

KNOWLEDGE (KU)		130
APPLICATION (AP)		114
THINKING (TI)		115
COMMUNICATION (CO)		level

Name: ANSWERS

TEST #6 SIMILAR TRIANGLES AND TRIGONOMETRY

Knowledge & Understanding (KU)

1. Determine the value of each lower-case letter (x & y).

$$\frac{AB}{DE} = \frac{AC}{DF} = \frac{BC}{EF}$$

$$\frac{4.1}{5.3} = \frac{x}{7} = \frac{y}{6.8}$$

$$\textcircled{1} \frac{4.1}{5.3} = \frac{x}{7}$$

$$28.7 = 5.3x \checkmark$$

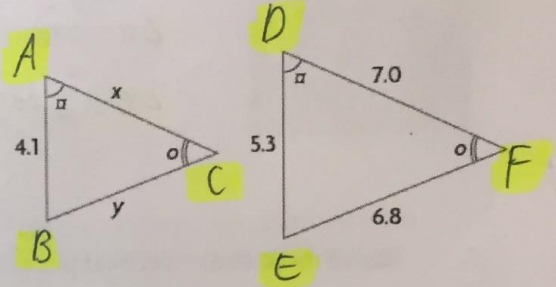
$$5.4 = x \checkmark$$

$$\textcircled{2} \frac{4.1}{5.3} = \frac{y}{6.8}$$

$$27.88 = 5.3y$$

$$5.3 = y \checkmark$$

Out of 5



2. Determine the value of each lower-case letter (f, g & h).

$\angle ACE = \angle BCD$ (shared)

$\angle CBD = \angle CAE$
 $\angle CDB = \angle CEA$ } PLT-F \checkmark

$\therefore \triangle ACE \sim \triangle BCD$

$$\frac{CE}{CD} = \frac{BD}{AE}$$

$$\frac{9g}{9} = \frac{36}{9}$$

$$\frac{9}{4} = \frac{9}{g} \checkmark$$

$$g = 4 \checkmark$$

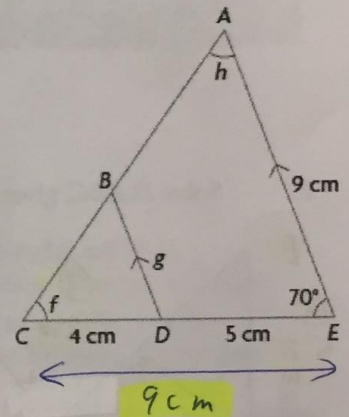
isosceles triangle

$$\therefore f = h = \frac{180 - 70}{2}$$

$$= 55^\circ$$

$$\therefore f = 55^\circ \text{ \& } h = 55^\circ \checkmark$$

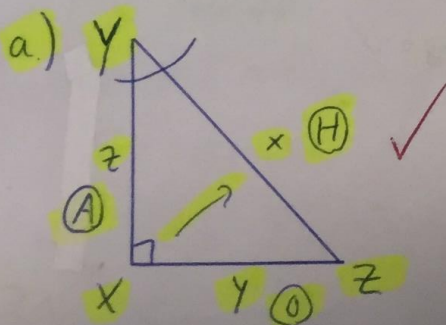
Out of 6



3. $\triangle XYZ$ is a right triangle, with $\angle X = 90^\circ$.

a) Sketch $\triangle XYZ$. Label the sides using lower-case letters.

b) Write the ratios for $\sin Y$, $\cos Y$, and $\tan Y$ in terms of x, y, and z.



$$\text{b.) } \sin y = \frac{O}{H} = \left(\frac{y}{x}\right) \checkmark$$

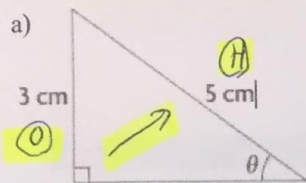
$$\cos y = \frac{A}{H} = \left(\frac{z}{x}\right) \checkmark$$

$$\tan y = \frac{O}{A} = \left(\frac{y}{z}\right) \checkmark$$

Out of 4

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4. Determine the value of θ , to the nearest degree, in each triangle.

