

5 Trigonometry of Acute Triangles
 Chapter 4 - Functions Practice Test

Name: ANSWERS

Knowledge & Understanding (KU)

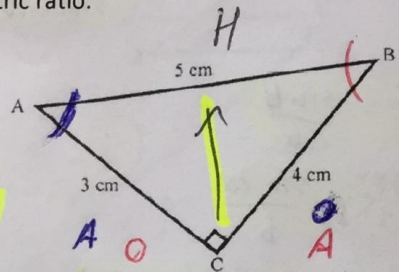
1.) For triangle ABC on the right, write the ratio of sides for each trigonometric ratio.

a) $\sin A = \frac{O}{H} \rightarrow \left(\frac{4}{5}\right)$

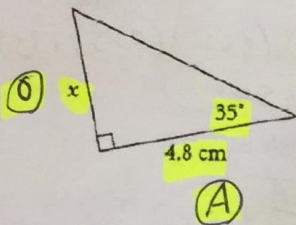
b) $\cos A = \frac{A}{H} \rightarrow \left(\frac{3}{5}\right)$

c) $\tan B = \frac{O}{A} \rightarrow \left(\frac{3}{4}\right)$

d) $\cos B = \frac{A}{H} \rightarrow \left(\frac{4}{5}\right)$



2.) Determine the length of x in the triangle below to 1 decimal place.



$\tan 35^\circ = \frac{O}{A}$

$\tan 35^\circ = \frac{x}{4.8}$

$x = 3.4 \text{ cm}$

3.) Determine the measure of angle B to the nearest degree.

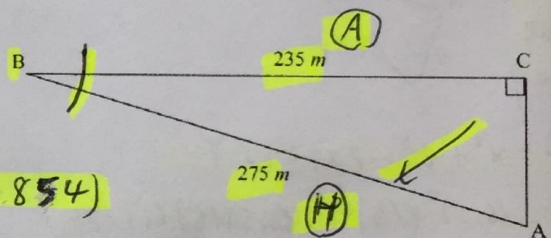
$\cos B = \frac{A}{H}$

$\cos B = \frac{235}{275}$

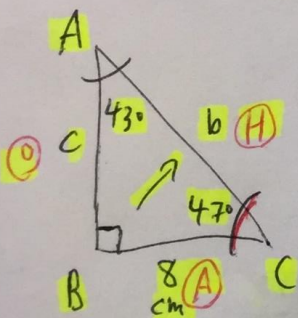
$\cos B = 0.854$

$\angle B = \cos^{-1}(0.854)$

$\angle B = 31^\circ$



4.) Given the information below, solve the triangle (Hint: Draw a diagram first)
 $\triangle ABC: \angle C = 47^\circ, \angle B = 90^\circ,$ and $a = 8 \text{ cm}$



$\tan 47^\circ = \frac{O}{A}$

$\tan 47^\circ = \frac{c}{8}$

$c = 8.6 \text{ cm}$

$\cos 47^\circ = \frac{A}{H}$

$\cos 47^\circ = \frac{8}{b}$

$b = \frac{8}{\cos 47^\circ}$

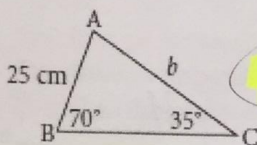
$b = 11.7 \text{ cm}$

$\angle A = 180^\circ - 90^\circ - 47^\circ$

$\angle A = 43^\circ$

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4.) Find the measure of side b.



SAA
sine law

$$\frac{\sin C}{c} = \frac{\sin B}{b}$$

$$\frac{\sin 35^\circ}{25} = \frac{\sin 70^\circ}{b}$$

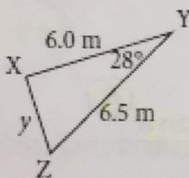
$$(b)(\sin 35^\circ) = (25)(\sin 70^\circ)$$

$$\frac{(b)(\sin 35^\circ)}{\sin 35^\circ} = \frac{(25)(\sin 70^\circ)}{\sin 35^\circ}$$

$$b = 41 \text{ cm}$$

6.) Find the measure of side y.

