Week 10 Wednesday

March 13, 2019 7:49 AM

Ex: Circle's radius is 6m. Find area of sector formed by an angle of 45°.

$A = \frac{1}{2} r^2 \theta$ Use radians (unitless)

$\theta = 45° \times \frac{\pi}{180°} = \frac{\pi}{4}$

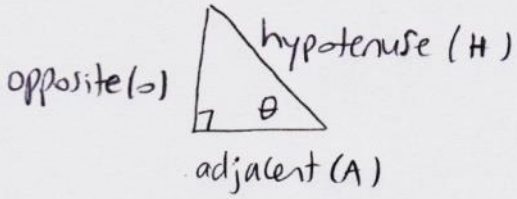
$A = \frac{1}{2} \cdot 6^2 \cdot \frac{\pi}{4}$

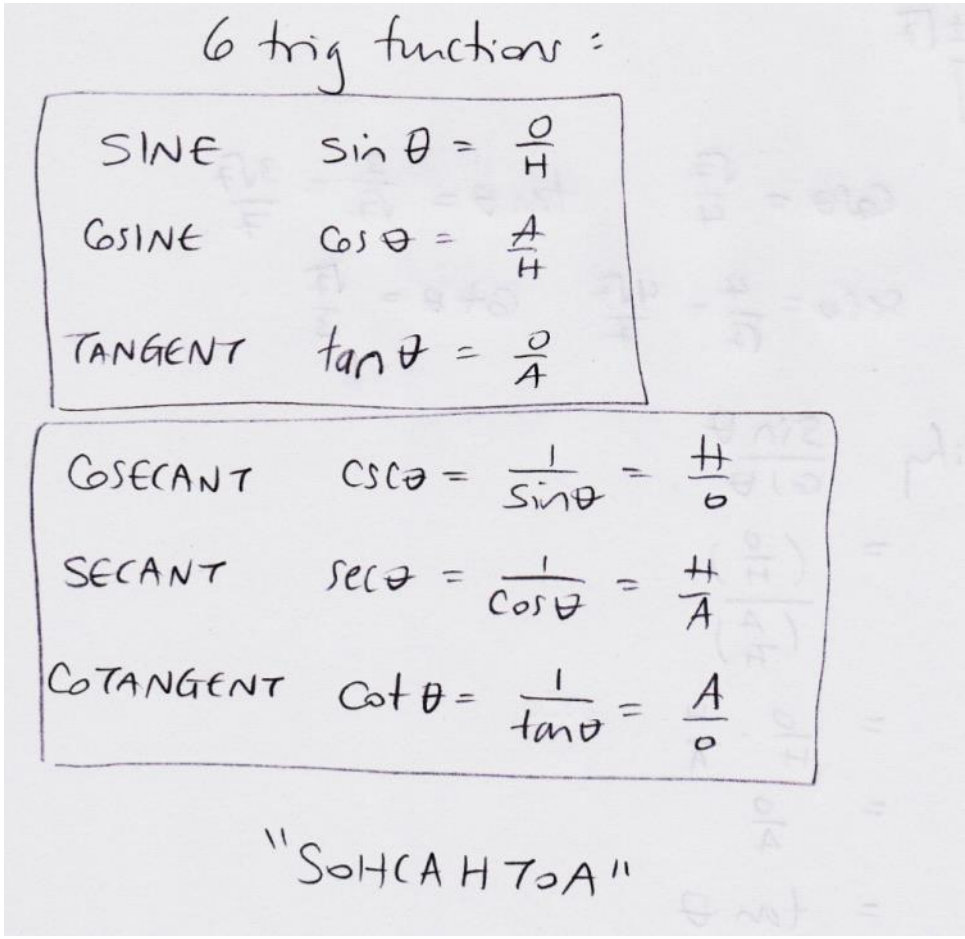
$= \frac{9\pi}{2}\ m^2$

7.2 Right Angle Trigonometry

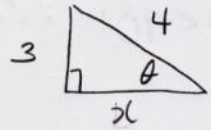
Right triangle

θ is an acute angle : $0° < \theta < 90°$




6 trig functions:
SINE $\sin\theta = \frac{O}{H}$
COSINE $\cos\theta = \frac{A}{H}$
TANGENT $\tan\theta = \frac{O}{A}$
COSECANT $\csc\theta = \frac{1}{\sin\theta} = \frac{H}{O}$
SECANT $\sec\theta = \frac{1}{\cos\theta} = \frac{H}{A}$
COTANGENT $\cot\theta = \frac{1}{\tan\theta} = \frac{A}{O}$
"SOHCAHTOA"

Ex: Given $\sin\theta = \frac{3}{4}$ and θ is acute, find remaining five values.



$3^2 + x^2 = 4^2$

$x^2 = 16 - 9$

$x^2 = 7$

$x = \pm\sqrt{7}$

$\boxed{x = \sqrt{7}}$

$\sin\theta = \frac{3}{4}$ $\quad \cos\theta = \frac{\sqrt{7}}{4}$ $\quad \tan\theta = \frac{3}{\sqrt{7}} = \frac{3\sqrt{7}}{7}$

$\csc\theta = \frac{4}{3}$ $\quad \sec\theta = \frac{4}{\sqrt{7}} = \frac{4\sqrt{7}}{7}$ $\quad \cot\theta = \frac{\sqrt{7}}{3}$

Ex: Simplify $\frac{\sin\theta}{\cos\theta}$

$$= \frac{\left(\frac{O}{H}\right)}{\left(\frac{A}{H}\right)}$$

$$= \frac{O}{H} \cdot \frac{H}{A}$$

$$= \frac{O}{A}$$

$$= \tan\theta$$

$\tan\theta = \frac{\sin\theta}{\cos\theta}$ and $\cot\theta = \frac{\cos\theta}{\sin\theta}$ for any angle θ

Notation: $\sin^2\theta$ means $(\sin\theta)^2$

$\cos^2\theta$ " $(\cos\theta)^2$

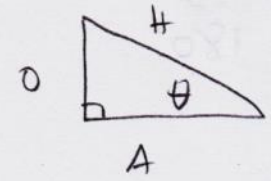
etc.

Ex: Simplify $\sin^2\theta + \cos^2\theta$

$= (\sin\theta)^2 + (\cos\theta)^2$

$= \left(\frac{O}{H}\right)^2 + \left(\frac{A}{H}\right)^2$

$= \frac{O^2 + A^2}{H^2}$



$O^2 + A^2 = H^2$

$= \frac{H^2}{H^2}$

$= 1$