Questions from Homework

⑤ a)

hyp 4

opp $+\sqrt{7}$

adj -3
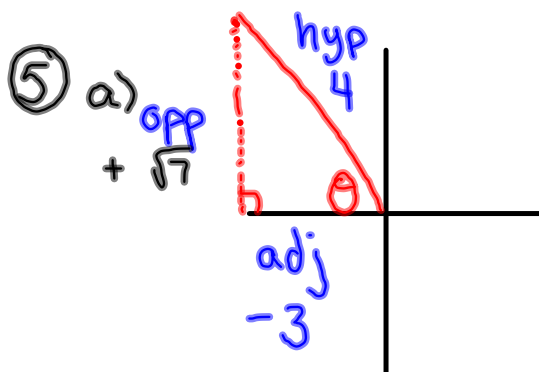
$\cos\theta = -\frac{3}{4}$ **adj / hyp**

To find the opp:

$$a^2 + b^2 = c^2$$
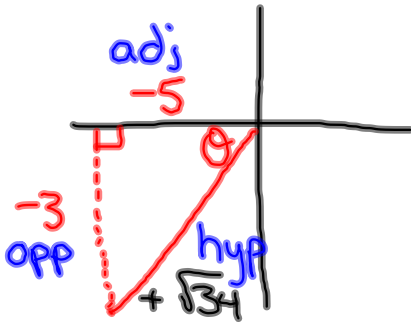$$(-3)^2 + b^2 = 4^2$$
$$9 + b^2 = 16$$
$$b^2 = 7$$
$$b = \pm\sqrt{7}$$

b) $\sin\theta = \frac{\sqrt{7}}{4}$

$\tan\theta = \frac{\sqrt{7}}{-3} = -\frac{\sqrt{7}}{3}$

c) $(x, y) \rightarrow \tan\theta = \frac{y}{x}$

1

Warm Up

Determine the 6 trigonometric ratios of an angle whose terminal arm passes through the ordered pair (-5, -3).

adj
-5

-3
opp

hyp
+ $\sqrt{34}$

$$a^2 + b^2 = c^2$$
$$(-3)^2 + (5)^2 = c^2$$
$$34 = c^2$$
$$\pm\sqrt{34} = c$$

$$\sin\theta = \frac{-3}{\sqrt{34}} = \frac{-3\sqrt{34}}{34}$$

$$\cos\theta = \frac{-5}{\sqrt{34}} = \frac{-5\sqrt{34}}{34}$$

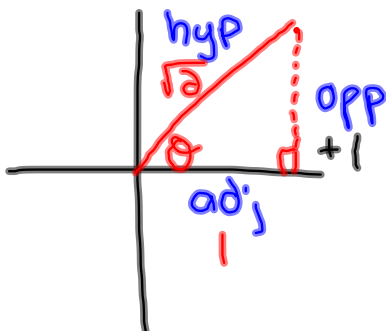$$\tan\theta = \frac{-3}{-5} = \frac{3}{5}$$

$$\csc\theta = \frac{\sqrt{34}}{-3}$$

$$\sec\theta = \frac{\sqrt{34}}{-5}$$

$$\cot\theta = \frac{-5}{-3} = \frac{5}{3}$$

θ is a first quadrant angle. If $\cos\theta = \dfrac{1 \ \text{adj}}{\sqrt{2} \ \text{hyp}}$, find $\sin\theta$ and $\sec\theta$

