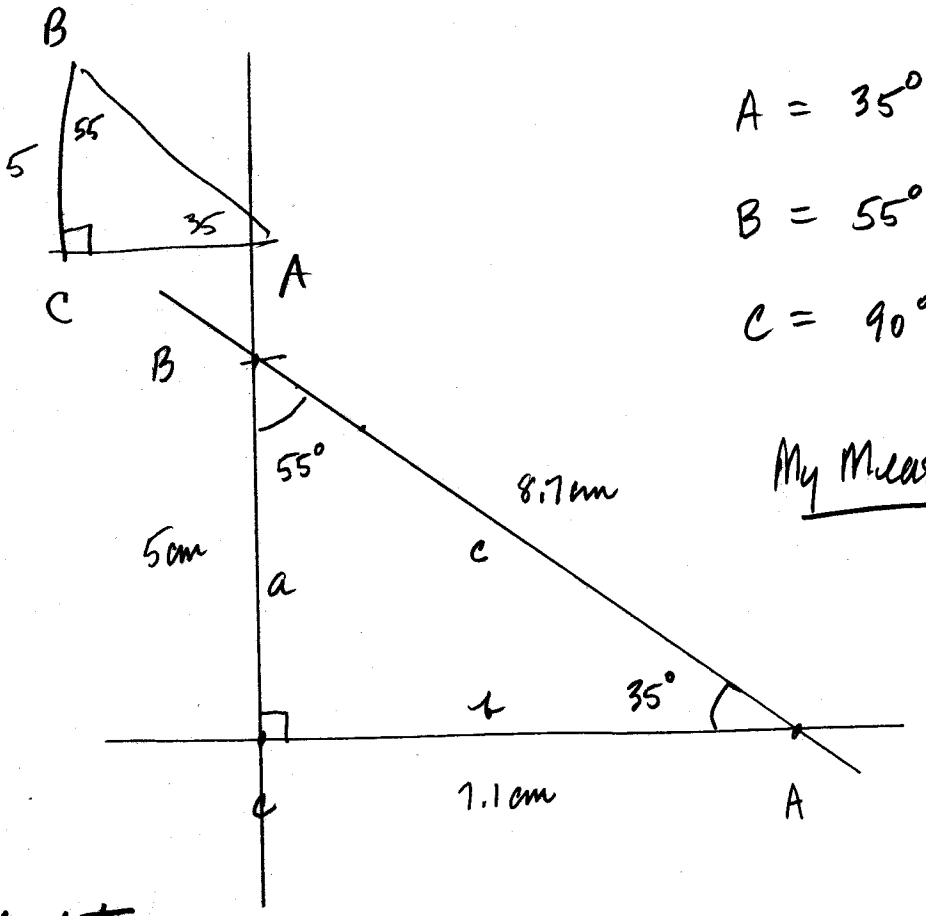
(1a)

5pts



$A = 35^\circ$ $a = 5\text{cm}$

$B = 55^\circ$ $b = 7.1\text{cm}$

$C = 90^\circ$ $c = 8.7\text{cm}$

My Measurements

My Calculations:

