c = 12,$ find the length of side a.
5. Find the equation of the line perpendicular to $-3x - 6y = 10$ and through the point (-1,7).

---

## Assignment #11-4

**Bookwork:** p.445 3-42 (multiples of 3), 85,90

**Additional Problems:**

1. Given $\Delta ABC$ with $a = 12, b = 15, and\ c = 21,$ find the measure of angle A.
2. Given $f(x) = -3x + 5\ and\ g(x) = 2x^2 + 1,$ find $(f \circ g)(x)$.
3. Graph and label a full period: $f(x) = -4\sin(2x) + 2$.
4. Divide: $(x^3 - 2x^2 - 5x + 6) \div (x - 3)$
5. Find the equation of the line that passes through the point (2,4) with an average rate of change(slope) of -3.

## Assignment #11-5

**Find <u>exact values</u> of the x and y components for the following force and velocity vectors. (No Calculators/NO decimals.)**

1. Magnitude = 200 ft/sec Direction angle = 45°

2. Magnitude = 50 pounds Direction angle = 120°

3. Magnitude = 80 ft/sec Direction angle = 90°

**Find values to 3 decimal place accuracy of the components of the following vectors. Set your calculator to degree mode.**

4. 473.5 ft/sec Direction angle = 21°

5. Magnitude = 16.87 miles/hour Direction angle = 143°

**Use parametric equations to graph (on your calculator) the following flight paths for objects propelled from the ground with velocities as shown. Then answer parts a), b), and c) for each question. Round to 1 decimal place.**

**a. The x and y values for the object at t = 1, 2, 3 seconds.**
**b. Maximum height and the time it occurs.**
**c. How long will the object remain in the air?**

6. Magnitude = 100 ft/sec Direction Angle = 45°

7. Magnitude = 500 ft/sec Direction Angle = 20°

8. A golfer hits a ball from ground level with an initial velocity of 113 ft/sec and at an angle of 36° from the horizontal. There is no wind.

   a. Find when and where the ball will hit the ground? Round time to 1 decimal place. Round distance to the nearest foot.

   b. Will the ball clear a 9 foot high fence that is 275 feet from the golfer?

9. An arrow is shot into the air with an initial velocity of 205 ft/sec and an angle of elevation of 48° from an initial height of 4 feet. Find when and where the arrow will strike the ground, and the maximum height of the arrow during its flight path for the following conditions. (Express time to the nearest tenth of a second and distances or heights to the nearest foot.)

   a. No Wind

   b. 10 ft/sec tail wind (aiding the horizontal speed and distance)

   c. 10 ft/sec head wind (hindering the horizontal speed and distance)

10. An object is shot upward from ground level with an initial velocity of 58 ft/sec and an angle of elevation of 41°. Consider the position of the object at any time t, where t = 0 when the object is shot. Neglect air resistance. There is no wind.

    a. Find the parametric equations that model the problem situation

    b. When will the object hit the ground? (nearest tenth)?

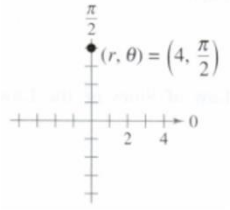
    c. Find the maximum height of the object (nearest tenth) and the time (nearest tenth) when the object reaches this height.

    d. How far does the object travel in a horizontal direction (nearest tenth)?

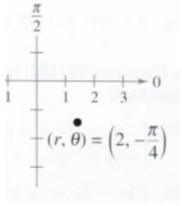
## Assignment #11-6

In Exercises 1 & 2, a point in polar coordinate is given. Find the corresponding rectangular coordinates for the point.

1. $\left(4, \frac{\pi}{2}\right)$




2. $\left(2, -\frac{\pi}{4}\right)$




Plot the point given in polar coordinates and find three additional polar representation of the point, using $-2\pi < 0 < 2\pi$

3. $\left(3, \frac{5\pi}{6}\right)$

Plot the point given in polar coordinates and find the corresponding rectangular coordinates for the point.

4. $\left(4, -\frac{\pi}{3}\right)$

Use a graphing utility to find the rectangular coordinates of the point given in polar coordinates. Round your results to two decimal places.

5. $\left(2, \frac{2\pi}{9}\right)$

6. $(8.25, 3.5)$

Plot the point given in rectangular coordinates and find ***two*** sets of polar coordinates for the point for $0 \leq \theta < 2\pi$.

7. $(-7,\ 0)$

8. $\left(\sqrt{3},\ -1\right)$

Use a graphing utility to find one set of polar coordinates for the point given in rectangular coordinates. (There are many correct answers)

9. $(-5, 2)$

Convert the rectangular equation to polar form. Assume $a > 0$.

10. $x^2 + y^2 = 9$

11. $y = 4$

12. $x = 8$

13. $3x - 6y + 2 = 0$

Convert the polar equation to rectangular form.

14. $r = 6 \sin\theta$

15. $r = 4$

Sketch the graph of the polar equation. Use a graphing utility to verify your graph. (Show a point every 30 degrees).

16. $r = 5$

17. $r = 3 \sin\theta$

18. $r = 3(1 - \cos\theta)$

19. $r = 4 + 5 \sin\theta$

20. $r = -\sin 5\theta$

Use a graphing utility to graph the polar equation. Describe your viewing window. (Show intercepts, petal tips, etc.)

21. $r = 6 - 4 \sin\theta$

22. $r^2 = 4 \cos 2\theta$

23. $r = 4 - \sec\theta$