

Key

Quiz 5

Show *all* your work algebraically for each. No credit is given without supporting work. There are *two* sides to this quiz.

1. [3] (§5.5 #11) Find $\sin v$, given.

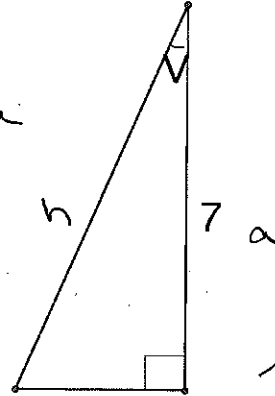
(+1.5) Sohcahtoa

(+1) $\sin v = \frac{0}{h} = \frac{2}{h}$

need h :

$$2^2 + 7^2 = h^2$$

$$\Rightarrow 4 + 49 = 53 = h^2 \Rightarrow h = \sqrt{53} \approx 7.28$$

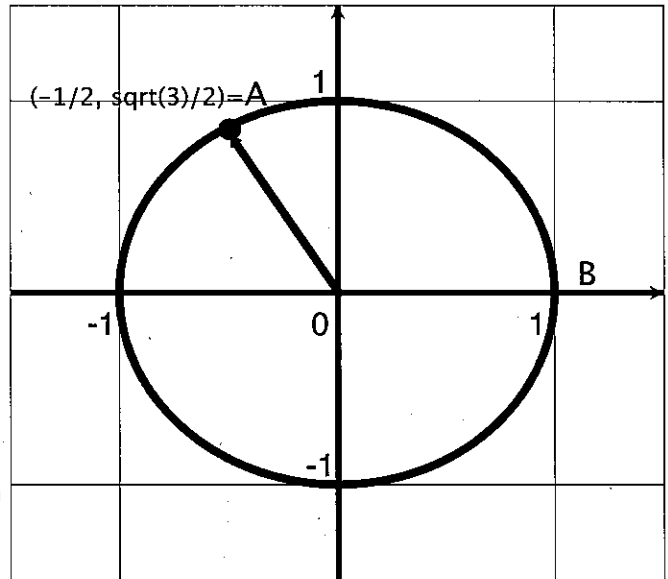


(+1.5) Thus $\sin v = \frac{2}{\sqrt{53}} \approx 0.274$

2. The following questions refer to the angle depicted on the left between A, O, and B.

(a) [1] Find the radian measure of the angle AOB.

terminal side on $(-\frac{1}{2}, \frac{\sqrt{3}}{2})$ is a special angle: $\frac{2\pi}{3}$



(b) [1] Find the degree measure of the angle AOB.

$\frac{2\pi}{3} \cdot \frac{180^\circ}{\pi} = 2 \cdot 60^\circ = 120^\circ$ (+1.5)

(c) [1] (§5.1 #21) Find the length of the arc connecting A to B that passes through quadrant I.

$\frac{2\pi}{3}$ units by def of radians.

3. Given $\cos 15^\circ = \frac{\sqrt{2+\sqrt{3}}}{2}$, find the following:

(a) [3] (§5.4 #13) Find the exact simplified value (not a decimal approximation) of $\sin 15^\circ$

Pyth: $\sin^2 15^\circ + \cos^2 15^\circ = 1$ (+.5)

(+.5) $\sin^2 15^\circ + \left(\frac{\sqrt{2+\sqrt{3}}}{2}\right)^2 = 1$

$\sin^2 15^\circ + \frac{2+\sqrt{3}}{4} = 1$

$\sin^2 15^\circ = 1 - \frac{2+\sqrt{3}}{4}$

$\sin^2 15^\circ = \frac{4 - (2+\sqrt{3})}{4}$

$\sin^2 15^\circ = \frac{2-\sqrt{3}}{4}$

$\sin 15^\circ = \pm \sqrt{\frac{2-\sqrt{3}}{4}}$

$= \pm \frac{\sqrt{2-\sqrt{3}}}{2}$

b/c 15° is in quad 1

$\sin 15^\circ = \frac{\sqrt{2-\sqrt{3}}}{2}$

syn (+.5)

alg (+.5)

(b) [1] (§5.4 #15) Find the exact simplified value (not a decimal approximation) of $\tan 15^\circ$

$\tan 15^\circ = \frac{\sin 15^\circ}{\cos 15^\circ} = \frac{\frac{\sqrt{2-\sqrt{3}}}{2}}{\frac{\sqrt{2+\sqrt{3}}}{2}} = \frac{\sqrt{2-\sqrt{3}}}{\sqrt{2+\sqrt{3}}}$ (+.5)