$\tan 35^\circ = \frac{5}{b}$

$b \tan 35^\circ = 5$

$b = \frac{5}{\tan 35^\circ}$

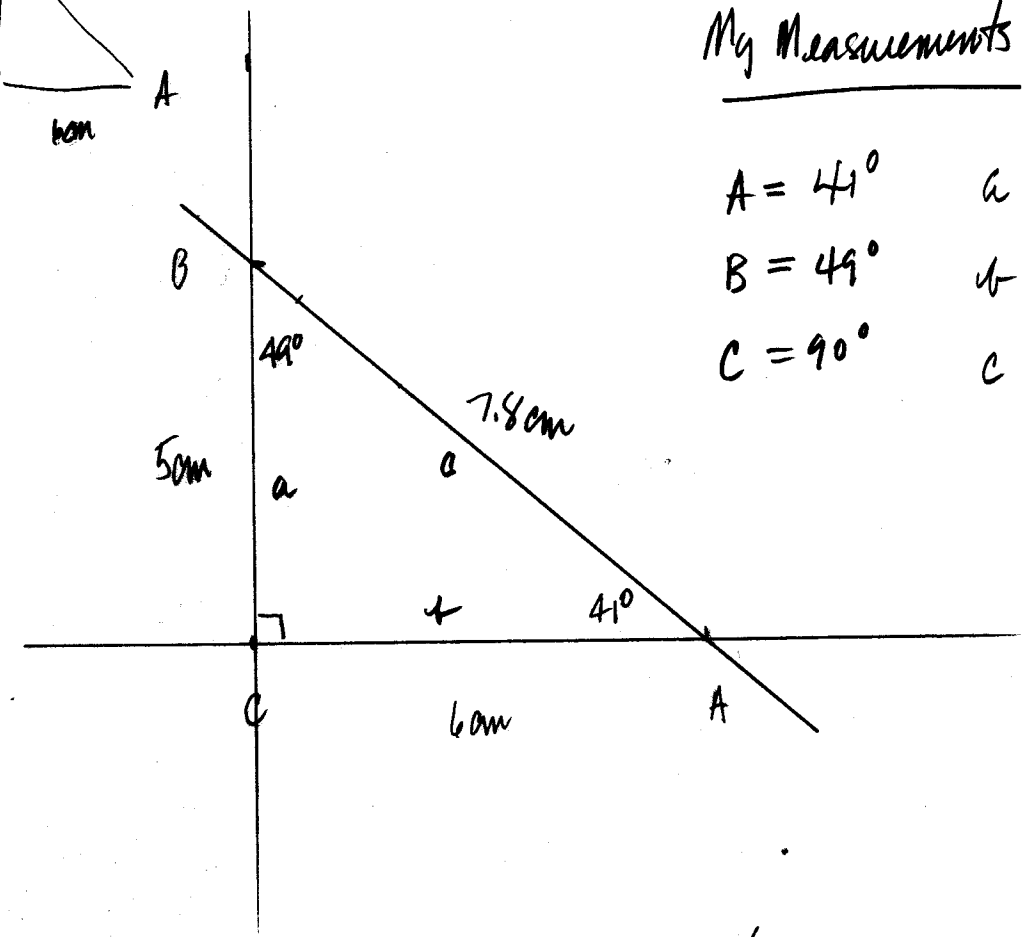
$b \approx 7.14\text{cm}$

$\sin 35^\circ = \frac{5}{c}$

$c \sin 35^\circ = 5$

$c = \frac{5}{\sin 35^\circ}$

$c = 8.71\text{cm}$.



My Measurements

$A = 41°$ $\quad a = 5\text{cm}$

$B = 49°$ $\quad b = 6\text{cm}$

$C = 90°$ $\quad c = 7.8\text{cm}$

$\tan A = \frac{5}{6}$ $\qquad \tan B = \frac{6}{5}$

$A = \tan^{-1}\frac{5}{6}$ $\qquad B = \tan^{-1}\frac{6}{5}$

$A = 39.8°$ $\qquad B = 50.2°$

$c^2 = 5^2 + 6^2$

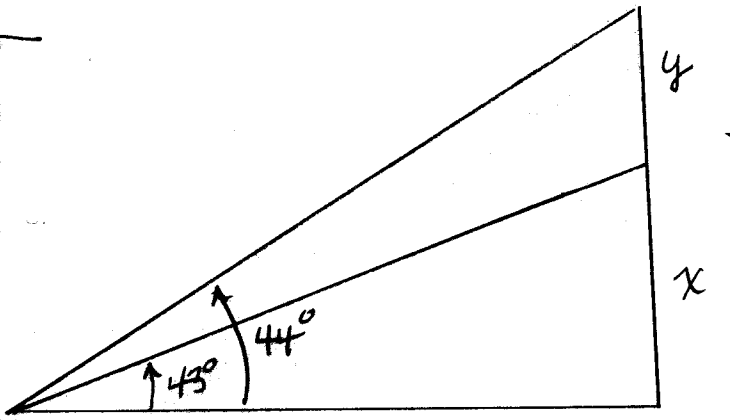
$c^2 = 25 + 36$

$c^2 = 61$

$c = \sqrt{61} \approx 7.8\text{ cm}.$

5pts
②

Not drawn to scale



$\tan 44^\circ = \frac{x+y}{200}$ $\qquad$ $\tan 43^\circ = \frac{x}{200}$

$x+y = 200\tan 44^\circ$ ① $\qquad$ $x = 200\tan 43^\circ$ ②

Sub ② in ① :

