



1.3 Primary Trig Ratios

ONLY RIGHT TRIANGLES!

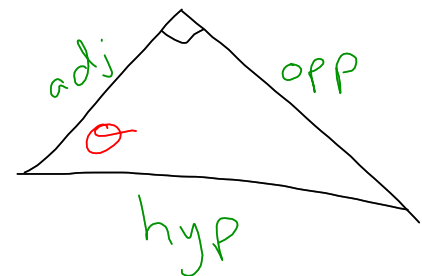
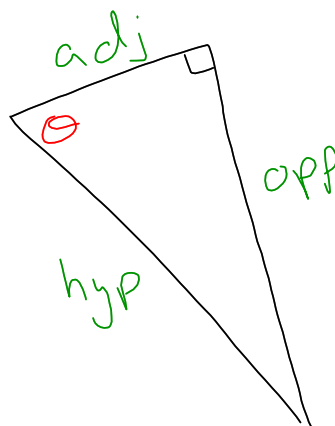
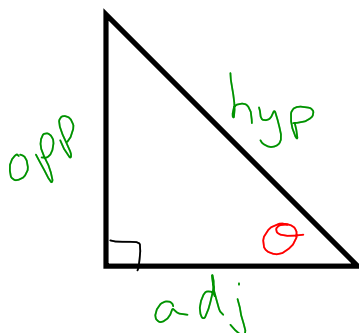
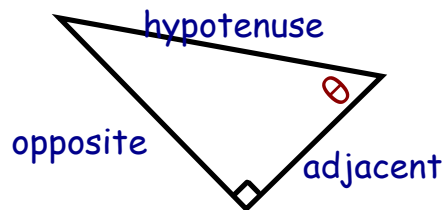
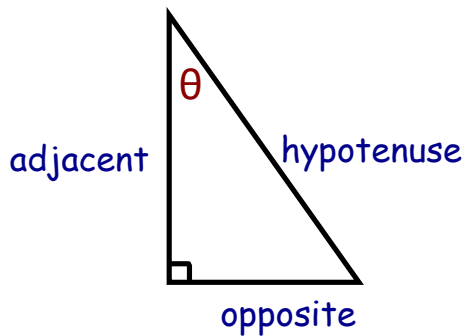
Trigonometric ratios are based on sides, relative to a given angle.

hypotenuse: the side ^{→ Always longest side} across from the right angle.

opposite: the side across from a given angle θ .

adjacent: the side that is *beside* a given angle θ .

θ = "theta"

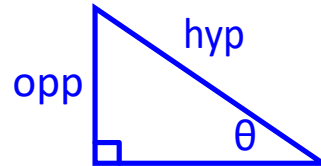




In right angle triangles, there are 3 primary trig ratios.

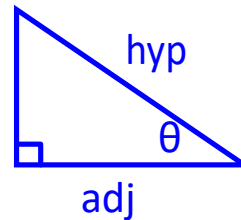
The Sine Ratio

$$\sin \theta = \frac{\text{opposite}}{\text{hypotenuse}}$$



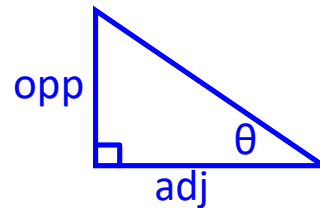
The Cosine Ratio

$$\cos \theta = \frac{\text{adjacent}}{\text{hypotenuse}}$$



The Tangent Ratio

$$\tan \theta = \frac{\text{opposite}}{\text{adjacent}}$$



SOH-CAH-TOA

θ → The Greek letter "theta" - represents an ANGLE

<https://www.geogebra.org/m/N5K7XhXb>

- * If we know the side lengths of a triangle, we can find the angles.
- * If we know the angles of a triangle, we can find the side lengths.



Solving for an Unknown Angle

Ex. 1 Determine the angle measure, to the nearest degree, for the following trig ratios. **Make sure your calculator is in degree mode!**

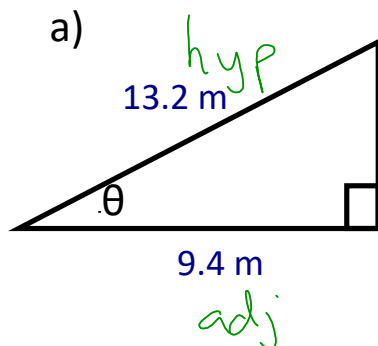
a) $\sin \theta = 0.5432$
 $\theta = \sin^{-1}(0.5432)$
 $\approx 33^\circ$

b) $\tan A = \frac{3}{4}$
 $A = \tan^{-1}\left(\frac{3}{4}\right)$
 $\approx 37^\circ$

c) $\cos \theta = \frac{8}{9}$
 $\theta \approx 27^\circ$

**** Since you are finding an angle, you need to work backwards.
 This means using the 2nd button on your calculator.**

Ex. 2 Solve for the unknown angle.



