Trig 5.5

Evaluate inverse trig functions
Find missing angle measurements
Solve right triangles

special triangles/handy angles

reference angle

inverse function

inverse sine = arcsin = $\sin^{-1}$

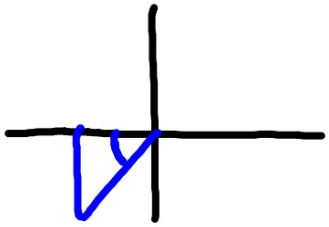
inverse cosine

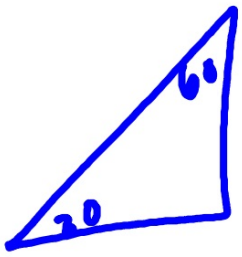
inverse tangent

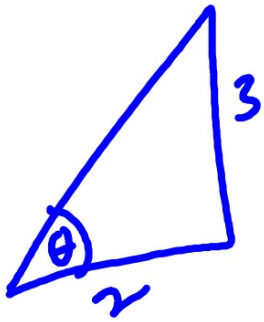
solving a triangle

whiteboards(?)

30, 45, 60° (exact)







are ∠'s all sides

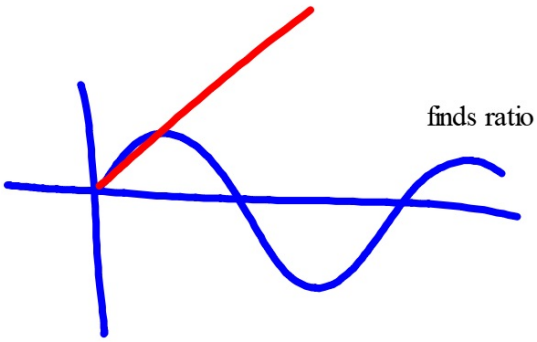
=

θ	0°	30°	45°	60°	90°	120°	135°	150°	180°
sin θ	0	$\frac{1}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{3}}{2}$	1	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{1}{2}$	0
cos θ	1	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{1}{2}$	0	$-\frac{1}{2}$	$-\frac{\sqrt{2}}{2}$	$-\frac{\sqrt{3}}{2}$	-1
tan θ	0	$\frac{\sqrt{3}}{3}$	1	$\sqrt{3}$	undefined	$-\sqrt{3}$	-1	$-\frac{\sqrt{3}}{3}$	0

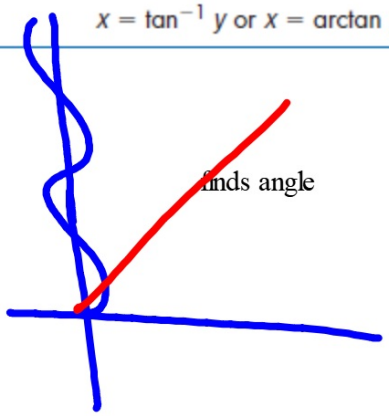
θ	210°	225°	240°	270°	300°	315°	330°	360°
sin θ	$-\frac{1}{2}$	$-\frac{\sqrt{2}}{2}$	$-\frac{\sqrt{3}}{2}$	-1	$-\frac{\sqrt{3}}{2}$	$-\frac{\sqrt{2}}{2}$	$-\frac{1}{2}$	0
cos θ	$-\frac{\sqrt{3}}{2}$	$-\frac{\sqrt{2}}{2}$	$-\frac{1}{2}$	0	$\frac{1}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{3}}{2}$	1
tan θ	$\frac{\sqrt{3}}{3}$	1	$\sqrt{3}$	undefined	$-\sqrt{3}$	-1	$-\frac{\sqrt{3}}{3}$	0

Handy angles :)
Reference angle if outside Quadrant 1

Inverses of the Trigonometric Functions	Trigonometric Function	Inverse Trigonometric Relation
	$y = \sin x$	$x = \sin^{-1} y$ or $x = \arcsin y$
	$y = \cos x$	$x = \cos^{-1} y$ or $x = \arccos y$
	$y = \tan x$	$x = \tan^{-1} y$ or $x = \arctan y$



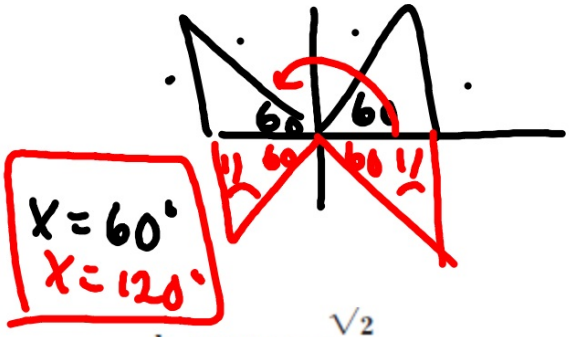
finds ratio from triangle



finds angle

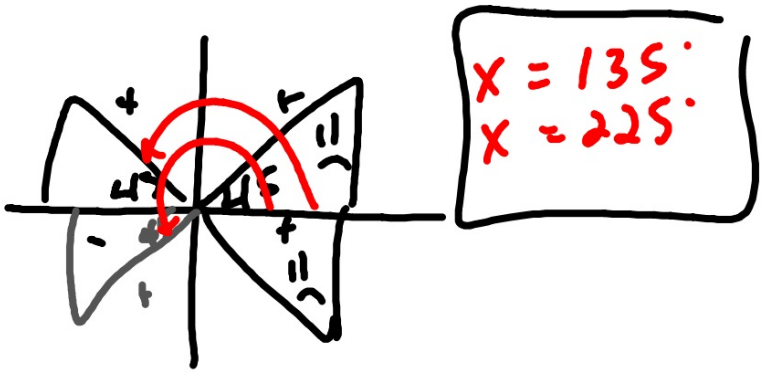
1 Solve each equation.

