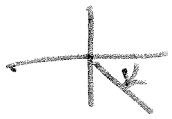
Name Mine Date

Math 112: Quiz 6.1, 6.2, 6.3A: show any relevant work.

1. Find two angles, one positive and one negative that are coterminal with $-\frac{\pi}{4}$.

$-\frac{\pi}{4} + \frac{8\pi}{4} = \frac{7\pi}{4}$ +1

$-\frac{\pi}{4} - \frac{8\pi}{4} = -\frac{9\pi}{4}$ +1 +2



2. For each angle below, change degrees to radians and radians to degrees:

a) $480° = 8 \cdot 60°$ +1

$= \frac{8\pi}{3}$ +2

b. $\frac{5\pi}{3}$ rad $= 5 \cdot \frac{180°}{3} = 5 \cdot 60° = 300°$ +1

3. If $\sin\theta = \frac{2}{5}$ and $\cos\theta < 0$, find the value of the other 5 elementary trigonometric functions at θ. Draw a sketch with appropriate reference triangle.

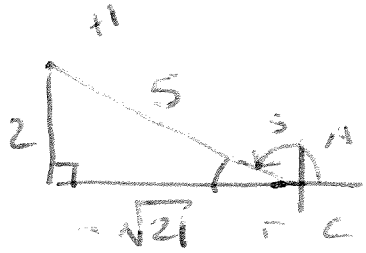
sin = ⊕ & cos = ⊖ only in II

+3

$\sin\theta = \frac{2}{5}$ +1 ↓ $\quad \csc\theta = \frac{5}{2}$ +1 ↓

$\cos\theta = -\frac{\sqrt{21}}{5} \quad \sec\theta = -\frac{5\sqrt{21}}{21}$

$\tan\theta = -\frac{2\sqrt{21}}{21} \quad \cot\theta = -\frac{\sqrt{21}}{2}$



4. Find the exact value of each of the following. Include a circle sketch and reference triangle.

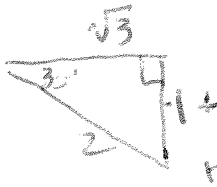
+4

a) $\tan(-\frac{\pi}{6})$

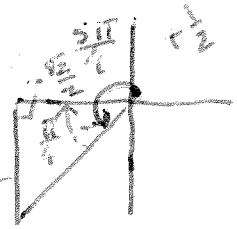
$\tan(-\frac{\pi}{6}) = -\tan\frac{\pi}{6}$

$\tan -30° = -\tan 30°$

$= -\frac{\sqrt{3}}{3}$ +1



b. $\csc(\frac{5\pi}{4})$



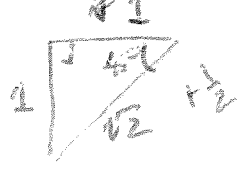
$= \csc\frac{\pi}{4}$

$= -\csc 45°$

$= \frac{1}{-\sin 45°}$

$= \frac{1}{-\sqrt{2}/2}$

$= -\sqrt{2}$ +1



11/11

5. A central angle θ of a circle of radius 6 is subtended by an arc of length 15. Find the measure of θ in both radians and degrees.

arc length = $S = r\theta$

$15 = 6\theta$

$\frac{15}{6} = \theta = \frac{5}{2}$ radians

$\frac{5}{2} \cdot \frac{180}{\pi} = 143.2^\circ$

6. A sector of a circle with a central angle measure of $5\pi/4$ rad has an area of $8m^2$. Find the radius of the circle.

$\frac{5\pi/4}{2\pi} \cdot \pi r^2 = 8$ or $\frac{1}{2} r^2 \theta = 8$

or $\frac{225^\circ}{360^\circ}$

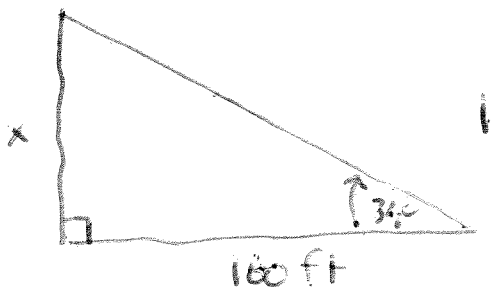
$r^2 = \frac{8}{\pi} \cdot \frac{8}{5}$

$r^2 = 64/5\pi$

$r = 2.02m$

$r^2 = 2 \cdot 8 \cdot \frac{4}{5\pi}$

7. A ponderosa pine casts a shadow of 160 ft on level ground when the angle of elevation to the sun is 34°. How tall is the tree?



$\tan 34^\circ = \frac{x}{160}$

$160 \cdot \tan 34^\circ = x = 107.9 ft$

Bonus Question: The wheel of a bicycle has a radius of 15 inches and is rotating at 250rpm. How fast is the bicycle travelling in inches per minute? In miles per hour?

$v = \frac{S}{t} = \frac{r\theta}{t} = \frac{15 \cdot 250 \cdot 2\pi}{1 min}$

$= 7500\pi$ in per min

min→hour

$\frac{7500\pi \cdot 60}{12 \cdot 5280} = 22.3$ mph

in→ft ft→mile

6/4