$$\cos \theta = \frac{\text{adj}}{\text{hyp}}$$

$$\cos \theta = \frac{9.4}{13.2}$$

$$\theta = \cos^{-1}\left(\frac{9.4}{13.2}\right)$$

$$\approx 45^\circ$$

① Label relevant sides

② Which trig ratio applies here?

③ Setup the ratio

④ Replace

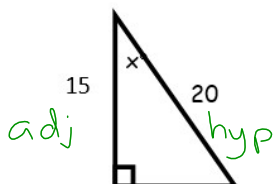
⑤ Solve



Try some: Solve for the unknown angle.

- Label the sides
opposite/adjacent/hypotenuse
- Choose the Trig Ratio
SOH CAH TOA
- Set up the Ratio
- Solve for the angle
Dont forget: 2nd Function!!

a)



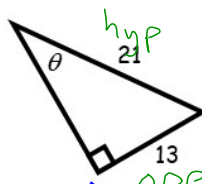
$$\cos x = \frac{\text{adj}}{\text{hyp}}$$

$$= \frac{15}{20}$$

$$x = \cos^{-1}\left(\frac{15}{20}\right)$$

$$= 41^\circ$$

b)



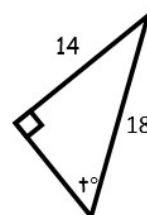
$$\sin \theta = \frac{\text{opp}}{\text{hyp}}$$

$$= \frac{13}{21}$$

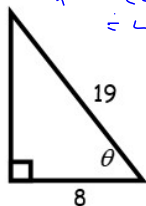
$$\theta = \sin^{-1}\left(\frac{13}{21}\right)$$

$$= 38^\circ$$

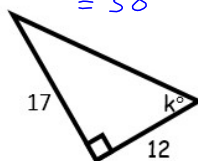
c)



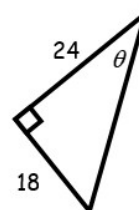
d)



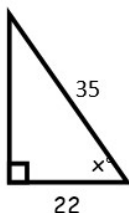
e)



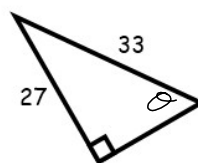
f)



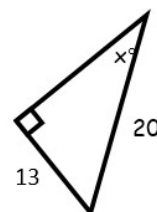
g)



h)

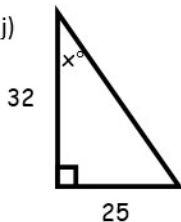


i)

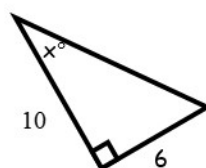


ANSWERS ON
NEXT PAGE

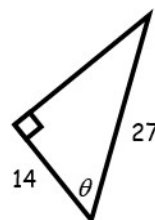
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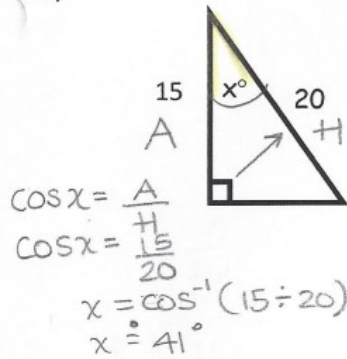
k)



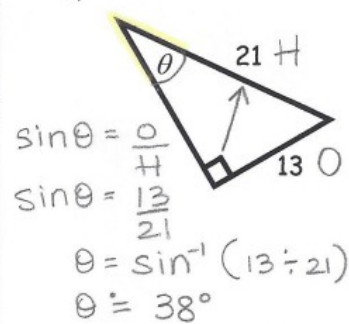
l)



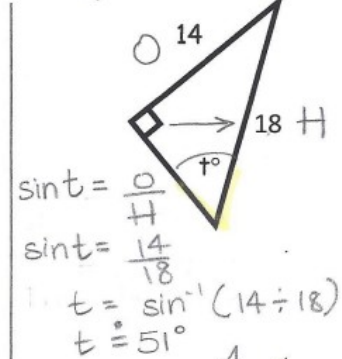
a)