$200\tan 43^\circ + y = 200\tan 44^\circ$

$y = 200\tan 44^\circ - 200\tan 43^\circ$

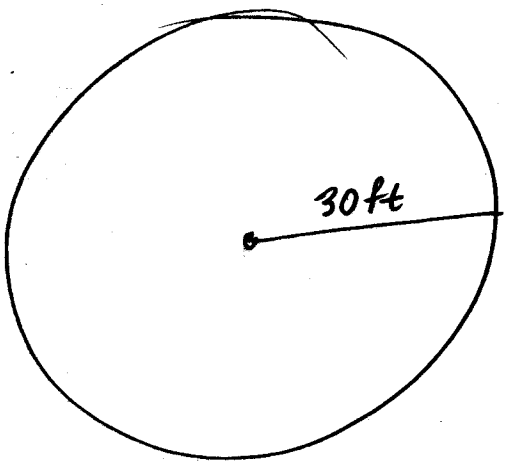
$y = 200(\tan 44^\circ - \tan 43^\circ)$

$y \approx 6.63$ ft.

5pts ③ $18^\circ = 18^\circ \times \frac{\pi^R}{180^\circ} = \frac{\pi}{10}^R$

5pts ④ $\frac{7\pi}{15}^R = \frac{7\pi}{15} \times \frac{180^\circ}{\pi^R} = 84^\circ$

5pts ⑤



a) $w = 1 \text{ rev/min}$

$w = 1 \frac{\text{rev}}{\text{min}} \times \frac{2\pi \text{ rad}}{1 \text{ rev}}$

$w = 2\pi \text{ rad/min}$

$w = 2\pi \frac{\text{rad}}{\text{min}} \times \frac{1 \text{ min}}{60 \text{ s}}$

$w = \frac{\pi}{30} \text{ rad/s}$

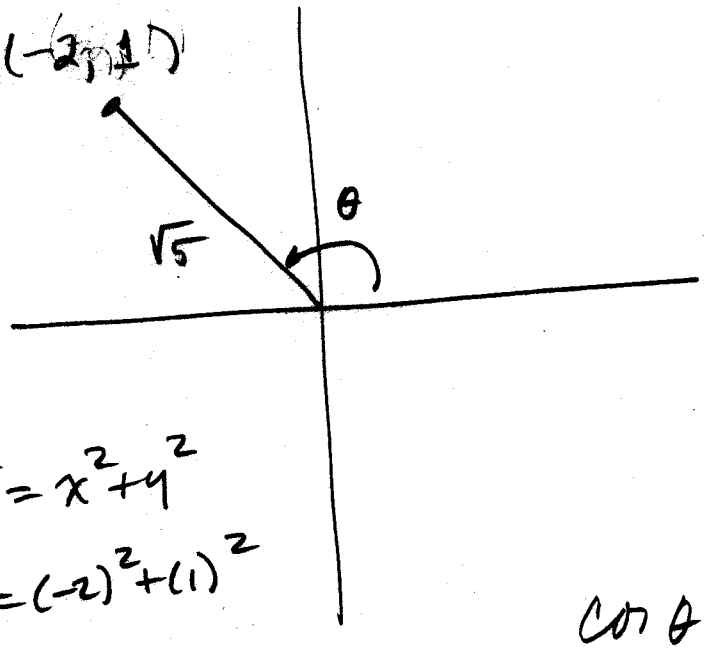
b) $V = rw$

$V = (30\text{ft})\left(\frac{\pi}{30} \text{ rad/s}\right)$

$V = \pi \text{ ft/s}.$

5pts (6)