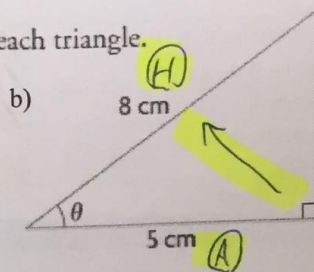


$$\sin \theta = \frac{O}{H}$$

$$\sin \theta = \frac{3}{5} \checkmark$$

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

$$\angle \theta = 37^\circ \checkmark$$



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

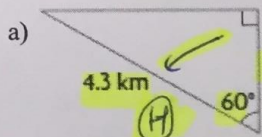
$$\cos \theta = \frac{5}{8} \checkmark$$

$$\angle \theta = \cos^{-1}(0.625)$$

$$\angle \theta = 51^\circ \checkmark$$

Out of 4

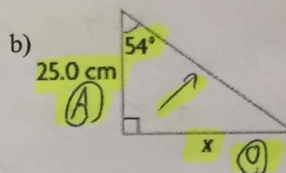
5. Solve for x , to one decimal place, for each of the following.



$$\cos 60^\circ = \frac{O}{H}$$

$$\cos 60^\circ = \frac{x}{4.3} \checkmark$$

$$x = 2.2 \text{ km} \checkmark$$



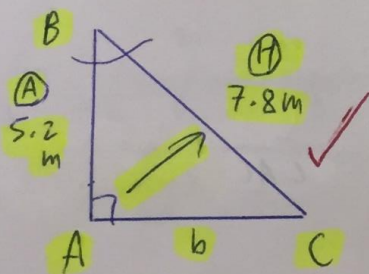
$$\tan 54^\circ = \frac{O}{A}$$

$$\tan 54^\circ = \frac{x}{25} \checkmark$$

$$x = 34.4 \text{ cm} \checkmark$$

Out of 4

6. Solve $\triangle ABC$, given $\angle A = 90^\circ$, $a = 7.8 \text{ m}$, and $c = 5.2 \text{ m}$.



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

$$\cos B = \frac{5.2}{7.8} \checkmark$$

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

$$\angle B = 48^\circ \checkmark$$

Out of 7

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

$$(5.2)^2 + b^2 = (7.8)^2$$

$$27.04 + b^2 = 60.84 \checkmark$$

$$b^2 = 60.84 - 27.04$$

$$\sqrt{b^2} = \sqrt{33.8}$$

$$b = 5.8 \text{ m} \checkmark$$

$$\therefore \angle C = 180 - 90 - 48^\circ \checkmark$$

$$\angle C = 42^\circ \checkmark$$

Application (AP)

1. A ladder leans against a wall, as shown. How long is the ladder, to the nearest tenth of a metre?

$$\sin 75^\circ = \frac{O}{H}$$

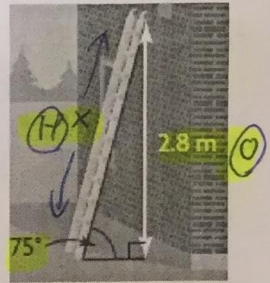
$$\sin 75^\circ = \frac{2.8}{X}$$

$$X = \frac{2.8}{\sin 75^\circ}$$

$$X = 2.9 \text{ m}$$

\therefore the ladder is 2.9 m long.

Out of 3



2. Ayesha is a forester. She uses a clinometer (a device used to measure angles of elevation) to sight the top of a tree. She measures an angle of 48° . She is standing 7.2 m from the tree, and her eyes are 1.6 m above ground. How tall is the tree?

$$\tan 48^\circ = \frac{O}{A}$$

$$\tan 48^\circ = \frac{X}{7.2}$$

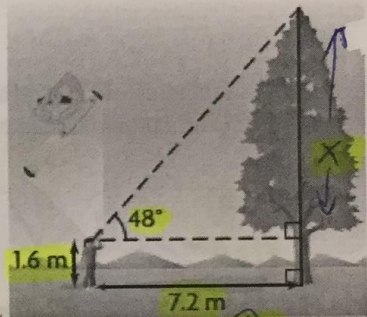
$$X = 8 \text{ m}$$

$$\therefore 8 + 1.6$$

$$= 9.6 \text{ m}$$

\therefore the height of the tree is 9.6 m high

Out of 5



3. A telephone pole is supported by a guy wire, as shown in the diagram at the right, which is anchored to the ground 3.00 m from the base of the pole. The guy wire makes a 75° angle with the ground and is attached to the pole 7.46 m from the top. Another guy wire is attached to the top of the pole. This guy wire also makes an angle of 75° with the ground 5.00 m from the base of the pole. Determine the height of the pole.

