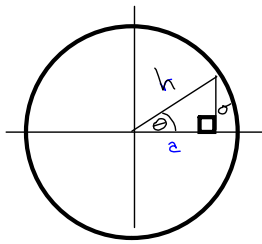


Tests - in-person

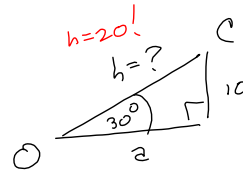
Homework - WebAssignment



$$\sin \theta = \frac{10}{r}$$

$$\cos \theta = \frac{r}{h}$$

$$\tan \theta = \frac{10}{r}$$

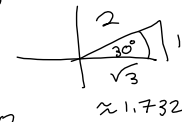


Want h & I know $\theta = 30^\circ$
 & $r = 10$
 what's h ?

$$\frac{10}{h} = \sin 30^\circ$$

$$10 = h \sin 30^\circ$$

$$\frac{10}{\sin 30^\circ} = h = \frac{10}{\frac{1}{2}} = 20 = h$$

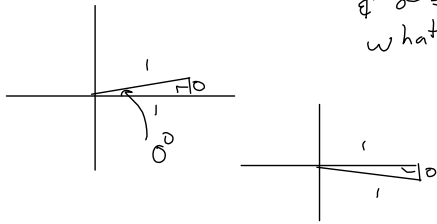


$h =$
 $(\) (h)$

$$\approx 1.732$$

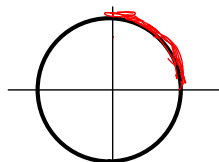
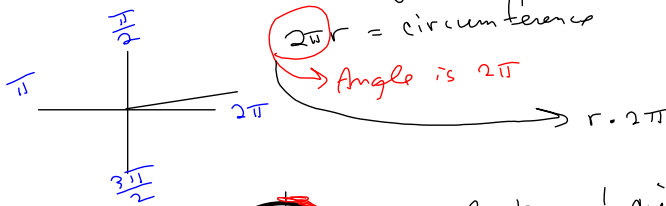
$$= 10 \cdot 2$$

$$= 20 = h$$



Make sure you're in the right mode!

Degrees are more intuitive.
 Radians are built to relate angles to lengths and areas in a natural way.



arc length = $\frac{1}{4}$ circumference

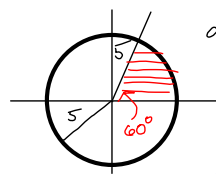
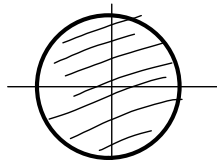
$$\frac{2\pi r}{4} = \frac{\pi}{2} \cdot r = r \cdot \frac{\pi}{2}$$

$s = \text{arc length} = r \theta$
 Doesn't work in degrees!

Area of a sector.

Area of a circle = πr^2

$$A = \pi r^2 = r^2 \pi = \frac{r^2 \cdot 2\pi}{2} = \frac{1}{2} r^2 \theta$$



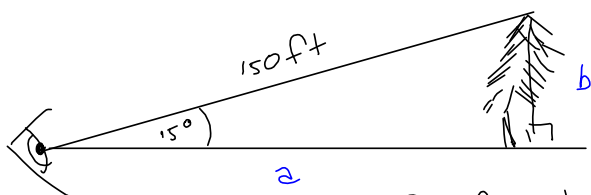
area of the sector is

$$\frac{1}{2} r^2 \theta = \frac{1}{2} \cdot 5^2 \cdot 60^\circ \cdot \frac{\pi}{180^\circ}$$

$$= \frac{25 \cdot \pi}{2 \cdot 3}$$

$$= \frac{25\pi}{6} \text{ units}^2$$

Osteogenesis Imperfecta = Brittle Bones = OI
 + Blue sclera



How far from the tree am I?