SAS
cosine law



$$y^2 = x^2 + z^2 - 2xz \cos Y$$

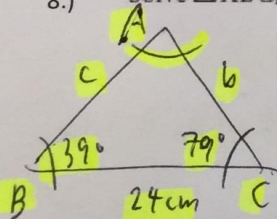
$$y^2 = (6.5)^2 + (6)^2 - 2(6.5)(6) \cos 28^\circ$$

$$y^2 = 42.25 + 36 - 68.9$$

$$\sqrt{y^2} = \sqrt{9.35}$$

$$y = 3.1 \text{ m}$$

8.) Solve $\triangle ABC$, given $\angle B = 39^\circ$, $\angle C = 79^\circ$, and $a = 24 \text{ cm}$.



$$\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$$

$$\frac{\sin 62^\circ}{24} = \frac{\sin 39^\circ}{b} = \frac{\sin 79^\circ}{c}$$

$$\frac{\sin 62^\circ}{24} = \frac{\sin 39^\circ}{b}$$

$$(b)(\sin 62^\circ) = (24)(\sin 39^\circ)$$

$$\frac{(b)(\sin 62^\circ)}{\sin 62^\circ} = \frac{(24)(\sin 39^\circ)}{\sin 62^\circ}$$

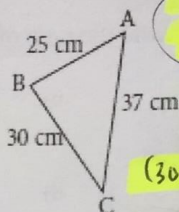
$$b = 17 \text{ cm}$$

$$\angle A = 180^\circ - 39^\circ - 79^\circ$$

$$\angle A = 62^\circ$$

5.) Find the measure of the unknown angle.

Find $\angle A$.



SSS
cosine law

$$a^2 = b^2 + c^2 - 2bc \cos A$$

$$(30)^2 = (37)^2 + (25)^2 - 2(37)(25) \cos A$$

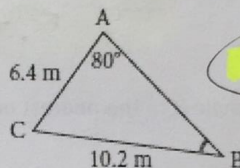
$$900 - 1369 - 625 = -1850 \cos A$$

$$\frac{-1094}{-1850} = \frac{-1850 \cos A}{-1850}$$

$$\angle A = \cos^{-1}(0.59135)$$

$$\angle A = 54^\circ$$

7.) Find the measure of angle B.



SSA
sine law

$$\frac{\sin B}{b} = \frac{\sin A}{a}$$

$$\frac{\sin B}{6.4} = \frac{\sin 80^\circ}{10.2}$$

$$(10.2) \sin B = (6.4) (\sin 80^\circ)$$

$$\frac{(10.2) \sin B}{10.2} = \frac{(6.4) (\sin 80^\circ)}{10.2}$$

$$\angle B = \sin^{-1}(0.61791)$$

$$\angle B = 38^\circ$$

$$\frac{\sin 62^\circ}{24} = \frac{\sin 79^\circ}{c}$$

$$(c)(\sin 62^\circ) = (24)(\sin 79^\circ)$$

$$\frac{(c)(\sin 62^\circ)}{\sin 62^\circ} = \frac{(24)(\sin 79^\circ)}{\sin 62^\circ}$$

$$c = 27 \text{ cm}$$

Application (AP) & Thinking (TI)

1.) A rectangle is 4.8cm wide. A diagonal of the rectangle makes an angle of 37 degrees with the longer side of the rectangle.

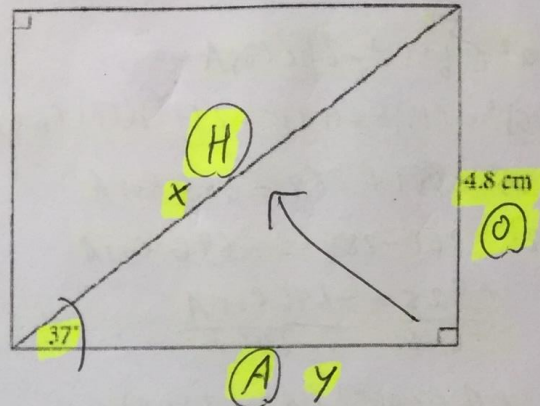
a.) Determine the length of the diagonal to the nearest cm.

$$\sin 37^\circ = \frac{O}{H}$$

$$\sin 37^\circ = \frac{4.8}{x}$$

$$x = \frac{4.8}{\sin 37^\circ}$$

$$x = 8 \text{ cm}$$



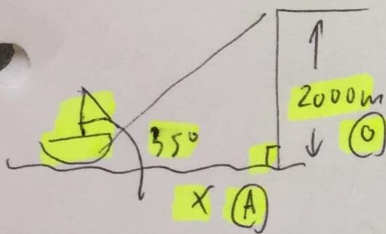
b.) Determine the length of the rectangle to the nearest cm.