$$\frac{AB}{BD} = \frac{BC}{BE}$$

$$\frac{3}{5} = \frac{X}{X + 7.46}$$

$$3(X + 7.46) = 5X$$

$$3X + 22.38 = 5X$$

$$22.38 = 5X - 3X$$

$$\frac{22.38}{2} = \frac{2X}{2}$$

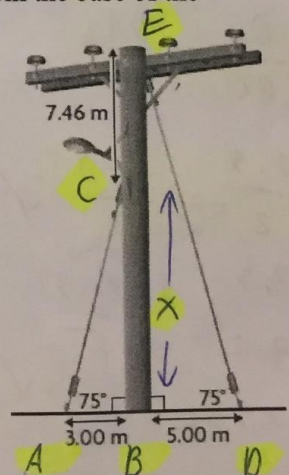
$$11.2 = X$$

$$\therefore 11.2 + 7.46$$

$$= 18.7 \text{ m}$$

\therefore the pole is 18.7 m tall.

Out of 6



Thinking & Inquiry (TI)

1. Solve for i and j .

$$\tan 60^\circ = \frac{j}{A}$$

$$\frac{\tan 60^\circ}{1} = \frac{j}{4}$$

$$j = 6.9 \text{ cm}$$

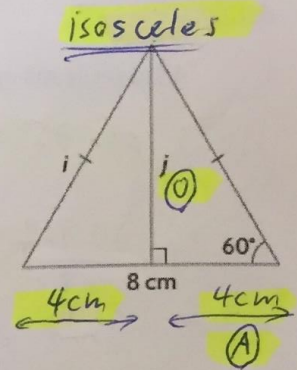
$$a^2 + b^2 = c^2$$

$$(4)^2 + (6.9)^2 = (i)^2$$

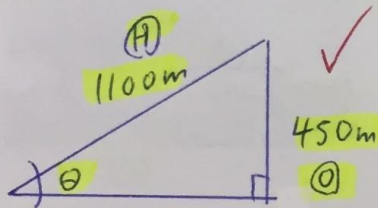
$$\sqrt{63.61} = \sqrt{i^2}$$

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

Out of 4



2. A plane takes off in a straight line and travels along this line for 20s, when it reaches a height of 450 m. If the plane is travelling at 55 m/s, at what angle is the plane ascending?



$$\sin \theta = \frac{O}{H}$$

$$\sin \theta = \frac{450}{1100}$$

$$\angle \theta = \sin^{-1}(0.41)$$

$$\angle \theta = 24^\circ$$

Out of 5

$$20_s \times 55 \text{ m/s} = 1100 \text{ m}$$

\therefore the plane is ascending at a 24° angle

3. Determine the length of DB .

$$\frac{DE}{BC} = \frac{DA}{BA}$$

$$\frac{2.5}{2} = \frac{y+3}{3}$$

$$7.5 = 2(y+3)$$

$$7.5 = 2y + 6$$

$$7.5 - 6 = 2y$$

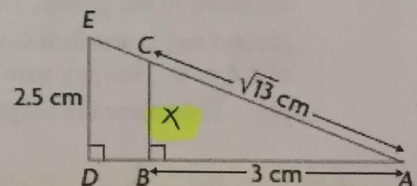
$$\frac{1.5}{2} = \frac{2y}{2}$$

$$0.75 = \frac{y}{1}$$

$$\therefore DB = y$$

$$DB = 0.75 \text{ cm}$$

Out of 6



$$x = y$$

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

$$(x)^2 + (3)^2 = (\sqrt{13})^2$$

$$x^2 + 9 = 13$$

$$x^2 = 13 - 9$$

$$\sqrt{x^2} = \sqrt{4}$$

$$x = 2$$

$$\therefore BC = 2 \text{ cm}$$

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