

Out of 37 points

MAC1114

Test 1

Name

Key

(D. Howard 3-16)

Show all work for credit.

1. Convert 104.255° to degree, minutes, seconds. Angle #4

2

$$104^\circ 15' 18''$$

2. Find the supplement to $48^\circ 5'$.

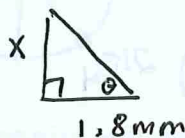
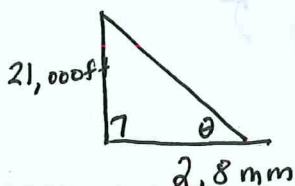
2

$$180^\circ - 48^\circ 5' = 131^\circ 55'$$

Angle #4

3. The lunar mountain peak Huygens has a height of 21,000 feet. The shadow of Huygens on a photograph was 2.8 mm, while the nearby mountain of Bradley had a shadow of 1.8 mm on the same photograph. Calculate the height of Bradley.

3



similar triangles

$$\frac{x}{1.8} = \frac{21,000}{2.8}$$

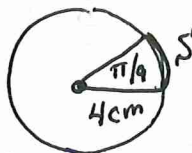
$$x = \frac{21,000(1.8)}{2.8}$$

$$x = 13,500 \text{ ft}$$

4. Find the arc length (rounded to two decimal places) subtended by a central

3 angle of $\frac{\pi}{9}$ in a circle with radius 4 cm.

$$s = r\theta$$



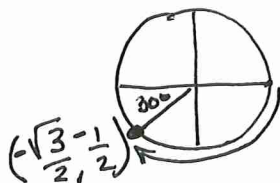
$$\frac{s}{2\pi(4)} = \frac{\frac{\pi}{9}}{2\pi}$$

$$s = \frac{4\pi}{9} = 1.396263402 \text{ cm}$$

$$\approx 1.40 \text{ cm}$$

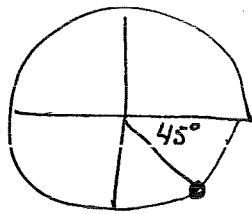
5. Find the EXACT value of $\cos(-510^\circ)$.

3



$$\begin{array}{r} 510^\circ \\ -360^\circ \\ \hline 150^\circ \end{array} \quad | \text{rev} \quad \begin{array}{r} 180^\circ \\ -150^\circ \\ \hline 30^\circ \end{array}$$

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



$$\begin{array}{r} \text{6 rev} \\ 360 \overline{) 2205} \\ \underline{-2160} \\ 45 \end{array}$$

$$\left(\frac{\sqrt{2}}{2}, -\frac{\sqrt{2}}{2} \right)$$

6. Find the EXACT value of $\sec(-2205^\circ)$.

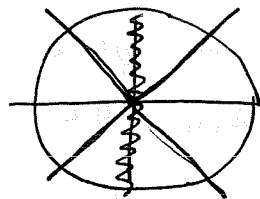
③

$$= \frac{r}{x} = \frac{1}{\frac{\sqrt{2}}{2}} = \frac{2}{\sqrt{2}} = \frac{2\sqrt{2}}{2} = \sqrt{2}$$

7. Find the EXACT value of $\sin\left(\frac{-13\pi}{3}\right) = \frac{y}{r}$

③

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

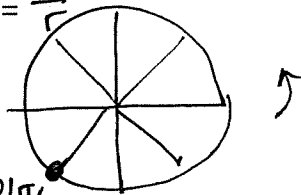


$$\frac{-13\pi}{3} \left(\frac{1}{2}, \frac{\sqrt{3}}{2} \right)$$

8. Find the EXACT value of $\cos\left(\frac{21\pi}{4}\right) = \frac{x}{r}$

③

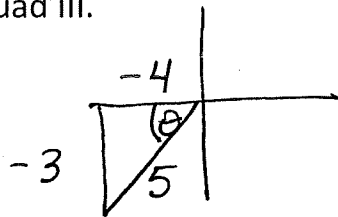
$$\frac{-\sqrt{2}}{2}$$



$$\left(-\frac{\sqrt{2}}{2}, -\frac{\sqrt{2}}{2} \right) \frac{21\pi}{4}$$

9. Find the values of the remaining five trigonometric functions given that $\sin\theta = -\frac{3}{5}$ and θ is in Quad III.

