

To convert degrees to radians; multiply by $\frac{\pi}{180^\circ}$
Preferred answer is fraction form

$$1) 36^\circ \left(\frac{\pi}{180^\circ} \right) = \frac{36\pi}{180^\circ} \text{ Reduce fraction } \frac{\pi}{5} \\ \approx .6283$$

$$2) 200^\circ \left(\frac{\pi}{180^\circ} \right) = \frac{200\pi}{180} = \frac{10\pi}{9} \\ \approx 3.49$$

$$3) -480^\circ \left(\frac{\pi}{180^\circ} \right) = \frac{-480\pi}{180} = -\frac{8\pi}{3} \\ \approx -8.38$$

$$4) -72^\circ \left(\frac{\pi}{180^\circ} \right) = \frac{-72\pi}{180} = -\frac{2\pi}{5} \\ \approx -1.257$$

To convert from radians to degrees multiply by $\frac{180^\circ}{\pi}$

$$5) \frac{3\pi}{4} \left(\frac{180^\circ}{\pi} \right) = 135^\circ$$

← Make sure to write the degree symbol. Without it I will think it is a radian measure

$$6) -\frac{7\pi}{2} \left(\frac{180^\circ}{\pi} \right) = -630^\circ$$

$$7) 2 \left(\frac{180^\circ}{\pi} \right) = \frac{360^\circ}{\pi} \approx 114.59^\circ$$

$$8) -1.5 \left(\frac{180^\circ}{\pi} \right) = \frac{-270^\circ}{\pi} \approx -85.94^\circ$$

Convert from DMS to decimal form (Type in calculator

$$9) 23^{\circ}12' \Rightarrow 23.20^{\circ}$$

$$10) 118^{\circ}44'15'' \Rightarrow 118.7375^{\circ}$$

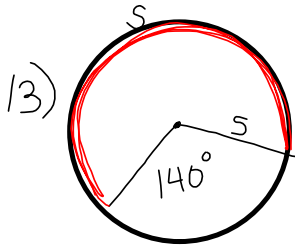
using degree, minute,
Second symbols $\frac{1}{2}$ then
hit enter

Convert from decimal form to degrees, minutes,
seconds

$$11) 21.2^{\circ} \Rightarrow 21^{\circ}12'0''$$

$$12) 118.32^{\circ} \Rightarrow 118^{\circ}19'12''$$

Type the given angle
degree in calculator
then enter DMS (button)
*found in angle menu
Enter



$$S = r\theta \leftarrow \text{has to be in radians}$$

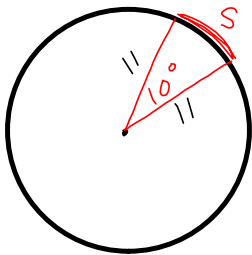
220° is the angle measure for the given arc length S

$$220^\circ \left(\frac{\pi}{180^\circ} \right) = \frac{11\pi}{9}$$

$$S = r\theta$$

$$S = 5 \left(\frac{11\pi}{9} \right) \approx 19.2$$

14)



Perimeter is everything in red

$$P = 11 + 11 + S$$

$$P = 22 + S$$

$$P = 22 + 1.92$$

$$P = 23.92$$

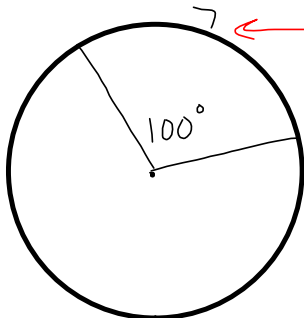
$$\theta = 10^\circ \left(\frac{\pi}{180^\circ} \right) = \frac{\pi}{18}$$

$$S = r\theta$$

$$S = (11) \left(\frac{\pi}{18} \right)$$

$$S \approx 1.92$$

15)



← arc length

$$100^\circ \left(\frac{\pi}{180^\circ} \right) = \frac{5\pi}{9}$$

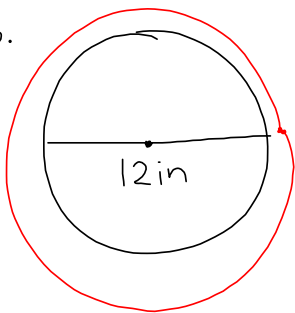
$$S = r\theta$$

$$7 = r \left(\frac{5\pi}{9} \right)$$

$$r = 7 \left(\frac{9}{5\pi} \right)$$

$$r \approx 4.01$$

16.