$\pi/2 < \theta < \pi$



$\tan\theta = -\frac{1}{2}$

$\tan\theta = \frac{1}{-2}$

$\tan\theta = \frac{y}{x}$

$r^2 = x^2 + y^2$

$r^2 = (-2)^2 + (1)^2$

$r^2 = 4 + 1$

$r = \sqrt{5}$

$\cos\theta = \frac{x}{r} = \frac{-2}{\sqrt{5}} = -\frac{2\sqrt{5}}{5}$

$\sin\theta = \frac{y}{r} = \frac{1}{\sqrt{5}} = \frac{\sqrt{5}}{5}$

$\tan\theta = -\frac{1}{2}$

$\cot\theta = \frac{1}{\tan\theta} = -2$

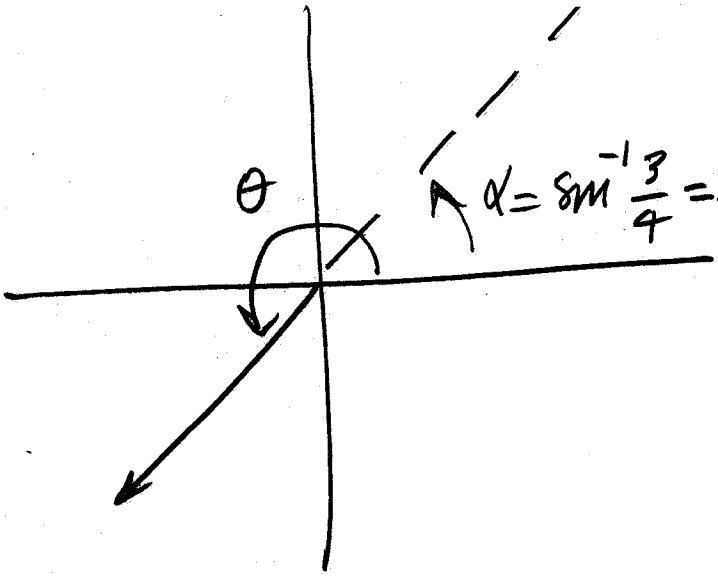
$\sec\theta = \frac{1}{\cos\theta} = -\frac{\sqrt{5}}{2}$

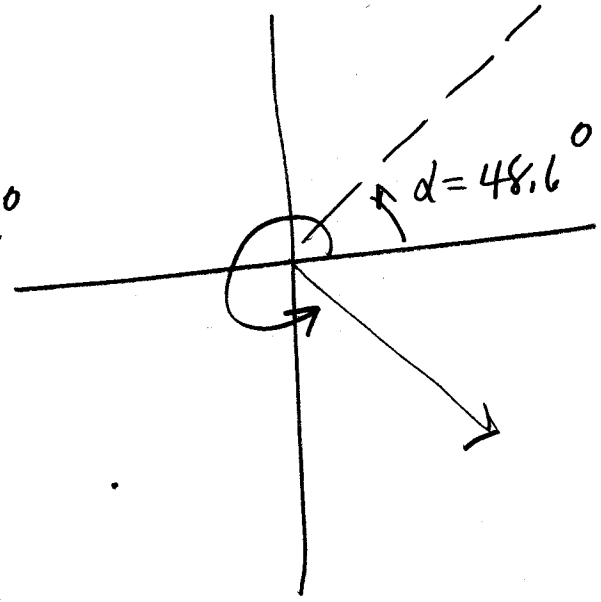
$\csc\theta = \frac{1}{\sin\theta} = \sqrt{5}$

(7) 5 pts

$\sin\theta = -\frac{3}{4}$.

There are two possibilities, one in Quad III, the other in Quad IV.