$$\frac{a}{150} = \cos 15^\circ$$

$$\frac{b}{150} = \sin 15^\circ$$

$$a = 150 \cos 15^\circ$$

$$x = r \cos \theta$$

$$b = 150 \sin 15^\circ$$

$$y = r \sin \theta$$

```

- .9880316241
sin(30)
.5
150cos(15)
144.8888739
150sin(15)
38.82285677

```

$$a \approx 144.8888739 \text{ ft}$$

$$b \approx 38.82285677 \text{ ft}$$

House keeping:

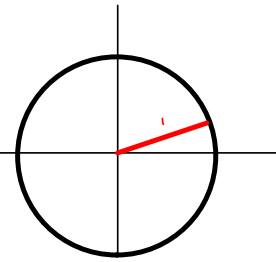
Let a = distance to the tree, in feet.
 b = height of the tree, in feet

Lexicon. Define variables in words & units.

$$a \approx 144.9 \text{ ft}$$

$$b \approx 38.8 \text{ ft}$$

Rad	Deg	Sin	Cos	Tan	Csc	Sec	Cot		
.0000	00	.0000	1.0000	.0000	-----	1.0000	-----	90	1.5707
.0175	01	.0175	.9998	.0175	57.2987	1.0002	57.2900	89	1.5533
.0349	02	.0349	.9994	.0349	28.6537	1.0006	28.6363	88	1.5359
.0524	03	.0523	.9986	.0524	19.1073	1.0014	19.0811	87	1.5184
.0698	04	.0698	.9976	.0699	14.3356	1.0024	14.3007	86	1.5010
.0873	05	.0872	.9962	.0875	11.4737	1.0038	11.4301	85	1.4835
.1047	06	.1045	.9945	.1051	9.5668	1.0055	9.5144	84	1.4661
.1222	07	.1219	.9925	.1228	8.2055	1.0075	8.1443	83	1.4486
.1396	08	.1392	.9903	.1405	7.1853	1.0098	7.1154	82	1.4312
.1571	09	.1564	.9877	.1584	6.3925	1.0125	6.3138	81	1.4137
.1745	10	.1736	.9848	.1762	5.7588	1.0154	5.6712	80	1.3953

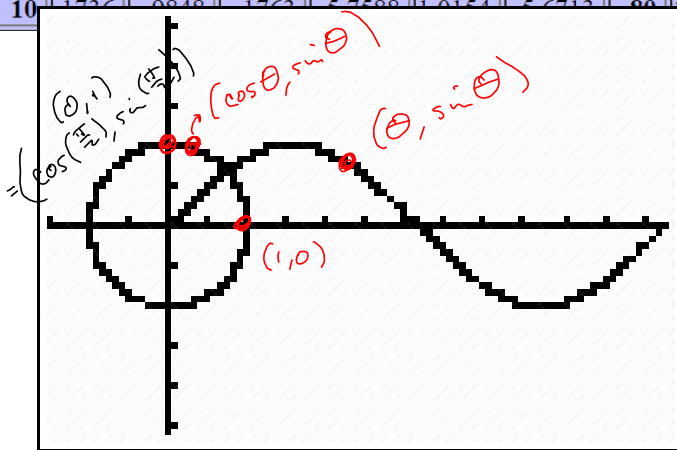


picture for $\theta = 180^\circ = \pi$

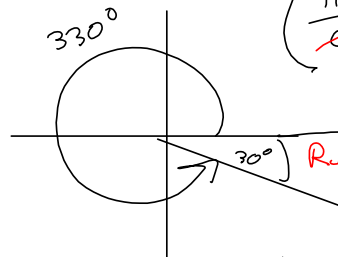
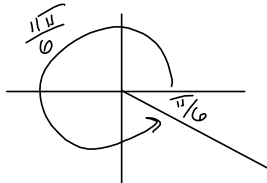
$\sin \pi = 0 = \frac{0}{1}$



Hypotenuse always positive,
 cosine \leftrightarrow x
 sine \leftrightarrow y



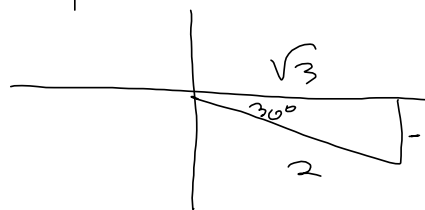
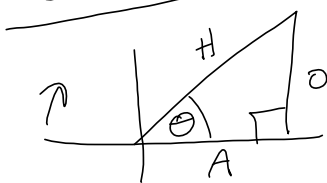
what's $\tan(\frac{11\pi}{6})$?



