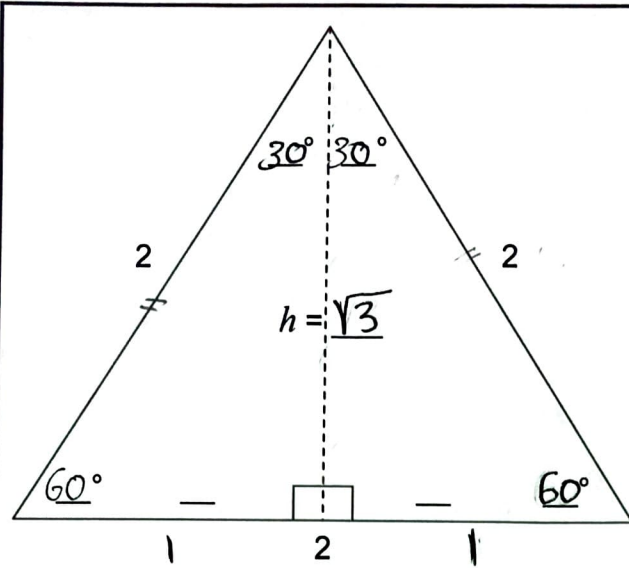


Special Angle Ratios

Date: _____

In an *equilateral triangle*, all sides are the same length and all angles measure 60°



by PT: $h^2 + 1^2 = 2^2 \therefore h = \sqrt{3}$
 $h = \sqrt{2^2 - 1^2}$

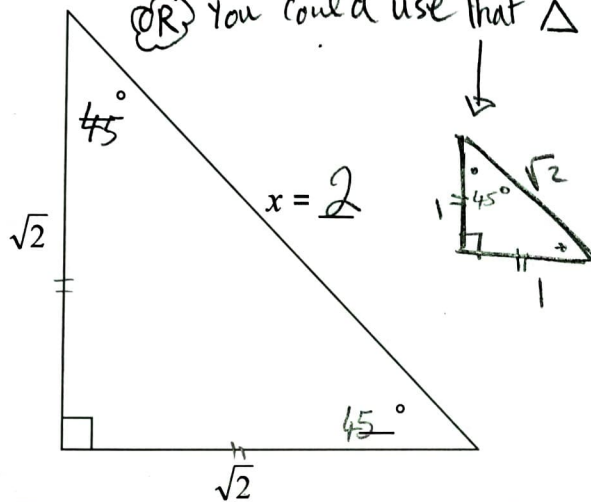
$\sin 30^\circ = \frac{1}{2}$ $\sin 60^\circ = \frac{\sqrt{3}}{2}$

$\cos 30^\circ = \frac{\sqrt{3}}{2}$ $\cos 60^\circ = \frac{1}{2}$

$\tan 30^\circ = \frac{1}{\sqrt{3}}$ $\tan 60^\circ = \frac{\sqrt{3}}{1}$

The triangle in this diagram is called a right isosceles triangle.

OR You could use that Δ



by PT: $x^2 = \sqrt{2}^2 + \sqrt{2}^2 \therefore x = 2$


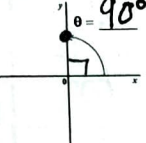
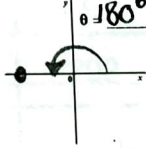

$\sin 45^\circ = \frac{\sqrt{2}}{2}$ OR $= \frac{1}{\sqrt{2}}$

$\cos 45^\circ = \frac{\sqrt{2}}{2} = \frac{1}{\sqrt{2}}$

$\tan 45^\circ = \frac{\sqrt{2}}{\sqrt{2}} = 1$

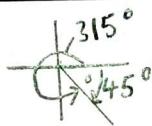
θ	0°	30°	45°	60°	90°
ratio					
$\sin \theta$	$\frac{\sqrt{0}}{2}$ = 0	$\frac{\sqrt{3}}{2}$ = $\frac{1}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{2}}{2}$ = 1
$\cos \theta$	$\frac{\sqrt{1}}{2}$ = 1	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{3}}{2}$ = $\frac{1}{2}$	$\frac{\sqrt{2}}{2}$ = 0
$\tan \theta$	0	$\frac{1}{\sqrt{3}}$	1	$\frac{\sqrt{3}}{1} = \sqrt{3}$	undefined (Does not exist)

a) $r = \sqrt{x^2 + y^2}$
 $= \sqrt{25} = 5$

#	P (x, y)	θ (in standard position)	r	$\sin \theta$ $= \frac{y}{r}$	$\cos \theta$ $= \frac{x}{r}$	$\tan \theta$ $= \frac{y}{x}$
a	(5, 0) 	$\theta = 0^\circ$	5	$\frac{0}{5} = 0$	$\frac{5}{5} = 1$	$\frac{0}{5} = 0$
b	(0, 4) 	$\theta = 90^\circ$ Label the coordinates of point P on the graph.	4	$\frac{4}{4} = 1$	$\frac{0}{4} = 0$	$\frac{4}{0} = \text{undefined}$
c	(-2, 0) 	$\theta = 180^\circ$ Draw the arc representing θ on the diagram as in (b) above. Also label point P.	2	$\frac{0}{2} = 0$	$\frac{-2}{2} = -1$	$\frac{0}{-2} = 0$
d	(0, -3) 	$\theta = 270^\circ$ Draw the arc representing θ on the diagram as in (b) above. Also label point P.	3	$\frac{-3}{3} = -1$	$\frac{0}{3} = 0$	$\frac{-3}{0} = \text{undefined}$

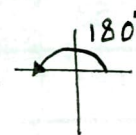
Examples: Evaluate each trig ratio to an exact answer. Show all steps.

a) $\sin 1035^\circ$
 $= \sin (1035^\circ - 720^\circ)$
 $= \sin 315^\circ$ (Q4)
 $= -\sin 45^\circ$
 $= -\frac{\sqrt{2}}{2}$



check w/ calculator.

b) $\cos (-540^\circ)$
 $= \cos (-540^\circ + 720^\circ)$
 $= \cos 180^\circ$
 $= -1$



Exercise: Follow the above examples to evaluate each trig ratio exactly. Show all steps.

1. a) $\sin 480^\circ$

b) $\tan 1410^\circ$

c) $\cos 945^\circ$

d) $\cos 1650^\circ$

e) $\cos (-420^\circ)$

f) $\tan (-1035^\circ)$

g) $\sin (-570^\circ)$

h) $\sin (-945^\circ)$

i) $\tan 2040^\circ$

j) $\tan 1215^\circ$

k) $\sin 585^\circ$

l) $\cos (-1290^\circ)$

2. a) $\tan 1980^\circ$

b) $\tan 810^\circ$

c) $\cos (-1620^\circ)$

d) $\sin 900^\circ$

e) $\cos (-1170^\circ)$

f) $\sin 1530^\circ$

g) $\sin (-450^\circ)$

h) $\cos 1080^\circ$

Answers:

1. a) $\frac{\sqrt{3}}{2}$

b) $-\frac{1}{\sqrt{3}}$

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

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

e) $\frac{1}{2}$

f) 1

g) $\frac{1}{2}$

h) $\frac{\sqrt{2}}{2}$

i) $\sqrt{3}$

j) -1

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

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

2. a) 0

b) undefined

c) -1

d) 0

e) 0

f) 1

g) -1

h) 1