

### Sheet 651: Radians, right triangles, circular functions, master formula

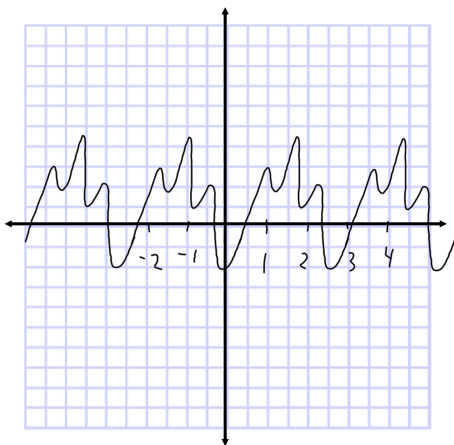
$y = \pm A \sin(B(t-h)) + k$      $\sin \theta = \frac{y}{r}$      $\cos \theta = \frac{x}{r}$      $\tan \theta = \frac{y}{x}$ . Calculator needed.

1. Find the values of each of the three trigonometric functions sine, cosine, and tangent of  $\theta$  for the following coordinates in the  $x$ - $y$  plane.

- a. (3, 4)
- b. (3, -4)
- c. (-5, -7)
- d. (-1, 0)
- e.  $\left(-\frac{\sqrt{3}}{2}, -\frac{1}{2}\right)$

2. Using the given information, find a good approximation of the period.

a. The graph, assuming that the horizontal axis is time in units of seconds.



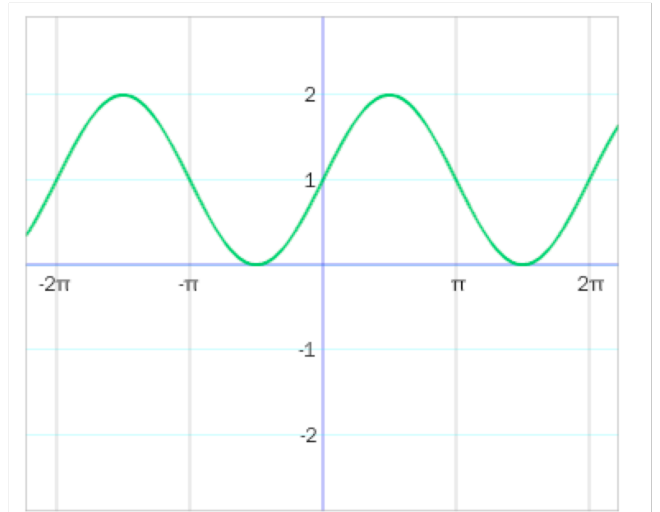
b. The table

$t$ (minutes)	0	4	8	12	16	20	24	28	32
$y$ (meters)	3	7	9	7	3	7	9	7	3

c. The position of Earth as it revolves around the Sun.

3. Find the amplitude, angular frequency, period, horizontal shift, phase shift, vertical shift, and the equation of the midline using the given information.

a. The graph



b. The formula  $y = \pm A \sin(B(t-h)) + k$

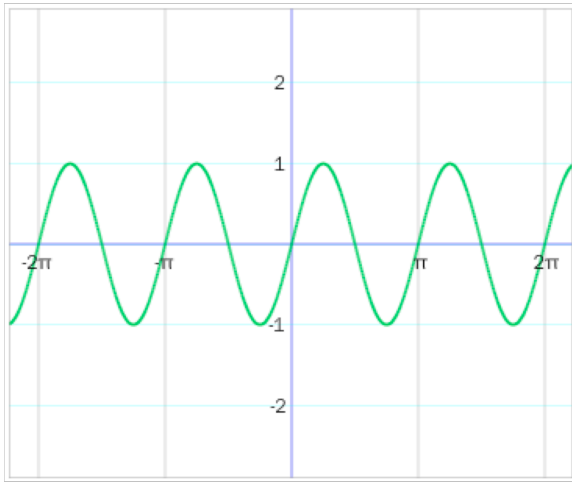
c. The equation  $y = 2 \cos(t)$

d. The equation  $y = -5 \sin(4(t-3)) + 7$

e. The equation  $y = \sin(8t - 16)$

f. The height,  $y$ , of the second hand of a clock with radius of 10 centimeters, starting at the top with  $y = 10$  centimeters when time  $t = 0$  seconds.

g. The graph



4. Write an equation for a sine function,  $y$  versus  $t$ , with amplitude of 4, period of  $\pi/4$ , and horizontal shift of  $\pi/8$ .

5. Convert to degrees:  $\pi/18$

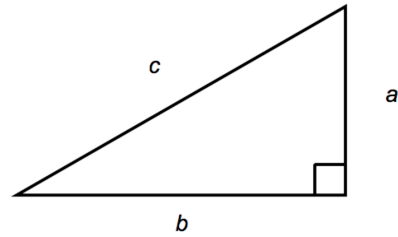
6. Convert to radians:  $260^\circ$

7. State the reference angle:  $260^\circ$

8. State the quadrant given this measure:  $31\pi/18$

9. Given a circle, what is the arc length if the radius is 15 meters and the subtended central angle is  $\pi/6$ ?

10. Given the right triangle shown. The angle  $A$  is the angle opposite the side  $a$ .



a) Find  $\sin A$  in terms of the variables given.

b) If  $c = 8$  and  $b = 3$ , find  $\cos A$ .

c) If  $c = 8$  and  $b = 3$ , find  $\sin A$  exactly (use integers and square roots as needed but no decimals).

d) If  $c = 7$  and  $a = 2$ , find the measure of the angle  $A$  to one decimal.