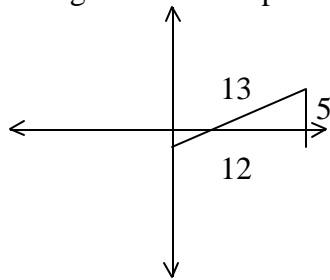


Exercises

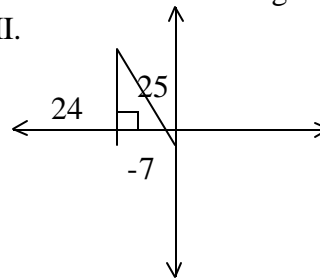
1. Given the triangles in standard position what function names do the following ratios have?

I.



- a. $12/13$ b. $5/12$
 c. $13/12$ d. $5/13$
 e. $12/5$ f. $13/5$

II.



- a. $24/25$ b. $-24/7$
 c. $25/24$ d. $-7/25$
 e. $-25/7$ f. $-7/24$

2. a. With the terminal side of an angle in standard position whose endpoint is (3,4), determine the six trigonometric function values formed by this angle:

b. If (3,-4) is the point, what are the function values?

c. If (-3,-4) is the point, what are the function values?

d. If (-3,4) is the point, what are the function values?

3. State the quadrants in which the following are possible. Do **not** use your charts or computer.

- a. $\cos \theta > 0$ b. $\tan \theta < 0$ c. $\sin \theta > 0$
 d. $\cot \theta > 0$ e. $\sec \theta > 0$ f. $\csc \theta < 0$
 g. $\cos \theta > 0$ and $\tan \theta < 0$ h. $\sin \theta > 0$ and $\cos \theta < 0$
 i. $\tan \theta > 0$ and $\cos \theta < 0$ j. $\sec \theta > 0$ and $\sin \theta > 0$
 k. $\csc \theta > 0$ and $\tan \theta < 0$ l. $\sec \theta > 0$ and $\cos \theta < 0$

4. What is the reference angle for each of the following angles in standard position?

- a. 127° b. $7\pi/6$ c. -45° d. $4\pi/3$ e. 180°

- f. 5.1 g. 22.75° h. -181.92° i. 2.7 j. 238.1°

5. Which functions do the following ratios represent? (o-opposite, a-adjacent, h-hypotenuse, r-radius)

- a. x/r b. o/h c. a/o d. r/y e. x/y

f. h/a

g. r/x

h. y/r

i. o/a

j. a/h

6. a. You know that a $45^\circ - 45^\circ - 90^\circ$ triangle has the ratio: $1:1:\sqrt{2}$. Use these values to determine the six trig functions for 45° or $\pi/4$. (Hint: use the triangle to figure these out.) Your answers should be in **fractions**, which means you should not use a calculator!
- b. How would the values you determined above change if the angle were 135° or $3\pi/4$?
- c. How would the values change if the angle were 225° or $5\pi/4$?
- d. How would they change if the angle were 315° or $7\pi/4$?
7. The ratio of a $30^\circ - 60^\circ - 90^\circ$ triangle is $1:2:\sqrt{3}$. Use this to determine the six trig functions for 30° or $\pi/6$ **and** 60° or $\pi/3$. (Hint: use the triangle to figure these out.) Your answers should be in **fractions**, which means you should not use a calculator!
8. a. What are the angles (in degrees and radians) in Quadrants II, III & IV which use 30° or $\pi/6$ as a reference angle?
- b. How would the values of the Trig functions be different from the first quadrant values?
9. a. What are the angles (in degrees and radians) in Quadrants II, III & IV which use 60° or $\pi/3$ as a reference angle?
- b. How would the values of the Trig functions be different from the first quadrant values?
10. a. Go back to the Trig Explorer program on "Functions - Lesson" to the point where the 'hand' moves the red ball in a circle around the coordinate system. Place the red dot on 0° . Now calculate the sine, cosine and tangent from the given ratios. From these determine the secant, cosecant and cotangent.

- b. Do the same for 90° or $\pi/2$ and determine the values for the six trig functions.
- c. Do the same for 180° or π and determine the values for the six trig functions.
- d. Do the same for 270° or $3\pi/2$ and determine the values for the six trig functions.
11. Construct a clinometer and use it, outside, to measure the height of the building you are in. Don't forget to add in the height to your eye level.
12. Tommy is looking at the top of a hill and wonders what his distance from the top is. He learned in Trig class that if he knew the following measurements: the distance from him to another nearby point at the bottom of the hill; the angles his point and the nearby point makes with the top, he could use the law of sine to determine his distance from the top. He measures his angle to the top as 55° , the distance to the nearby point is 27 meters away from his point, and the angle of the nearby point to him and the top as 48° . What is Tommy's distance to the top of the hill?