

1. Graph the solution of the following system of inequalities. Be sure to clearly label your solution region.

$$x > 6$$

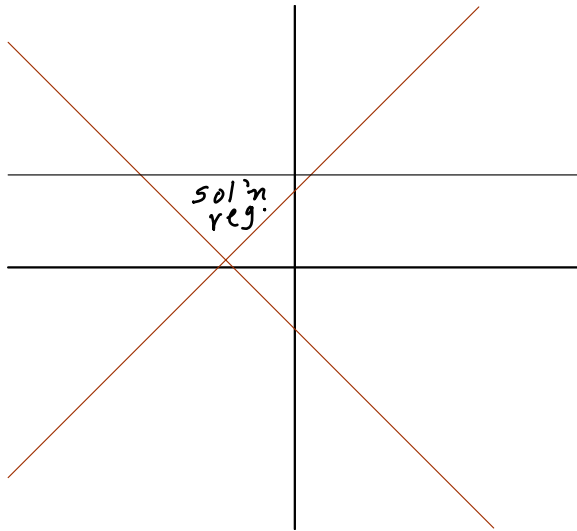
$$5x - 2y \geq 10$$

$$2x + 3y < 12$$

2. The solution region for the system of inequalities $x - y \leq -5$ is shown below.

$$x + y \geq -4$$

$$y \leq 6$$



- (a) Determine the corners of this solution region.
- (b) Determine the maximum and minimum values of $z = 3x + 5y$ if x and y satisfy the inequalities given above.

3. The Acme Toy Company makes two models of toy wagons, model X and model Y. The assembly time, painting time, and decorating time for model X are 2 hours, 1 hour, and 3.5 hours respectively. The assembly time, painting time, and decorating time for model Y are 2.5 hours, 2 hours, and 1.5 hours respectively. During a typical work week at the factory at most 75 hours of work time are devoted to assembling wagons, at most 40 hours are devoted to painting wagons, and at most 20 hours are devoted to decorating wagons. Set up a system of inequalities that describes the constraints that the Acme Toy Company must adhere to when it manufactures its two models of toy wagons. DO NOT SOLVE THE SYSTEM OF INEQUALITIES.

4. Determine exact values for each of the following associated with the right triangle shown below.

(a) $c =$ _____

(b) $\cos \angle A =$ _____

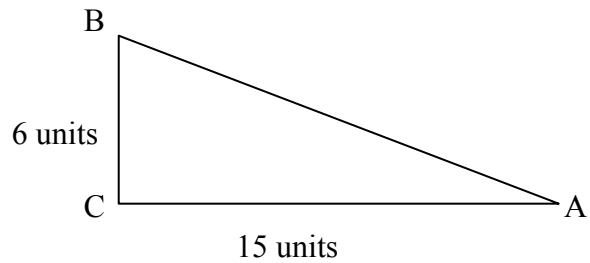
(c) $\sin \angle A =$ _____

(d) $\tan \angle A =$ _____

(e) $\csc \angle A =$ _____

(f) $\tan \angle B =$ _____

(g) $\sec \angle B =$ _____



5. In problem 4 determine the measures of $\angle A$ and $\angle B$. Give your answers in degrees (correct to four decimal places) and in degrees/minutes/seconds (rounded to the nearest second).

$m\angle A =$ _____ degrees = _____ $^{\circ}$ _____ $'$ _____ $''$

$m\angle B =$ _____ degrees = _____ $^{\circ}$ _____ $'$ _____ $''$

6. Determine the missing information for the following non-right triangle.

$$m\angle A = 28.7^\circ \qquad m\angle B = 54.7^\circ \qquad m\angle C = \underline{\hspace{2cm}}$$

$$a = \underline{\hspace{2cm}} \qquad b = \underline{\hspace{2cm}} \qquad c = 12.85 \text{ units}$$

7. A tower is 1200 feet tall. From a point on the ground where you are standing the angle of elevation to the top of the tower is $42^\circ 28'$.

(a) How far must you walk across the level ground to reach the bottom of the tower?

(b) How far must you walk to reach the bottom of the tower if the ground between you and the tower is inclined 20° ?

8. A ship leaves port and sails 100 nautical miles due south to a lighthouse. The ship then sails 50 nautical miles from the lighthouse to a marina that is located on a bearing of N 72° W from the lighthouse.

(a) How far is the marina located from the port?

(b) What is the bearing of the marina from the port?

9. A ship leaves port and sails 255 miles due east. The ship then sails 120 miles due south to its final destination.

(a) How far is the ship's final destination located from the port?

(b) What is the bearing from the port to the ship's final position?

10. A tree is leaning 5° off vertical away from the sun. If the length of the tree's shadow is 140 feet and the angle of elevation from the tip of the shadow to the top of the tree is $43^\circ 28'$, how tall is the tree?

11. Find the values of the six trigonometric functions for the angle $\theta = 125^\circ 38' 23''$. Round your answers to four decimal places. (2 points each)

$$\cos \theta = \underline{\hspace{2cm}} \qquad \sin \theta = \underline{\hspace{2cm}}$$

$$\tan \theta = \underline{\hspace{2cm}} \qquad \sec \theta = \underline{\hspace{2cm}}$$

$$\cot \theta = \underline{\hspace{2cm}} \qquad \csc \theta = \underline{\hspace{2cm}}$$