1 revolution of the saw blade is equal to the circumference

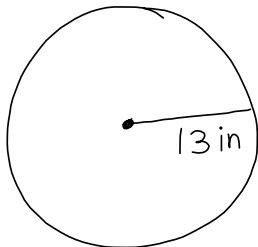
$$C = 2\pi r \text{ or } C = \pi d$$

$$C = 12\pi \text{ in} *$$

$$\left(10,000 \frac{\text{rev}}{\text{min}}\right) \left(\frac{12\pi \text{ in}}{1 \text{ rev}}\right) \left(\frac{1 \text{ ft}}{12 \text{ in}}\right) \left(\frac{1 \text{ mi}}{5280 \text{ ft}}\right) \left(\frac{60 \text{ min}}{1 \text{ hr}}\right) = 357 \frac{\text{mi}}{\text{hr}}$$

357 mph

17)



1 revolution \Rightarrow circumference

$$C = 2\pi r$$

$$C = 26\pi \text{ in}$$

$$\left(44 \frac{\text{ft}}{\text{sec}}\right) \left(\frac{1 \text{ rev}}{26\pi \text{ in}}\right) \left(\frac{12 \text{ in}}{1 \text{ ft}}\right) \left(\frac{60 \text{ sec}}{1 \text{ min}}\right) = 387.85 \frac{\text{rev}}{\text{min}}$$

387.9 rpm

Make sure your calculator is in the correct Mode

Degrees or Radians

18. $\sin 74^\circ \leftarrow$ degree mode
 $\approx .9613$

19. $\cos 20^\circ 23' \leftarrow$ degree mode
 $\approx .9374$

20. $\cot .89 \leftarrow$ radian mode / No degree symbol
 Not a button
 $\frac{1}{\tan .89} \approx .80997$

21) $\sec\left(\frac{\pi}{8}\right) \leftarrow$ radian mode
 Not a button
 $\frac{1}{\cos(\pi/8)} \approx 1.0824$

Evaluate without a calculator
 Draw triangle or use unit circle

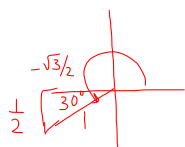
22 a) $\sin \frac{\pi}{2}$ $\sin 90^\circ$



y-value of point is $\sin \theta$

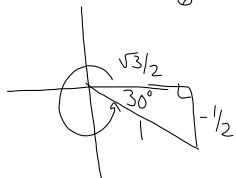
$\boxed{1}$

b) $\cos \frac{7\pi}{6}$ $\sin 210^\circ$



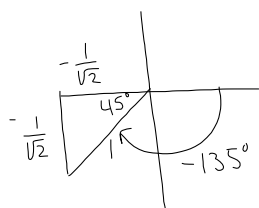
$\boxed{-\frac{\sqrt{3}}{2}}$

c) $\tan \frac{11\pi}{6}$ $\tan 330^\circ$



$\frac{-\frac{1}{2}}{\frac{\sqrt{3}}{2}} = -\frac{1}{\sqrt{3}} \frac{\sqrt{3}}{\sqrt{3}} = \boxed{-\frac{\sqrt{3}}{3}}$

