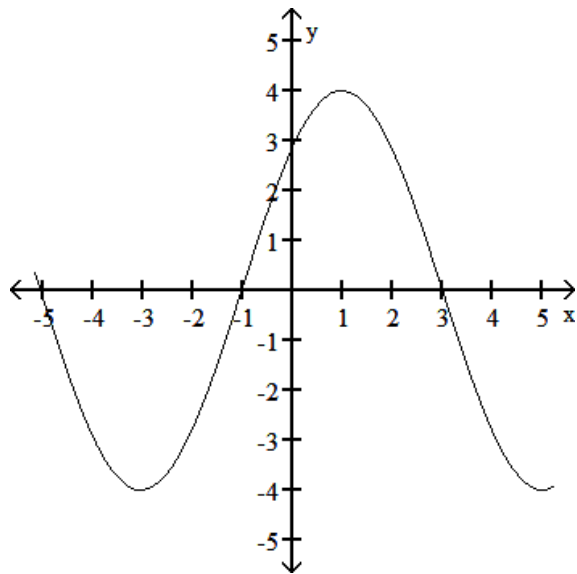


1) (no calculator part) Given that  $y = 4\sin\left(\frac{\pi}{4}x + \phi\right)$  has the shown waveform, find  $\phi$  in radians:



A)  $-\frac{\pi}{8}$

B)  $\frac{\pi}{4}$

C)  $\frac{\pi}{8}$

D)  $-\frac{\pi}{4}$

2) (no calculator part) Find the exact value of:  $\cos(2\theta)$  given that  $\sin \theta = \frac{4}{5}$

A)  $\frac{9}{25}$

B)  $-\frac{7}{25}$

C)  $-\frac{9}{25}$

D)  $\frac{7}{25}$

3) (no calculator part) Solve the equation.  $\cos(2\theta) = \frac{\sqrt{2}}{2}$  and

give a general formula for all the solutions, letting "k" represent any integer:

A)  $\left\{ \theta \mid \theta = \frac{\pi}{8} + 2k\pi, \theta = \frac{7\pi}{8} + 2k\pi \right\}$

B)  $\left\{ \theta \mid \theta = \frac{\pi}{8} + k\pi, \theta = \frac{7\pi}{8} + k\pi \right\}$

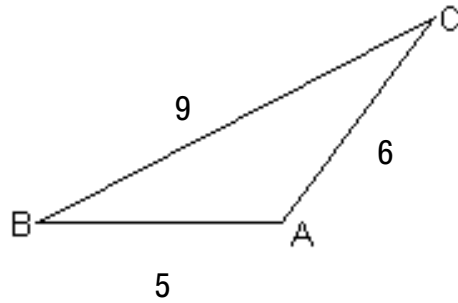
C)  $\left\{ \theta \mid \theta = \frac{\pi}{4} + k\pi, \theta = \frac{3\pi}{4} + k\pi \right\}$

D)  $\left\{ \theta \mid \theta = \frac{2\pi}{3} + k\pi, \theta = \frac{4\pi}{3} + k\pi \right\}$

4) (use calculator) A ship sailing parallel to shore sights a lighthouse at an angle of  $14^\circ$  from its direction of travel. After traveling 4 miles farther, the angle is  $25^\circ$ . At that time, how far is the ship from the lighthouse?

- A) 5.07 mi
- B) 2.29 mi
- C) 4 mi
- D) 8.86 mi

5) (use calculator) A triangle has sides  $a = 9$ ,  $b = 6$ , and  $c = 5$ . Find the angle "A" opposite side "a":



- A)  $A = 110.5^\circ$
- B)  $A = 109.5^\circ$
- C)  $A = 115.5^\circ$
- D)  $A = 118.5^\circ$

6) (a calculator) A wagon is pulled horizontally by exerting a force of 60 pounds on the handle at an angle of  $25^\circ$  to the horizontal. How much work is done in moving the wagon 50 feet in a horizontal direction?

- A) 1268 ft-lb
- B) 2719 ft-lb
- C) 2111 ft-lb
- D) 1617 ft-lb