HW 2a

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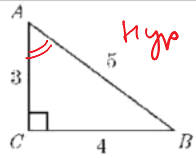
Pre-Calculus 11: HW 2.a Basic Trigonometric Review

1. Given each triangle, indicate which side is the "Hypotenuse", "Opposite" and "Adjacent" to the angle used. Then find the value of the trig ratio and angle:

a) $\sin A =$ $\frac{\text{opposite}}{\text{Hypotenuse}}$ h



$= \frac{BC}{AB} = \frac{4}{5} = 0.8$

$\sin A = 0.8$

$A = \sin^{-1}(0.8)$

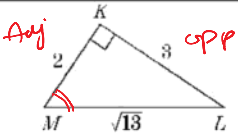
$A = 53.1°$

Hypotenuse: $\overline{AB}$

Opposite: $\overline{BC}$

Adjacent: $\overline{AC}$

b) $\cos M =$



$= \frac{\text{Adj}}{\text{Hyp}} = \frac{KM}{ML}$

$= \frac{2}{\sqrt{13}} = \frac{2\sqrt{13}}{13}$

$\cos M = \frac{2\sqrt{13}}{13}$

$M = \cos^{-1}(0.5547)$

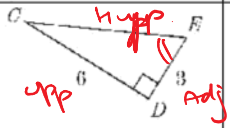
$M = 56.31°$

Hypotenuse: ML

Opposite: KL

Adjacent: KM

c) $\tan E =$



$= \frac{\text{opp}}{\text{Adj}}$

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

$\tan E = 2$

$E = \tan^{-1}(2)$

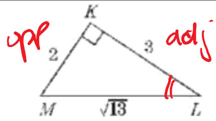
$E = 63.43°$

Hypotenuse: CE

Opposite: CD

Adjacent: ED

d) $\sin L =$ opp/Hyp



$= \frac{2}{\sqrt{13}} = \frac{2\sqrt{13}}{13}$

$\sin L = \frac{2}{\sqrt{13}}$

$L = \sin^{-1}\left(\frac{2}{\sqrt{13}}\right)$

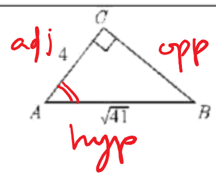
$L = 33.69°$

Hypotenuse: ML

Opposite: KM

Adjacent: KL

e) $\tan A =$ –



$\tan A =$

$A = \tan^{-1}$

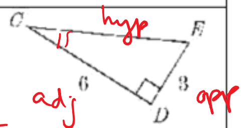
$A = 51.34°$

Hypotenuse: AB

Opposite: BC

Adjacent: AC

f) $\cos C =$ 26.57



$CE^2 = 6^2 + 3^2$

$CE^2 = 36 + 9$

$CE = \sqrt{45}$

$CE = 3\sqrt{5}$

$\cos \angle C = \frac{6}{3\sqrt{5}}$

$\boxed{\cos \angle C = \frac{2\sqrt{5}}{5}}$

$\cos C = \frac{6}{3\sqrt{5}}$

$C = \cos^{-1}\left(\frac{2\sqrt{5}}{5}\right)$

$\boxed{\angle C = 26.57°}$

Hypotenuse: CE

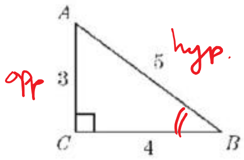
Opposite: ED = 3

Adjacent: CD = 6

2. Indicate which angle is equal to "x" and then solve for the angle:

a) $\sin x = 0.6$

$= \frac{3}{5} = \frac{opp}{hyp.}$



opp hyp.

