Right Triangle Review

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PRE-CALCULUS 11
TRIGONOMETRY
RIGHT TRIANGLE TRIGONOMETRY REVIEW

A. Definitions

1. **Trigonometry:** a branch of mathematics that deals triangles. Trigonometry specifically deals with the relationships between the sides and the angles of triangles, that is, the ***trig functions (Sine, Cosine & Tangent)***, and with calculations based on these functions.

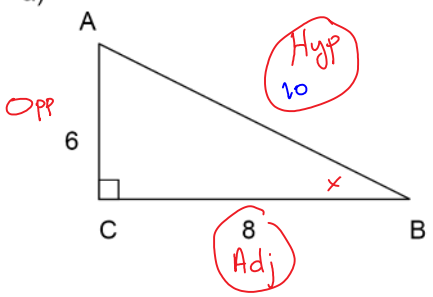
2. **Angle of Elevation:** an angle created between the line of sight and a horizontal when an observer looks upward.

3. **Angle of Depression:** an angle created between the line of sight and a horizontal when an observer looks downward.

B. Examples

1. Express the following trigonometric ratios in simplest form.

a)



$Cos B = \frac{8}{10} = \frac{4}{5}$

$Cos = \frac{Adj}{Hyp}$

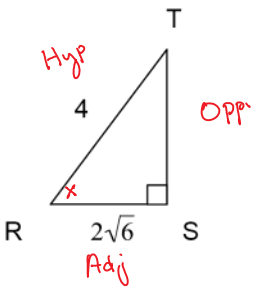
$a^2 + b^2 = c^2$

$(6)^2 + (8)^2 = c^2$

$100 = c^2$

$c = 10$

b)



$SinR =$ No solution

$Sin = \frac{Opp}{Hyp}$

$a^2 + b^2 = c^2$

$a^2 + (2\sqrt{6})^2 = (4)^2$

$a^2 + 24 = 16$

$-24 \quad -24$

$a^2 = -8$

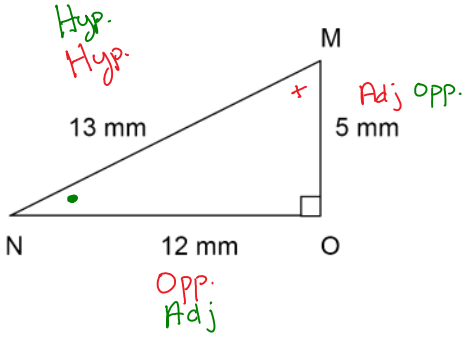
$a = \sqrt{-8}$ Unsolvable.

$(2\sqrt{6})(2\sqrt{6})$

$4\sqrt{36}$

24.

2. Calculate the $SinM$ and $CosN$. Then find $\angle M$ and $\angle N$. Round all angles to the nearest degree.

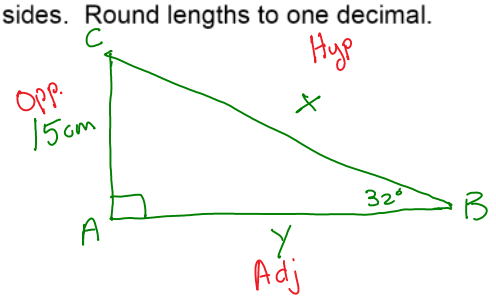


$Sin = \frac{Opp}{Hyp}$ $Cos = \frac{Adj}{Hyp}$

$Sin M = \frac{12}{13}$ $Cos N = \frac{12}{13}$

$\angle M = 67°$ $\angle N = 23°$

3. In ΔABC, $\angle A = 90^0$, $\angle B = 32^0$ and AC = 15 cm. Calculate the length of the other 2 sides. Round lengths to one decimal.



$\sin = \frac{Opp}{Hyp}$

$\times \left[\sin 32^\circ = \frac{15}{x} \right]$

$\frac{\sin 32^\circ}{\sin 32^\circ} x = \frac{15}{\sin 32^\circ}$

$BC = 28.3\text{ cm}$

$\tan = \frac{Opp}{Adj}$

$y \left[\tan 32^\circ = \frac{15}{y} \right]$

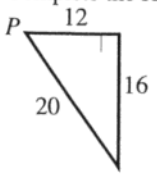
$\frac{\tan 32^\circ}{\tan 32^\circ} y = \frac{15}{\tan 32^\circ}$

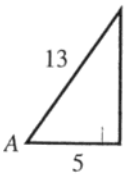
$AB = 24.0\text{ cm}$

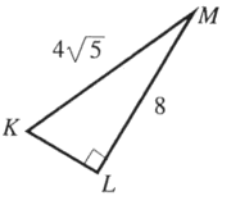
Assignment: Right Triangle Trigonometry Assignment #1 – 14

Assignment

1. Complete the following for the indicated trigonometric ratios.







a) $\cos P =$ **b)** $\tan A =$ **c)** $\sin M =$

2. Use a calculator to determine the value of each trigonometric ratio to four decimal places.

a) $\sin 68° =$ **b)** $\tan 30° =$ **c)** $\cos 19° =$

d) $\cos 22° =$ **e)** $\tan 85° =$ **f)** $\sin 7° =$

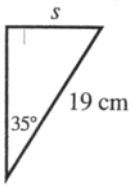
3. In each case determine the indicated acute angle to the nearest degree.