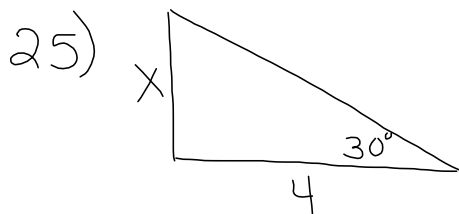
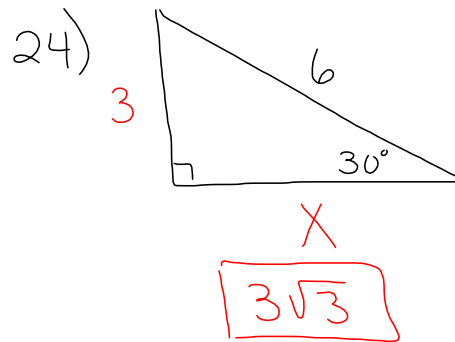
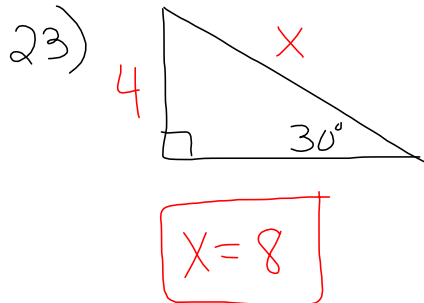
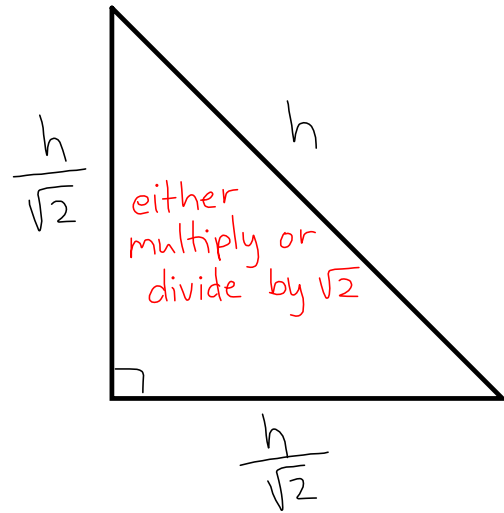
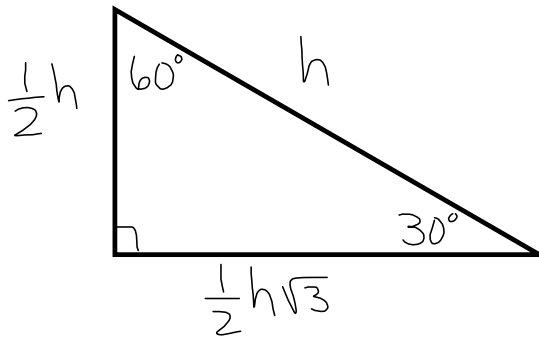
d) $\csc -\frac{3\pi}{4}$ $\csc(-135^\circ)$



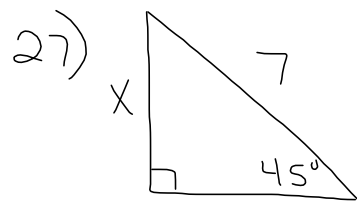
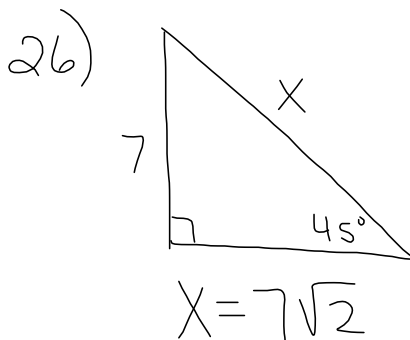
$\csc \theta$ is reciprocal of $\sin \theta$

$-\frac{1}{\sqrt{2}} \Rightarrow \frac{-\sqrt{2}}{1} = \boxed{-\sqrt{2}}$

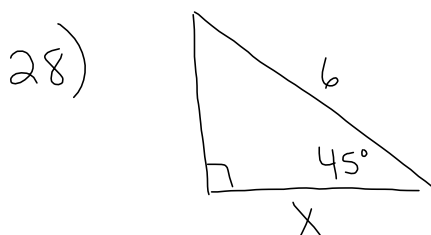
Use special right triangle Rules



$$X = \frac{4\sqrt{3}}{\sqrt{3}\sqrt{3}} = \frac{4\sqrt{3}}{3}$$



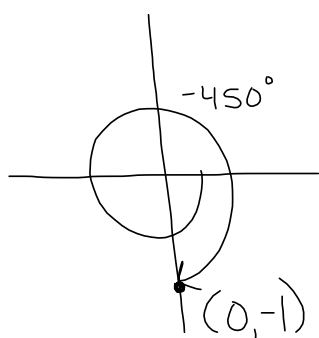
$$X = \frac{7\sqrt{2}}{\sqrt{2}\sqrt{2}} = \frac{7\sqrt{2}}{2}$$



$$X = \frac{6\sqrt{2}}{\sqrt{2}\sqrt{2}} = \frac{6\sqrt{2}}{2} = 3\sqrt{2}$$

Evaluate without a calculator

29) -450°

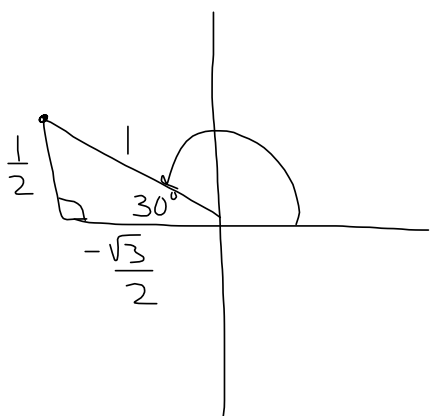


$$\sin \theta = -1$$

$$\cos \theta = 0$$

$$\tan \theta = \frac{-1}{0} \text{ undefined}$$

30) $\frac{5\pi}{6} = 150^\circ$



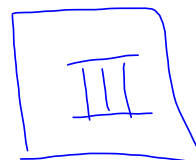
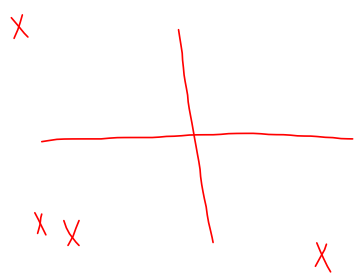
$$\sin \theta = \frac{1}{2}$$