$\therefore \angle B = x.$

36.87°

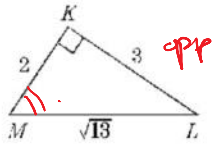
$\sin \angle B = 0.6$

$\angle B = \sin^{-1}(0.6)$

$\angle B = 36.87°$

b) $\sin x = \frac{3\sqrt{13}}{13} = \frac{3}{\sqrt{13}} = \frac{opp}{hyp.}$

$\therefore \angle M = x.$



opp hyp

56.31°

$\sin x = \frac{3\sqrt{13}}{13}$

$x = \sin^{-1}\left(\frac{3\sqrt{13}}{13}\right)$

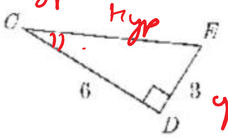
$x = 56.31°$

c) $\cos x = \frac{\sqrt{5}}{5} = \frac{1}{\sqrt{5}} = \frac{3}{3\sqrt{5}} = \frac{opp}{Hyp}$

① $EC^2 = 6^2 + 3^2$

$EC = \sqrt{45}$

$EC = 3\sqrt{5}$



Hyp opp

$\therefore \angle C = x.$

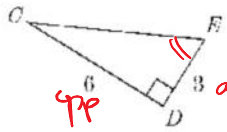
$\cos x = \frac{\sqrt{5}}{5}$

$x = \cos^{-1}\left(\frac{\sqrt{5}}{5}\right)$

$x = 63.43°$

d) $\tan x = 2 = \frac{6}{3} = \frac{opp}{adj}$

$\therefore \angle E = x.$



opp adj

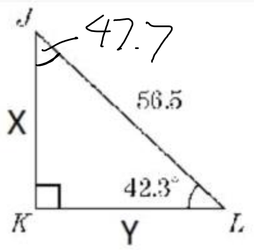
63.43°

$\tan x = 2$

$x = \tan^{-1}(2)$

$x = 63.43°$.

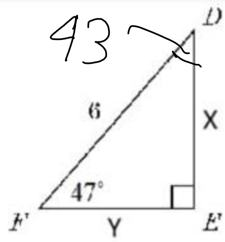
3. Find the length of the missing sides:



$\sin L = \frac{x}{56.5}$

$(\sin L) \cdot 56.5 = x$

$\boxed{x = 38.03}$ $\boxed{y = 41.79}$



$\boxed{x = 4.39}$

$\boxed{y = 4.09}$

4. When I use the regular trigonometric functions like sine, cosine, and tangent, does it only work for right triangles? Or can I use it for all sorts of triangles?

You can only use the regular trigonometric functions for right triangles.

5. When I sine an angle like 60°, it gives me a value like 0.866025403. What does this number represent?

The value that comes out of applying an angle to sine, cosine, or tangent represents the ratio between the respective sides that the function applies to. In this case, 0.866025403 represents the ratio between the opposite side of the angle and the hypotenuse of the triangle.

6. When I cosine or sine any angle in a right triangle will I ever get a value greater than 1? Why or why not?

No, as the hypotenuse can never have the same value in a right triangle as an opposite or adjacent side. As the hypotenuse has to have a larger numerical value than the other two sides.

7. What does the inverse trigonometric function do? Ie: $\sin^{-1}, \cos^{-1}$, or $\tan^{-1}$. What is the purpose of these inverse functions?

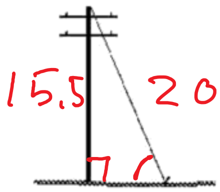
These inverse functions find the angle from a trigonometric ratio. For example, plugging in the value of sin(60) into its respective inverse function, it will return the value 60.

8. When I take sine 45 and divide it by cosine 45, does it equal to tangent 45? Why is it equal? Does sine an angle divided by cosine an angle always to tangent the angle? Why or why not?

$\sin\theta \cdot \cos\theta = \tan\theta \quad = \frac{O}{H} \cdot \frac{H}{A} = \frac{O}{A} = \frac{O\cancel{H}}{A\cancel{H}} = \frac{O}{A}$

$= \frac{O}{H} \div \frac{A}{H} = \frac{O}{A} \quad = \frac{OH}{AH} = \frac{O}{A} \quad \boxed{= \frac{O}{A} = \frac{O}{A}}$

9. A 20meter long wire is attached to the top of a telephone pole 15.5 meters tall. What is the exact measure of the angle the wire makes with the ground?



$= \sin^{-1}\left(\frac{15.5}{20}\right)$

$\boxed{= 50.81^\circ}$