$\theta = 48.6^\circ + 180^\circ$

$\theta = 228.6$

$\theta = 360^\circ - 48.6^\circ$

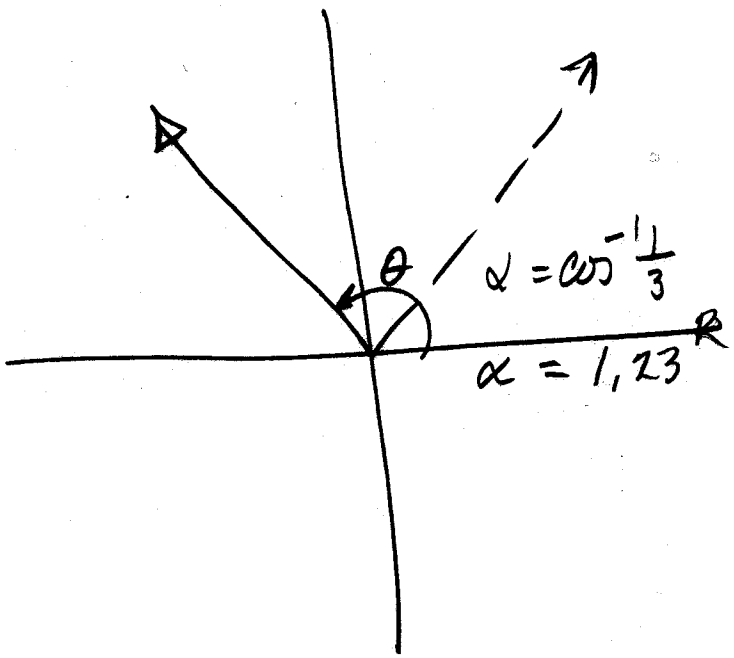
$\theta = 311.4^\circ$

5pts

(8) $\sec\theta = -3 \Rightarrow \frac{1}{\cos\theta} = -3$

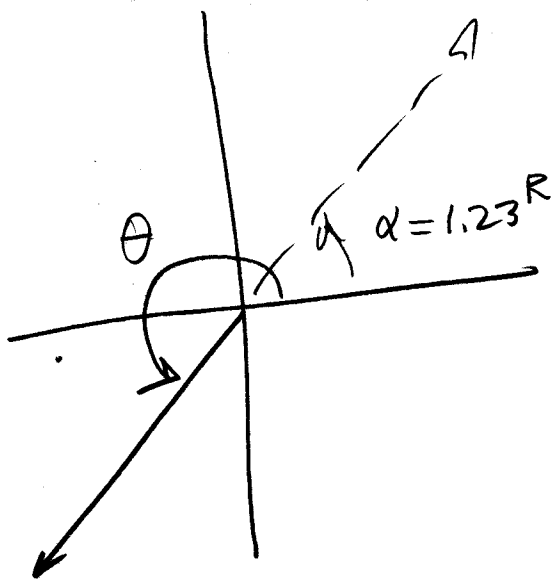
$\cos\theta = -\frac{1}{3}$

There are two possibilities, one in Quad II, one in Quad III.



