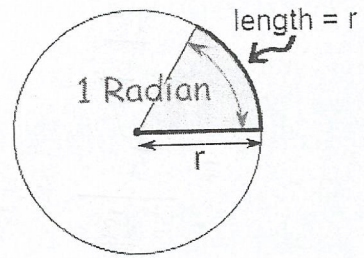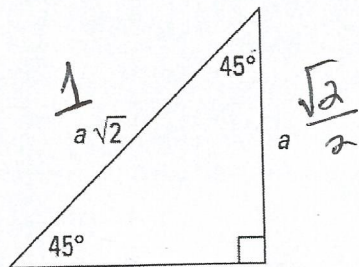radian — a standard unit for angle measure

— a radian is equal to the length of a corresponding arc measure in a unit circle

— around a circle is a little more than 6 radians (the circumference is exactly 2π)
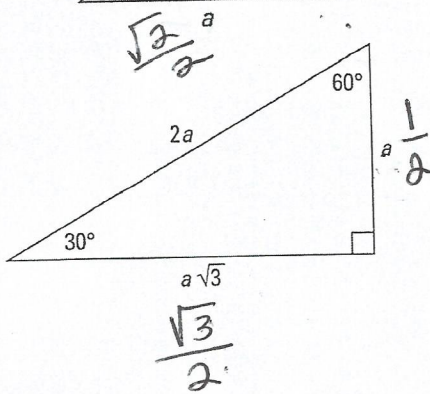
length = r

1 Radian

r

Special Right Triangles

$hypt. = 1$

$a\sqrt{2} = 1$

$a = \dfrac{1}{\sqrt{2}} \cdot \dfrac{\sqrt{2}}{\sqrt{2}} = \dfrac{\sqrt{2}}{\sqrt{4}} = \dfrac{\sqrt{2}}{2}$

$hypt = 1$

$2a = 1$

$a = \dfrac{1}{2}$

Right Triangle Trig Ratios

$\sin\theta = \dfrac{opposite}{hypotenuse} = \dfrac{y}{r}$

$\cos\theta = \dfrac{adjacent}{hypotenuse} = \dfrac{x}{r}$

$\tan\theta = \dfrac{opposite}{adjacent} = \dfrac{y}{x}$

$\csc\theta = \dfrac{hypotenuse}{opposite} = \dfrac{r}{y}$

$\sec\theta = \dfrac{hypotenuse}{adjacent} = \dfrac{r}{x}$

$\cot\theta = \dfrac{adjacent}{opposite} = \dfrac{x}{y}$

positive ratios

S	A
T	C

All
Sine (csc)
Tangent (cot)
Cosine (sec)
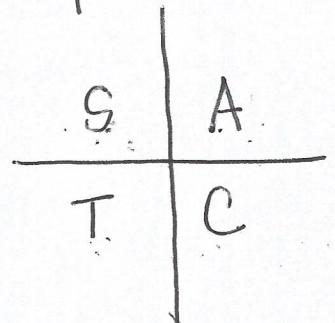
Find each value.

A. $\sin(30°) = \dfrac{1}{2}$

B. $\cos(240°) = -\dfrac{1}{2}$

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C. $\cos(450°) = 0$

D. $\sin\left(\dfrac{\pi}{3}\right) = \dfrac{\sqrt{3}}{2}$

E. $\tan\left(\dfrac{5\pi}{6}\right) = \dfrac{\frac{1}{2}}{-\frac{\sqrt{3}}{2}} = \dfrac{1}{2} \cdot -\dfrac{2}{\sqrt{3}} = -\dfrac{1}{\sqrt{3}} \cdot \dfrac{\sqrt{3}}{\sqrt{3}} = \dfrac{-\sqrt{3}}{3}$

F. $\sec(90°) = \dfrac{1}{0}$ undefined

G. $\cot\left(\dfrac{13\pi}{6}\right) = \dfrac{\frac{\sqrt{3}}{2}}{\frac{1}{2}} = \dfrac{\sqrt{3}}{2} \cdot \dfrac{2}{1} = \sqrt{3}$

H. $\csc\left(\dfrac{13\pi}{4}\right) = \dfrac{1}{-\frac{\sqrt{2}}{2}} = 1 \cdot \dfrac{2}{-\sqrt{2}} = \dfrac{2}{-\sqrt{2}} \cdot \dfrac{\sqrt{2}}{\sqrt{2}} = \dfrac{2\sqrt{2}}{-2} = -\sqrt{2}$

I. $\tan(5\pi) = \dfrac{0}{-1} = 0$

J. $\cos(30°) = \dfrac{\sqrt{3}}{2}$

K. $\sin(240°) = -\dfrac{\sqrt{3}}{2}$

L. $\sin(450°) = 1$

M. $\cos\left(\dfrac{\pi}{3}\right) = \dfrac{1}{2}$

N. $\cot\left(\dfrac{5\pi}{6}\right) = \dfrac{-\frac{\sqrt{3}}{2}}{\frac{1}{2}} = -\dfrac{\sqrt{3}}{2} \cdot \dfrac{2}{1} = -\sqrt{3}$

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