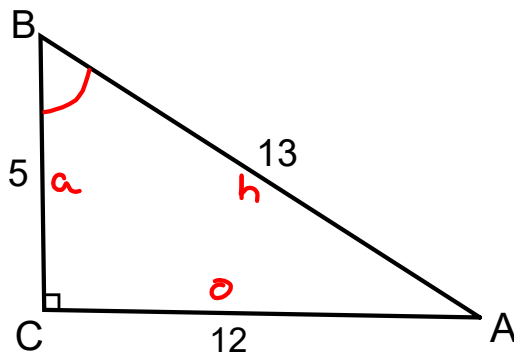# 9-2 Trig Inverses and Reciprocals

- I can identify the reciprocal of a trig ratio
- I can write all 6 trig ratios of a triangle
- I can use inverse trig functions to find measures of angles.
- I can solve a triangle

Oct 20-4:52 PM

Fill in the trigonometric expression with the correct ratio from the figure.

$\sin A = \dfrac{5}{13}$ $\sin B = \dfrac{12}{13}$

$\cos A = \dfrac{12}{13}$ $\cos B = \dfrac{5}{13}$

$\tan A = \dfrac{5}{12}$ $\tan B = \dfrac{12}{5}$

Oct 20-4:54 PM

The cosecant, secant, and cotangent ratios can be expressed in terms of sine, cosine, and tan ratios.

$$\csc\theta = \frac{1}{\sin\theta}, \quad \sec\theta = \frac{1}{\cos\theta}, \quad \cot\theta = \frac{1}{\tan\theta}$$

$$\frac{1}{\,^{o}/_{h}\,} = \frac{h}{o} \qquad \frac{a}{h} \qquad \frac{o}{a}$$

$$\csc\theta = \frac{h}{o} \qquad \sec\theta = \frac{h}{a} \qquad \cot\theta = \frac{a}{o}$$

Feb 26-11:55 AM

When you know the trigonometric ratio of an angle you can find the measure of that angle by using the ***inverse relation***

If tan A = ¾ then m∠A= tan $^{-1}$ ¾

$$\tan\theta = {}^{3}/_{4}$$

$$\tan^{-1}\left(\frac{3}{4}\right) = \theta$$

$$\theta \approx 36°$$

Feb 26-11:57 AM

Once you know the sine, cosine or the tangent of an acute angle, then you can use a calculator to find the measure of the angle.

For acute angle A:

$$\text{If } \sin A = x, \text{ then } \sin^{-1}(x) = m\angle A$$

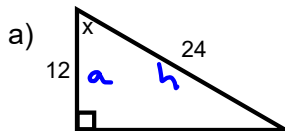$$\sin A = x \qquad \sin^{-1} x = A$$

$$\text{If } \cos A = x, \text{ then } \cos^{-1}(x) = m\angle A$$

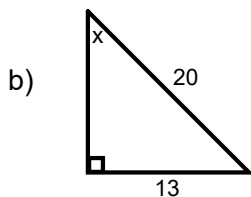$$\text{If } \tan A = x, \text{ then } \tan^{-1}(x) = m\angle A$$

Oct 20-4:58 PM

Inverse Trig

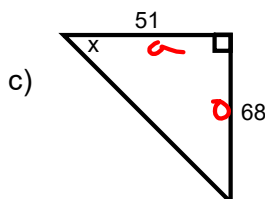Find the measure of the indicated angle to the nearest **degree** (hint: calculator mode)

a)

$$\cos x = \frac{a}{h} = \frac{12}{24} = \frac{1}{2}$$

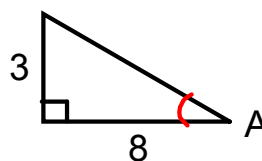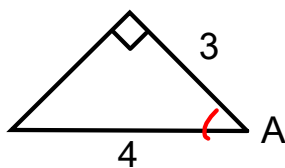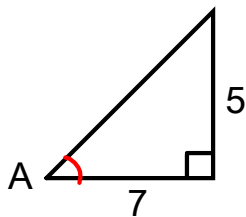$$\cos^{-1}\left(\frac{1}{2}\right) = x \qquad x = 60°$$

b)

$$x \approx 40°$$

c)

$$\tan x = \frac{68}{51}$$

$$x \approx 53°$$

Oct 27-3:24 PM

3

Find the m∠A by using inverse trigonometric functions.

Feb 26-11:57 AM

Solving a triangle involves finding the measures of all of the unknown sides and angles of the triangle.

Helpful hints:

- The sum of the two acute angles is 90°

- If you know two sides of the right triangle, use the Pythagorean Theorem to find the third side.

- Use trig ratios to find the length of sides and trig inverses to find the measure of angles

Feb 26-11:58 AM

Solve the right triangles.

A

b   o   c

40°

h

C   a   50°   B

6.1 a
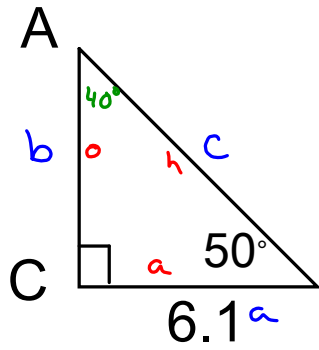
$A = 40°$ $a = 6.1$

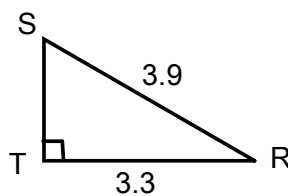$B = 50°$ $b = ?$ 7.3

$C = 90°$ $C = ?$ 9.5

$$\tan 50° = \frac{b}{6.1}$$

$$\cos 50° = \frac{6.1}{c}$$

$$\frac{1}{\cos 50°} = \frac{c}{6.1}$$
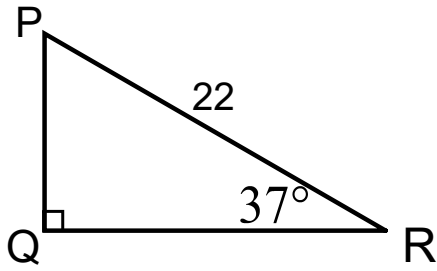
$$c =$$

Feb 26-11:58 AM

S

3.9

T   3.3   R

Apr 14-12:17 PM

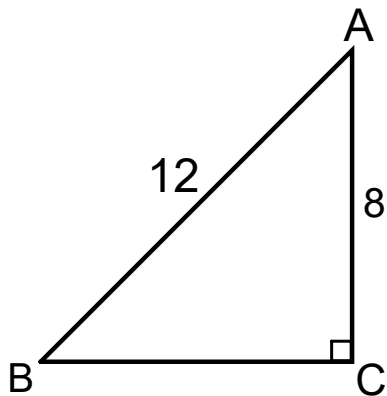Solve the right triangle. Round decimals to the nearest tenth.

$$\measuredangle P = \qquad p =$$

$$\measuredangle Q = \qquad q =$$

$$\measuredangle R = \qquad r =$$

P

22

37°

Q   R

Oct 20-5:02 PM

Solve the right triangle. Round decimals to the nearest tenth.

A

12   8

B   C

$$\measuredangle A = \qquad a =$$

$$\measuredangle B = \qquad b =$$

$$\measuredangle C = \qquad c =$$

Oct 20-6:06 PM