$$\cos \theta = -\frac{\sqrt{3}}{2}$$

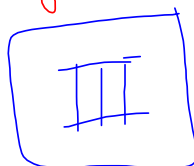
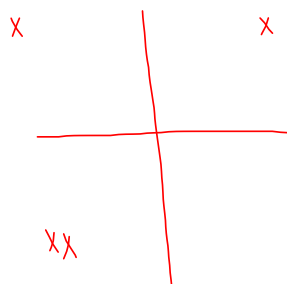
$$\tan \theta = \frac{\frac{1}{2}}{-\frac{\sqrt{3}}{2}} = \frac{1 \sqrt{3}}{-\sqrt{3} \sqrt{3}} = -\frac{\sqrt{3}}{3}$$

- 31) a) III & IV
b) I & III
c) II & III

32) a) $\csc \theta < 0$ and $\cos \theta < 0$
Neg *Neg*

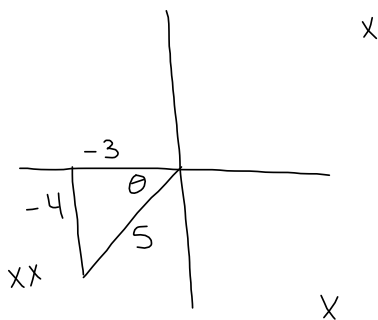


b) $\tan \theta > 0$ & $\cos \theta < 0$
POS. *neg*



$$33. \sin \theta = -\frac{4}{5} \frac{\text{opp}}{\text{hyp}} \quad \tan \theta > 0^{\text{pos}}$$

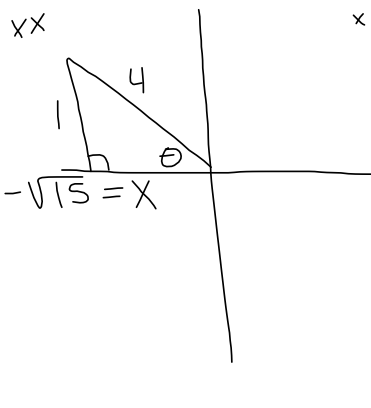
Build triangle in correct quadrant



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

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

$$34) \sin \theta = \frac{1}{4} \frac{\text{opp}}{\text{hyp}} \quad \tan \theta < 0^{\text{Neg}}$$



$$(1)^2 + x^2 = 4^2$$

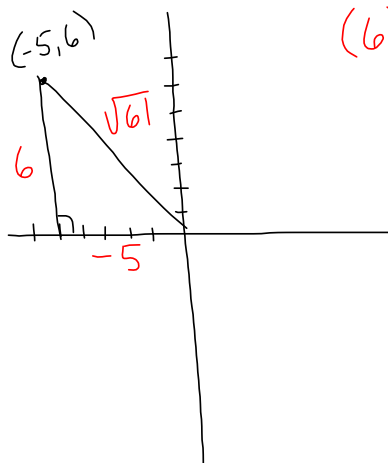
$$x^2 = 15$$

$$x = \sqrt{15}$$

$$\cos \theta = -\frac{\sqrt{15}}{4}$$

$$\cot \theta = \frac{-\sqrt{15}}{1} = -\sqrt{15}$$

35) Graph the point and build the triangle.



$$(6)^2 + (-5)^2 = h^2$$

$$61 = h^2$$

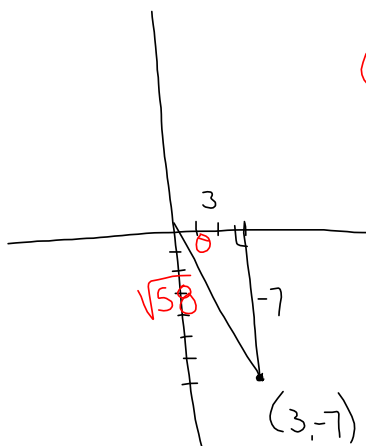
$$h = \sqrt{61}$$

$$\sin \theta = \frac{6}{\sqrt{61}} \quad \csc \theta = \frac{\sqrt{61}}{6}$$

$$\cos \theta = \frac{-5}{\sqrt{61}} \quad \sec \theta = -\frac{\sqrt{61}}{5}$$

$$\tan \theta = \frac{-6}{5} \quad \cot \theta = \frac{-5}{6}$$

36.