⑥



$$\sin\theta = -\frac{3}{5} = \frac{y}{r}$$

$$(-3)^2 + (A)^2 = 5^2$$

$$9 + A^2 = 25$$

$$A^2 = 16$$

$$A = \pm 4$$

Quad III choose $A = -4$

Do you have a " θ "?

$$\cos\theta = \frac{-4}{5}$$

$$\tan\theta = \frac{-3}{-4} = \frac{3}{4}$$

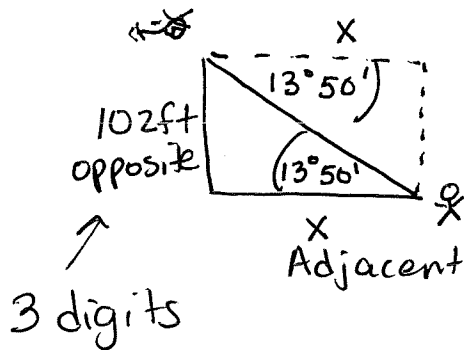
$$\sec\theta = \frac{-5}{4}$$

$$\csc\theta = \frac{-5}{3}$$

$$\cot\theta = \frac{4}{3}$$

10. A rescue helicopter is flying 102 feet above level ground. The angle of depression from the helicopter to its rescue victim is $13^\circ 50'$. How far horizontally must the helicopter fly to be directly over the rescue victim? Use significant digits for rounding.

3



$$\tan(13^\circ 50') = \frac{102}{x}$$

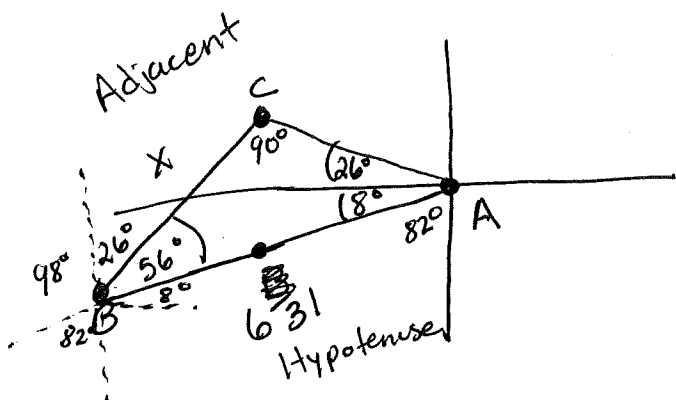
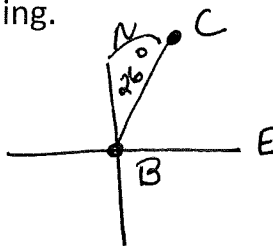
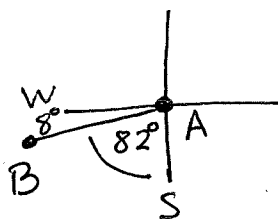
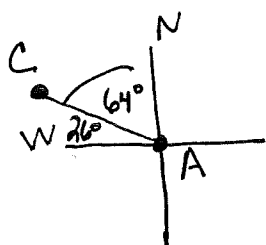
$$x = \frac{102}{\tan(13^\circ 50')}$$

$$x = 414.229141 \text{ ft}$$

$$x = 414 \text{ ft}$$

11. The bearing from A to C is $N 64^\circ W$. The bearing from A to B is $S 82^\circ W$. The bearing from B to C is $N 26^\circ E$. If the distance from A to B is 631, find the distance from B to C. Use significant digits for rounding.

6



$$\cos 56^\circ = \frac{x}{631}$$

$$x = 631 \cos 56^\circ = 352.8507221 = 353$$

$$\text{OR} \quad \sin 34^\circ = \frac{x}{631}$$

$$x = 631 \sin 34^\circ$$