$\theta = \pi - 1.23$

$\theta \approx 1.91^R$



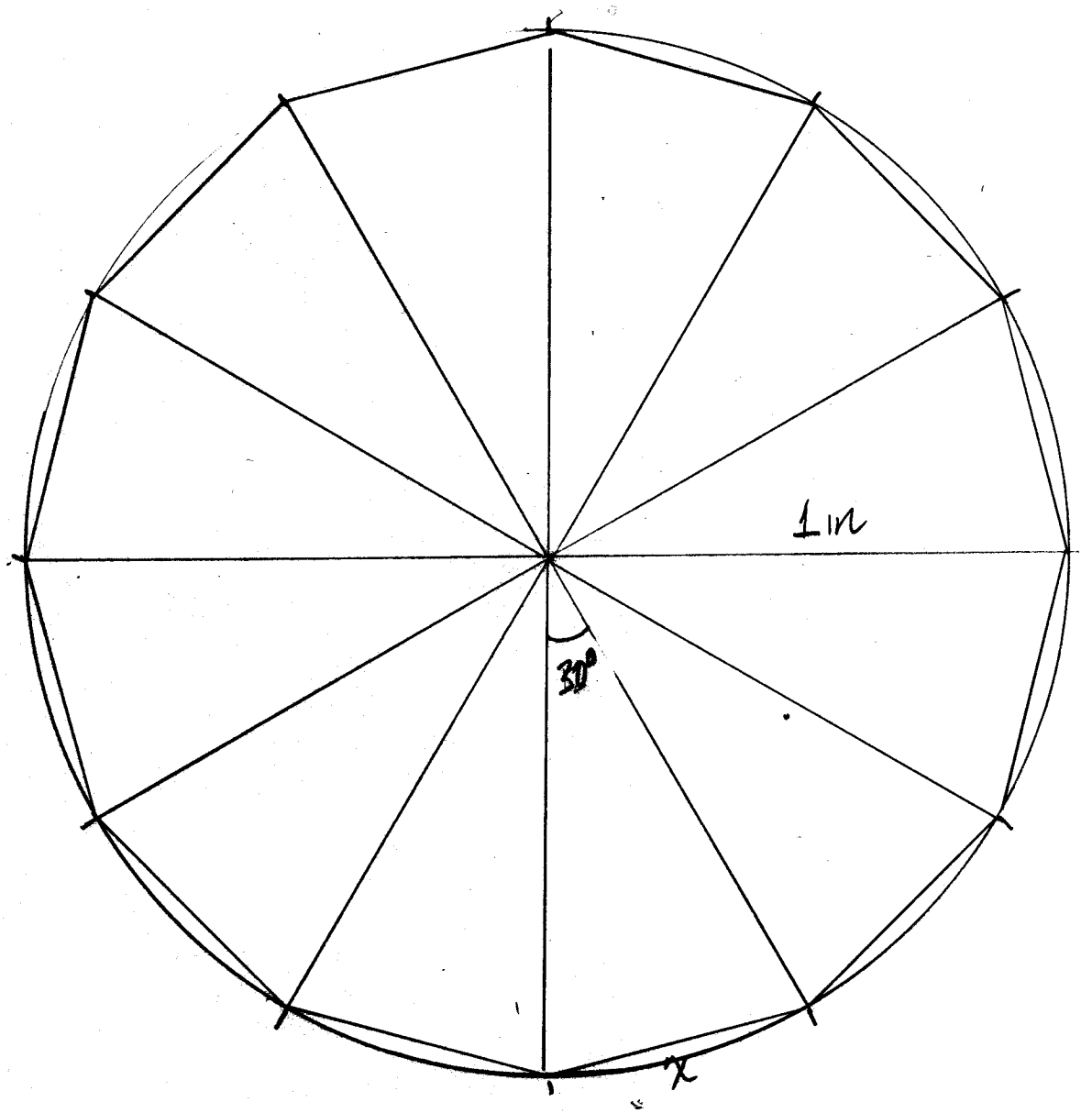
$\theta = \pi + 1.23$

$\theta = 4.37^R$

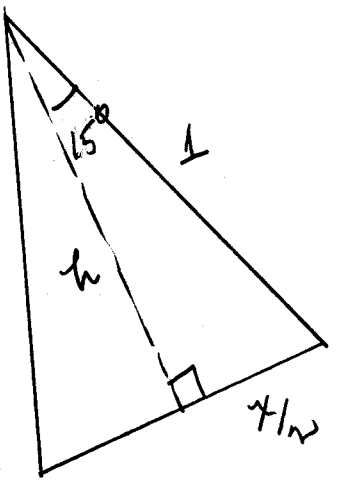
(9)

5pts

$\frac{360^\circ}{12} = 30^\circ$



To find the area, we find area of one triangle, then multiply by 12.



$$\sin 15^\circ = \frac{\frac{x}{2}}{1} \qquad \cos 15^\circ = \frac{h}{1}$$

$$\frac{x}{2} = \sin 15^\circ \qquad h = \cos 15^\circ$$

$$x = 2\sin 15^\circ$$

To find the area of the triangle (half the base times the height) we:

$$A_{\triangle} = \frac{1}{2} x \cdot h = \frac{1}{2}(2\sin 15^\circ)(\cos 15^\circ) = \sin 15^\circ \cos 15^\circ$$

Hence, the area of the dodecagon is 12 times this result:

$$A_{\text{dodecagon}} = 12\sin 15^\circ \cos 15^\circ \approx 3.0 \text{ in}^2$$

The perimeter of the dodecagon will be 12 times the length x.

$$P_{\text{dodecagon}} = 12x = 12(2\sin 15^\circ) = 24\sin 15^\circ$$

$$\approx 6.2 \text{ in}$$