$$(3)^2 + (-7)^2 = h^2$$

$$h^2 = 58$$

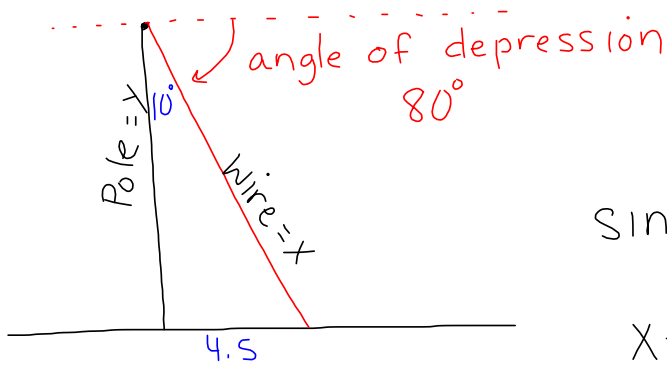
$$h = \sqrt{58}$$

$$\sin \theta = \frac{-7}{\sqrt{58}} \quad \csc \theta = \frac{-\sqrt{58}}{7}$$

$$\cos \theta = \frac{3}{\sqrt{58}} \quad \sec \theta = \frac{\sqrt{58}}{3}$$

$$\tan \theta = \frac{-7}{3} \quad \cot \theta = \frac{-3}{7}$$

37)



$$\sin 10^\circ = \frac{4.5}{x}$$

$$x = \frac{4.5}{\sin 10^\circ}$$

$$\text{WIRE} \Leftarrow x = 25.9 \text{ ft}$$

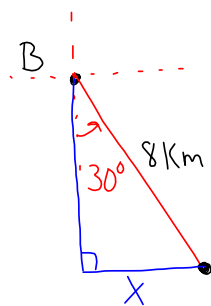
$$\tan 10^\circ = \frac{4.5}{y}$$

$$y = \frac{4.5}{\tan 10^\circ}$$

$$y = 25.5 \text{ ft}$$

$$\text{Pole } 25.5 \text{ ft}$$

38)

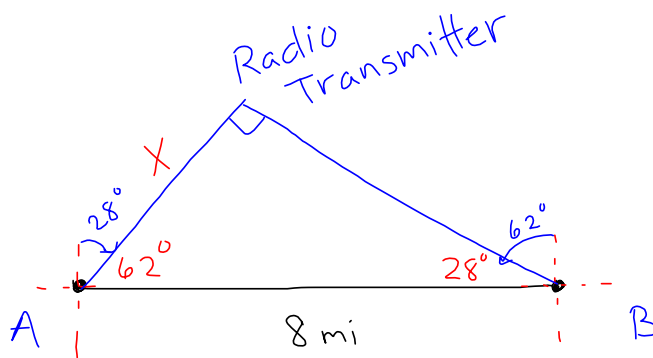


$$\sin 30^\circ = \frac{x}{8}$$

$$8 \sin 30^\circ = x$$

$$x = 4 \text{ Km}$$

39)

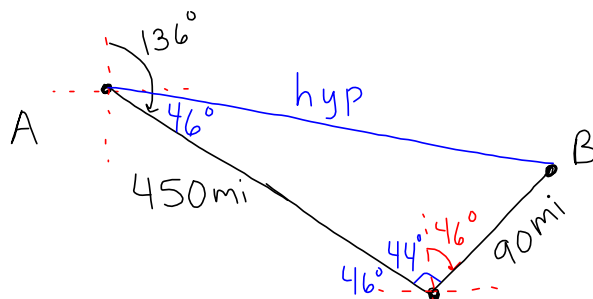


$$\cos 62^\circ = \frac{X}{8}$$

$$8 \cos 62^\circ = X$$

$$X = 3.8 \text{ mi}$$

40)



$$(450)^2 + (90)^2 = h^2$$

$$210600 = h^2$$

$$h = \sqrt{210600}$$

$$\approx 458.9 \text{ miles}$$

180 mph for 2.5 hrs
distance is:
 $(180)(2.5) = 450$

* only travels for
 $\frac{1}{2}$ hr after
changes direction

distance is:
 $(180)(.5) = 90$