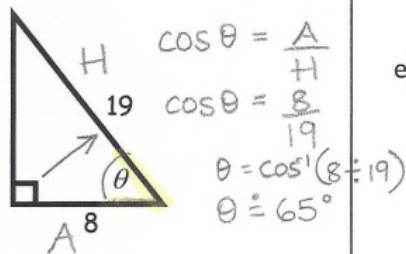
b)



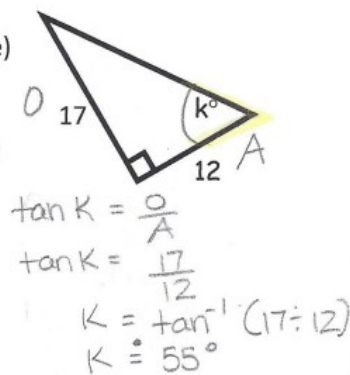
c)



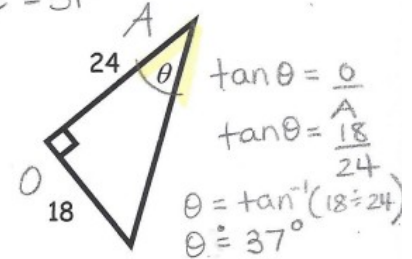
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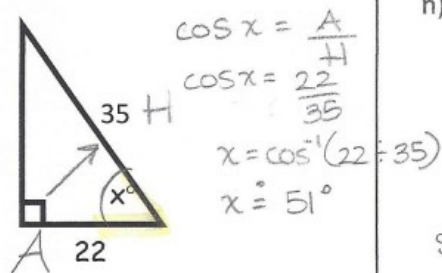
e)



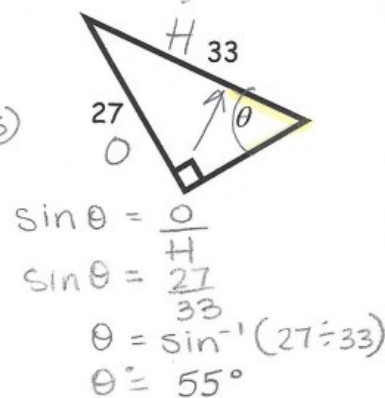
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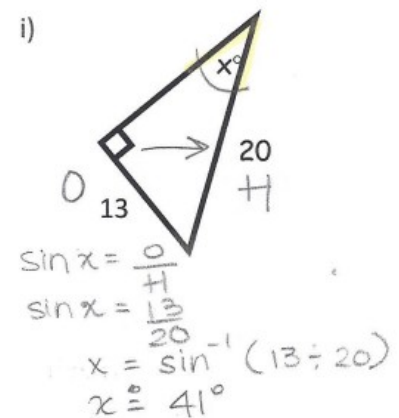
g)



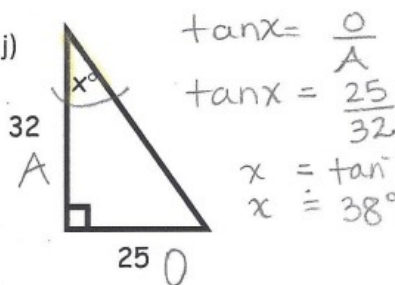
h)



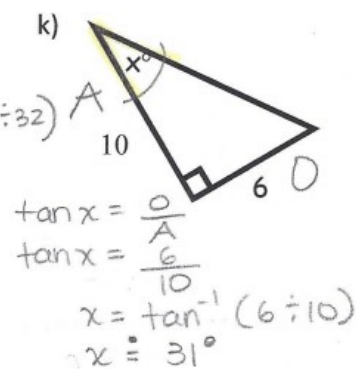
i)



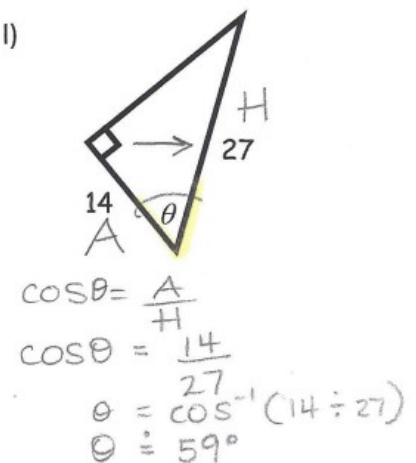
j)



k)



l)



HOMEWORK

Set 1: p. 362 #1ab,4eh,5d,

p. 372 #1a,2a,6ac,7ac,8a,9a

Set 2: p. 362 #1b,4eh,5d,15

p. 372 # 1a,2a,6ac,7ac,8a,9a,25