

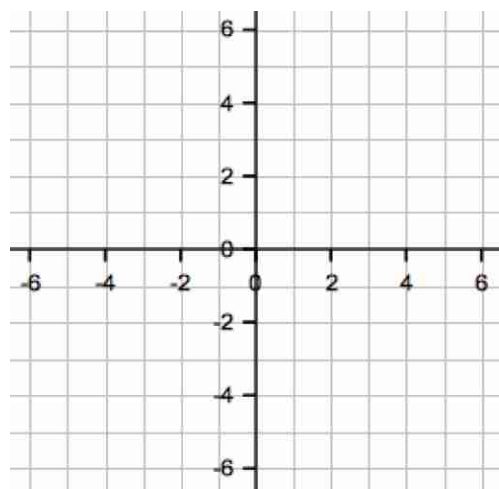
## MCR3U – Sin, cos and tan of angles made by co-ordinates

If a point  $(x, y)$  lies on the **terminal arm** of an angle  $\theta$ , we can calculate  $\sin \theta$ ,  $\cos \theta$  and  $\tan \theta$ .

1. Plot the point on a grid and draw a line from the origin to that point
2. Draw a vertical line from the point to the  $x$ -axis
3. Label the length and height of the triangle (these numbers correspond to the point  $(x, y)$ )
4. If necessary, calculate the length of the hypotenuse with the Pythagorean Theorem. Keep it as a **radical** – do not round an answer with decimals.
5. Figure out any of the trig ratios you need.

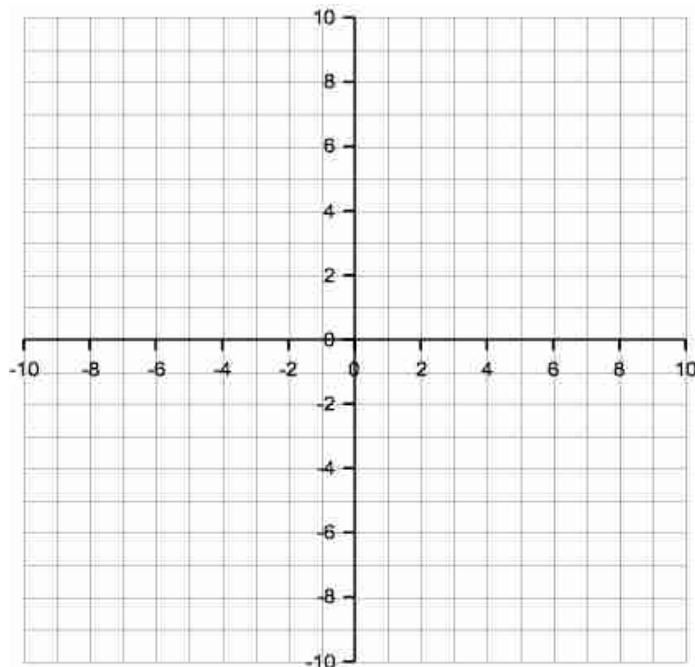
### Example 1

What is  $\sin \theta$ ,  $\cos \theta$  and  $\tan \theta$  for an angle ( $\theta$ ) whose terminal arm passes through  $(-4, 2)$ ?



### Example 2

What is  $\sin \theta$ ,  $\cos \theta$  and  $\tan \theta$  for an angle ( $\theta$ ) whose terminal arm passes through  $(7, -9)$ ?



## Homework

1. What is  $\sin \theta$ ,  $\cos \theta$  and  $\tan \theta$  for an angle ( $\theta$ ) whose terminal arm passes through each of the following points?

- a)  $(1, 8)$
- b)  $(-10, 10)$
- c)  $(-6, -8)$
- d)  $(3, -8)$
- e)  $(-57, -93)$

- 2.a) What is the exact trigonometric ratio for  $\sin 60^\circ$ ?
- b) Find another angle, between  $0^\circ$  and  $360^\circ$ , that has the exact same ratio for  $\sin$ .
- c) What do these two angles add up to?

- 3.a) What is the exact trigonometric ratio for  $\sin 45^\circ$ ?
- b) Find another angle, between  $0^\circ$  and  $360^\circ$ , that has the exact same ratio for  $\sin$ .
- c) What do these two angles add up to?

- 4.a) What is the exact trigonometric ratio for  $\cos 150^\circ$ ?
- b) Find another angle, between  $0^\circ$  and  $360^\circ$ , that has the exact same ratio for  $\cos$ .
- c) What do these two angles add up to?

- 5.a) What is the exact trigonometric ratio for  $\cos 30^\circ$ ?
- b) Find another angle, between  $0^\circ$  and  $360^\circ$ , that has the exact same ratio for  $\cos$ .
- c) What do these two angles add up to?