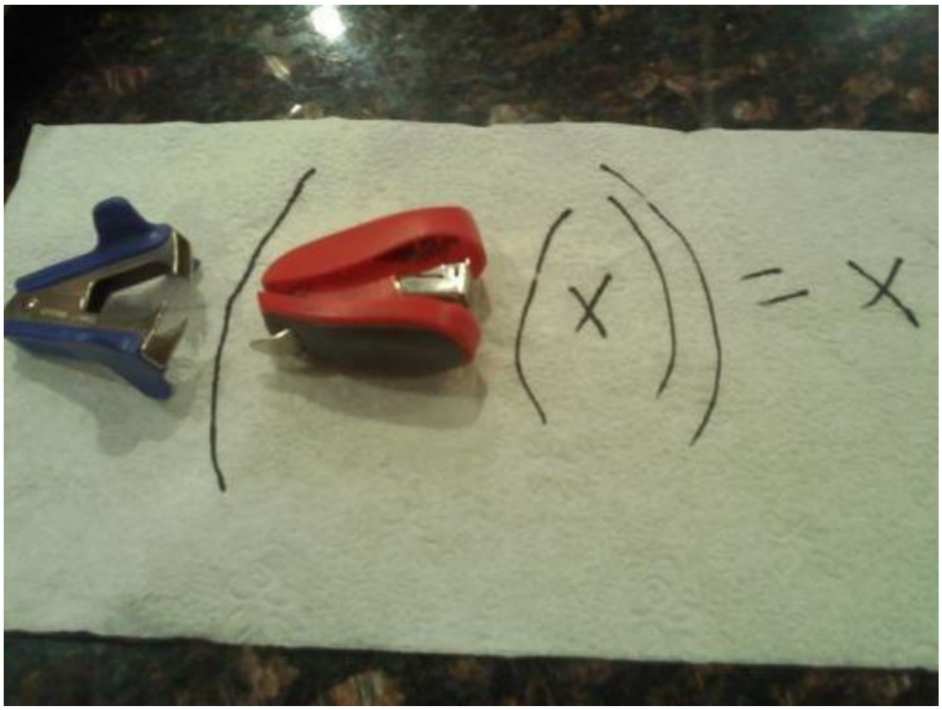
a. $\sin x = \frac{\sqrt{3}}{2}$



b. $\cos x = -\frac{\sqrt{2}}{2}$

What angle has ( ) for a sine?
Could be more than one answer (quadrants…)





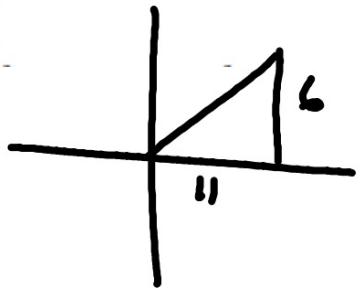
inverse

Use reference triangles...

2 Evaluate each expression. Assume that all angles are in Quadrant I.

a. $\tan\left(\tan^{-1}\frac{6}{11}\right)$

$\frac{6}{11}$



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

$x^2+4=9$

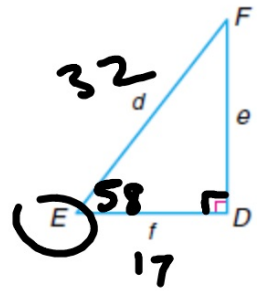
$x^2=5$

b. $\cos\left(\arcsin\frac{2}{3}\right)$

$\sin^{-1}$

$=\frac{\sqrt{5}}{3}$

Find a specific value or "solve"



3 If $f = 17$ and $d = 32$, find E.

is

$\cos E = \frac{17}{32}$

$\cos^{-1}(\quad) \approx 57.9$

Triangle nomenclature:

$\tan 33 = \frac{a}{5.8}$ $\quad \cos 33 = \frac{5.8}{c}$

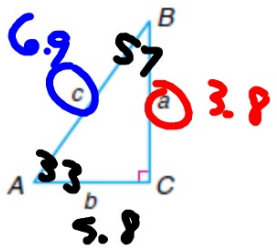
$a = 3.8$ $\quad c(\cos 33) = 5.8$

$c = 6.9$

2 Solve each triangle described, given the triangle at the right.

a. $A = 33°, b = 5.8$

b. $a = 23, c = 45$

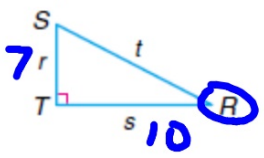


arc

Solve each problem. Round to the nearest tenth.

9. If $r = 7$ and $s = 10$, find R. $= 35^\circ$

10. If $r = 12$ and $t = 20$, find S.



$\longrightarrow \tan R = \frac{7}{10}$

$\bigstar \tan^{-1}\left(\frac{7}{10}\right)$

Solve each triangle described, given the triangle at the right. Round to the nearest tenth if necessary.

11. $B = 78°, a = 41$

12. $a = 11, b = 21$

13. $A = 32°, c = 13$