hyp
$\sqrt{2}$

opp
+1

adj
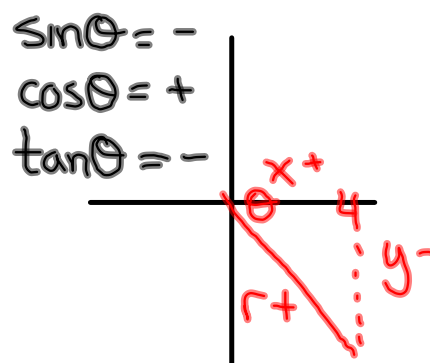1

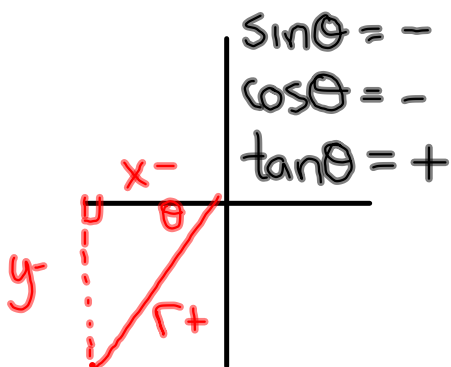$$a^2 + b^2 = c^2$$
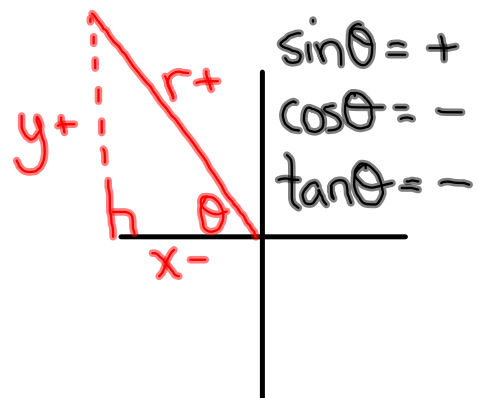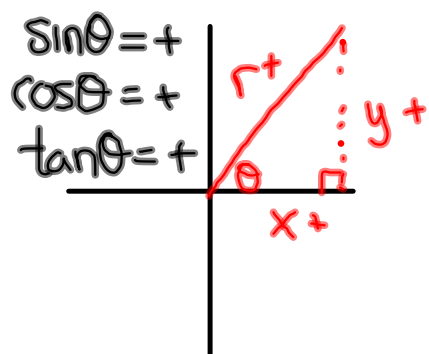$$(1)^2 + b^2 = (\sqrt{2})^2$$
$$1 + b^2 = 2$$
$$b^2 = 1$$
$$b = \pm 1$$

$$\sin\theta = \frac{1}{\sqrt{2}} = \frac{\sqrt{2}}{2}$$

$$\sec\theta = \frac{\sqrt{2}}{1} = \sqrt{2}$$

Review signs of the trig ratios in the 4 quadrants

$\sin\theta = +$
$\cos\theta = +$
$\tan\theta = +$

$r+$
$y+$
$x+$
θ

$\sin\theta = +$
$\cos\theta = -$
$\tan\theta = -$

$r+$
$y+$
$x-$
h
θ

$\sin\theta = -$
$\cos\theta = -$
$\tan\theta = +$

$x-$
θ
y
$r+$

$\sin\theta = -$
$\cos\theta = +$
$\tan\theta = -$

$x+$
θ
$r+$
$y-$

Cast Rule

Quadrants   **Remember 4CAST**

90

2 S   1A

180 ——————— **0**

360

3T   4 C

270
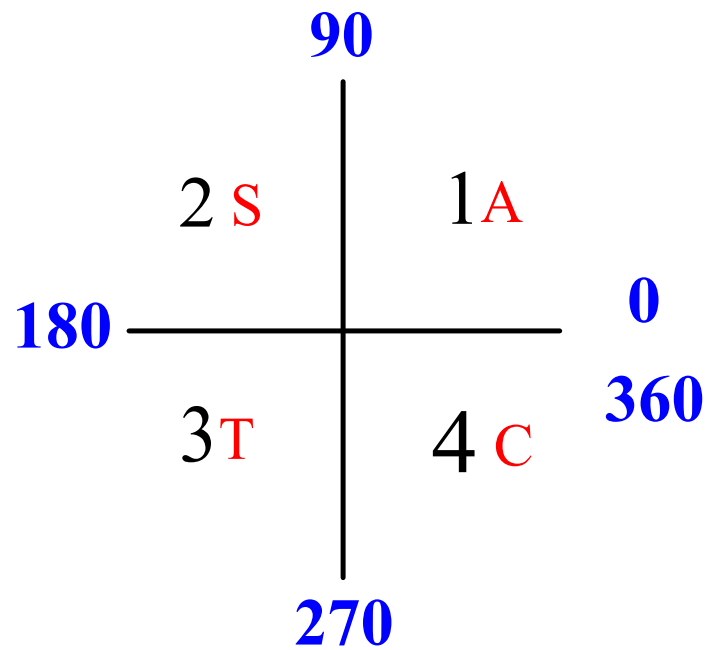
Special Angles

I. $30°$ and $60°$

```
        △
      30
        ⟋ ⟍
   √3  ⟋    ⟍  2
      ⟋        ⟍
     ⟋_____60___⟍
   □
        1
```