$$\tan 37^\circ = \frac{O}{A}$$

$$\tan 37^\circ = \frac{y}{4.8}$$

$$y = 4 \text{ cm}$$

2.) A sailboat is approaching a cliff. The angle of elevation from the sailboat to the top of the cliff is 35°. The height of the cliff is known to be about 2000 m. How far is the sailboat away from the base of the cliff?



$$\tan 35^\circ = \frac{O}{A}$$

$$\tan 35^\circ = \frac{2000}{x}$$

$$x = \frac{2000}{\tan 35^\circ}$$

$$x = 2856 \text{ m}$$

∴ the boat is about 2856 m from the base of the cliff

3.) Determine the length of y to the nearest 1 decimal place. Show all of your work.

$$\tan 61^\circ = \frac{O}{A}$$

$$\tan 61^\circ = \frac{15.6}{x}$$

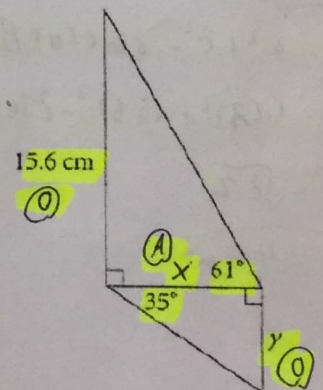
$$x = \frac{15.6}{\tan 61^\circ}$$

$$x = 8.6 \text{ cm}$$

$$\tan 35^\circ = \frac{O}{A}$$

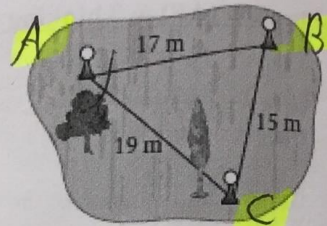
$$\tan 35^\circ = \frac{y}{8.6}$$

$$y = 6 \text{ cm}$$



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- 4.) Three lights are located in a park along three different paths.
 The distance between the first light and the second light is 15 m.
 The distance between the second light and the third light is 19 m.
 The distance between the first light and the third light is 17 m.
 Calculate the angles between the lights.



SSS cosine law

$$a^2 = b^2 + c^2 - 2bc \cos A$$

$$(15)^2 = (19)^2 + (17)^2 - 2(19)(17) \cos A$$

$$225 = 361 + 289 - 646 \cos A$$

$$225 - 361 - 289 = -646 \cos A$$

$$\frac{-425}{-646} = \frac{-646 \cos A}{-646}$$

$$\angle A = \cos^{-1}(0.657894)$$

$$\angle A = 49^\circ$$

$$\frac{\sin A}{a} = \frac{\sin B}{b}$$

$$\frac{\sin 49^\circ}{15} = \frac{\sin B}{19}$$

$$(19)(\sin 49^\circ) = (15) \sin B$$

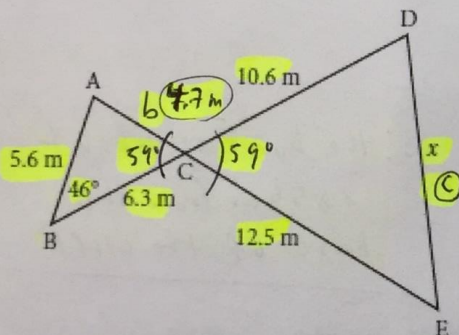
$$\angle B = \sin^{-1}(0.95596)$$

$$\angle B = 73^\circ$$

$$\angle C = 180^\circ - 49^\circ - 73^\circ$$

$$\angle C = 58^\circ$$

- 5.) Solve for x to the nearest tenth of a metre.



SAS
cosine law

$$b^2 = a^2 + c^2 - 2ac \cos B$$

$$b^2 = (6.3)^2 + (5.6)^2 - 2(6.3)(5.6) \cos 46^\circ$$

$$\sqrt{b^2} = \sqrt{22}$$

$$b = 4.7 \text{ m}$$

$$\frac{\sin B}{b} = \frac{\sin C}{c}$$

$$\frac{\sin 46^\circ}{4.7} = \frac{\sin C}{5.6}$$

$$(5.6)(\sin 46^\circ) = (4.7) \sin C$$

$$\angle C = \sin^{-1}(0.85708)$$

$$\angle C = 59^\circ$$

$$c^2 = d^2 + e^2 - 2de \cos C$$

$$(x)^2 = (12.5)^2 + (10.6)^2 - 2(12.5)(10.6) \cos 59^\circ$$

$$\sqrt{x^2} = \sqrt{132.12}$$

$$x = 11.5 \text{ m}$$