a) $\sin A = 0.6789$ $\angle A =$ **b)** $\cos X = 0.1234$ **c)** $\tan P = 0.55$

d) $\sin K = \frac{\sqrt{2}}{2}$ **e)** $\cos M = \frac{7}{24}$ **f)** $\tan R = \sqrt{3}$

4. Determine the length of the indicated side to the nearest 0.1 cm.

a)



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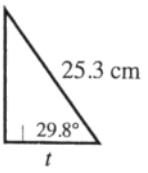
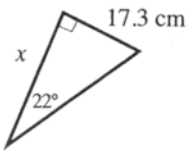
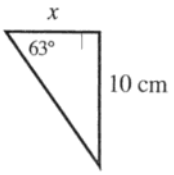


c)

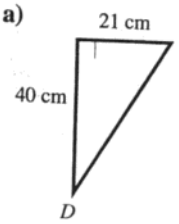


d)



5. Determine the measure of the indicated angle to the nearest degree.

a)



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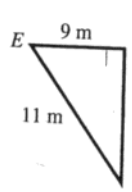

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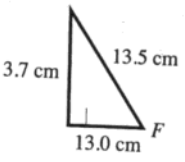
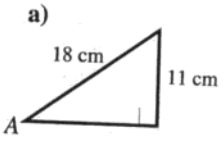


6. Solve for angle A to the nearest 0.1°.

a)



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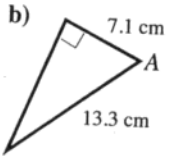
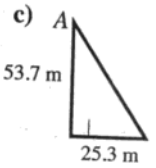


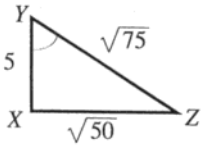
c)



7. Jacob has been given the task of determining the height of a building. He walks 30 m away from the base of the building and uses a clinometer to measure the angle of elevation of the top of the building to be 58°.
Calculate the height of the building to the nearest metre.

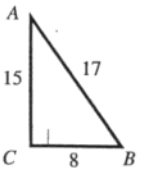
8. From the top of a vertical cliff 120 metres above sea level, Susan measures the angle of depression of a boat in the water to be 37°. To the nearest metre, determine the distance between the boat and the base of the cliff.

Multiple Choice **9.** In ΔXYZ, $XY = 5$ units, $XZ = \sqrt{50}$ units and $YZ = \sqrt{75}$ units. Cos Y is



A. $\sqrt{2}$
B. $\sqrt{3}$
C. $\frac{\sqrt{3}}{3}$
D. $\frac{\sqrt{6}}{3}$

10. For the right angled triangle ABC, only one of the following ratios is correct. The correct ratio is

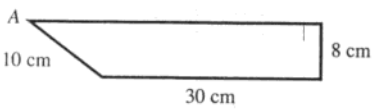


A. $\sin A = \frac{8}{15}$
B. $\cos A = \frac{8}{17}$
C. $\tan B = \frac{8}{15}$
D. $\sin B = \frac{15}{17}$

11. $ABCD$ is a rhombus with diagonals meeting at O. $AC = 4$ cm and $BD = 6$ cm. Sin $\angle ABO$ is

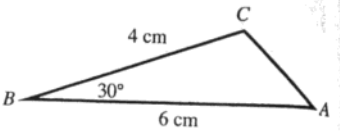
A. $\frac{3\sqrt{13}}{13}$
B. $\frac{2\sqrt{13}}{13}$
C. $\frac{\sqrt{13}}{2}$
D. $\frac{\sqrt{13}}{3}$

12. In the figure cos A is equal to



A. $\frac{3}{5}$
B. $\frac{4}{5}$
C. $\frac{4}{15}$
D. cannot be calculated from the given information

Numerical Response **13.** To the nearest whole number, the area of triangle ABC in cm^2, is _____ .



(Record your answer in the numerical response box from left to right)

14. A corner flag in a World Cup soccer match is 5 feet high. At game time, the flag casts a shadow which is 3.2 feet long. To the nearest 0.1 degree, the angle of elevation of the sun is _____.

(Record your answer in the numerical response box from left to right)

Answer Key

1. a) $\frac{3}{5}$ b) $\frac{12}{5}$ c) $\frac{\sqrt{5}}{5}$

2. a) 0.9272 b) 0.5774 c) 0.9455 d) 0.9272 e) 11.4301 f) 0.1219

3. a) 43° b) 83° c) 29° d) 45° e) 73° f) 60°

4. a) 10.9 cm b) 22.0 cm c) 42.8 cm d) 5.1 cm

5. a) 28° b) 35° c) 16°

6. a) 37.7° b) 57.7° c) 25.2°

7. 48 m **8.** 159 m

9. C **10.** D **11.** B **12.** A **13.** 6 **14.** 5 7 . 4