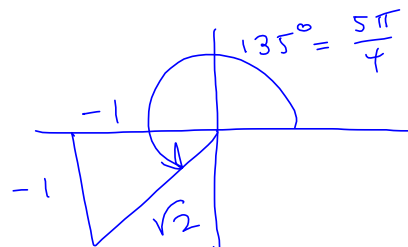
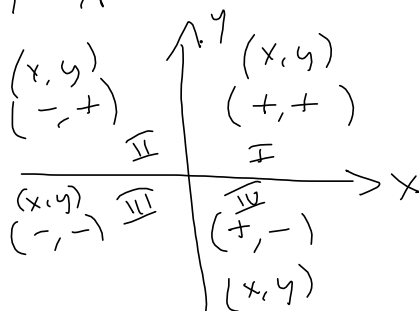
$(\frac{11\pi}{6}) (\frac{330^\circ}{\pi}) = 330^\circ$

Reference angle is 30°

SOHCAHTOA



$\tan \frac{11\pi}{6} = \tan 330^\circ = \frac{-1}{\sqrt{3}}$



$\cos 135^\circ = -\frac{1}{\sqrt{2}}$



$\sin \theta = \frac{1}{3}$, Terminal side in QII

Find the value of all 6 trig functions
Draw the picture.

2 triangles
 $\sin \theta = \frac{1}{3}$

Narrows it down

Pythagorus sez: $a^2 + b^2 = c^2$

The square of the hypotenuse is equal to the sum of the squares of the two opposing sides.

SOHCAHTOA

$$\Rightarrow a^2 + 1^2 = 3^2 = 9$$

$$a^2 = 9 - 1 = 8$$

$$a = \pm \sqrt{8} = \pm 2\sqrt{2}$$

2/8
2/4
2

which?

$\sin \theta = \frac{1}{3}$, Terminal side in QII

Find the value of all 6 trig functions
Draw the picture.

2 triangles
 $\sin \theta = \frac{1}{3}$

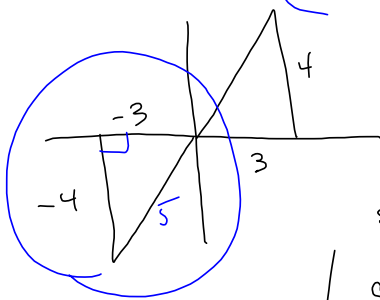
Narrows it down

Pythagorus sez: $a^2 + b^2 = c^2$

$a = -2\sqrt{2}$, b/c
we're in QII

$\sin \theta = \frac{1}{3}$	$\csc \theta = \frac{3}{1}$
$\cos \theta = \frac{-2\sqrt{2}}{3}$	$\sec \theta = \frac{3}{-2\sqrt{2}}$
$\tan \theta = \frac{1}{-2\sqrt{2}}$	$\cot \theta = -2\sqrt{2}$

$\tan \theta = \frac{4}{3}$ & $\sin \theta < 0$ Find all 6 trigs.



$$3^2 + 4^2 = 9 + 16 = 25 = c^2$$

$$\Rightarrow c = 5$$

$$\sin \theta = \frac{-4}{5}$$

$$\csc \theta = \frac{-5}{4}$$

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

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

$$\tan \theta = \frac{4}{3}$$

$$\cot \theta = \frac{3}{4}$$

Next time Clean up all questions from
1.1, 1.3, and then get as much done
in §1.4 as possible.

My 1st video on a problem type
Trig : Cengage, WebAssign
6 hrs/wk outside of class