	30	**60**
Sin	$\dfrac{1}{2}$	$\dfrac{\sqrt{3}}{2}$
Cos	$\dfrac{\sqrt{3}}{2}$	$\dfrac{1}{2}$
Tan	$\dfrac{1}{\sqrt{3}}$ or $\dfrac{\sqrt{3}}{3}$	$\sqrt{3}$

Special Angles

II. $45°$

The triangle shows a right triangle with a $45°$ angle at the top, a $45°$ angle at the bottom right, a right angle at the bottom left. The left vertical side is labeled 1, the bottom side is labeled 1, and the hypotenuse is labeled $\sqrt{2}$.

	45
Sin	$\dfrac{1}{\sqrt{2}}$ or $\dfrac{\sqrt{2}}{2}$
Cos	$\dfrac{1}{\sqrt{2}}$ or $\dfrac{\sqrt{2}}{2}$
Tan	1

MEMORIZE THESE DIAGRAMS!!!

III. Quadrantal Angles (Multiples of 90°)

Unit Circle

$(x, y) = (0, 1)$
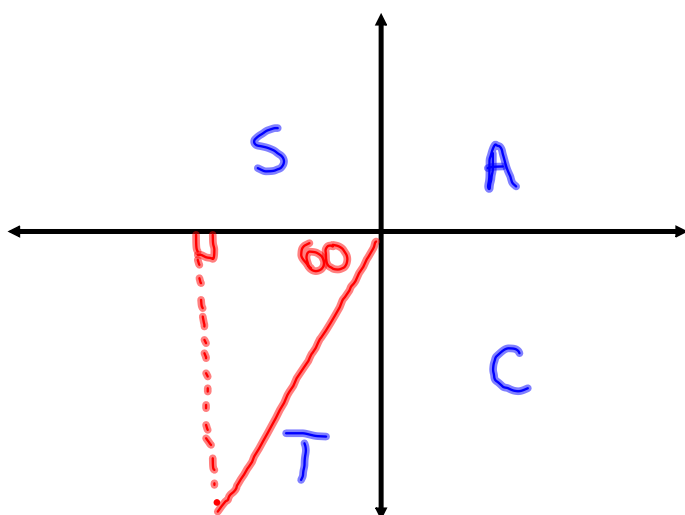
90

$(-1, 0)$ 180

0
360

$(1, 0)$

270

$(0, -1)$

$* \sin\theta = y \quad \csc\theta = \frac{1}{y}$

$\cos\theta = x \quad \sec\theta = \frac{1}{x}$
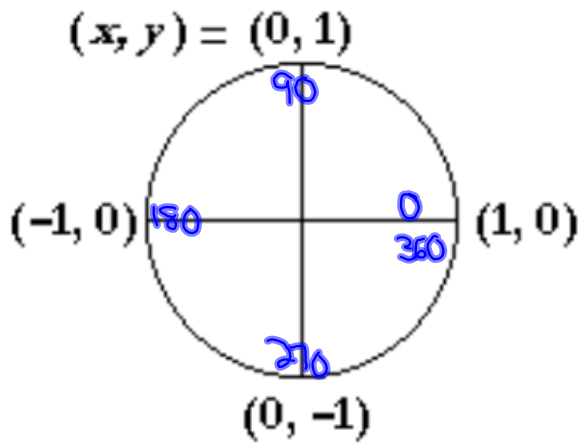
$\tan\theta = \frac{y}{x} \quad \cot\theta = \frac{x}{y}$

	0^0	90^0	180^0	270^0	360^0
sin	0	1	0	-1	0
cos	1	0	-1	0	1
tan	0	undefined	0	undefined	0

Extend the special angles into all FOUR quadrants

Without a calculator determine the value of $\cos 240°$

1. Start by sketching the angle

$$\cos 240° = -\frac{1}{2}$$

S | A

60

T

C