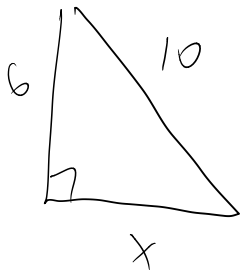
Name:_____ **Date:**_____

Foundations of Math 10 LG 15 Ver A **/20**

Expectation #1 Use the sine, cosine and tangent ratio to solve problems in right triangles.

1. A right triangle has one side measuring 6 cm. The length of the hypotenuse is 10 cm. Draw a diagram of the triangle and calculate the length of the missing side. (2 marks)



$X^2 + 6^2 = 10^2$

$X^2 + 36 = 100$

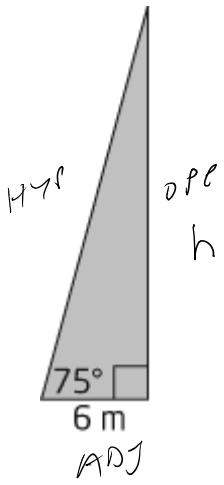
$X^2 = 100 - 36$

$X^2 = 64$

$\sqrt{X^2} = \sqrt{64}$

$X = 8$ cm

2. A telephone pole is secured with a guy wire as shown in the diagram. The guy wire makes an angle of 75° with the ground and is secured to the ground 6 m from the bottom of the pole. Determine the height of the telephone pole, to the nearest tenth of a metre. (3 marks)



$\tan 75° = \frac{OPP}{ADJ}$

$\tan 75° = \frac{h}{6}$

$6 \times \tan 75° = h$

$22.4 = h$

THE POLE IS 22.4m HIGH.

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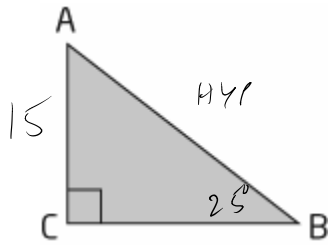
3. In △ABC, the side AC is 15 cm, and ∠B is 25°. How long is AB, to the nearest centimetre? (3 marks)



$\sin 25^\circ = \frac{15}{AB}$

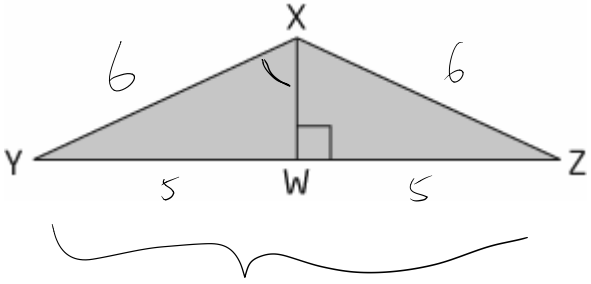
$AB \times \sin 25^\circ = 15$

$AB = \frac{15}{\sin 25^\circ}$

$= 35.49$

So AB = 35 cm

4. In △XYZ, XY and XZ have equal lengths of 6 cm. YZ is 10 cm. Determine the measure of ∠X, to the nearest degree. (3 marks)



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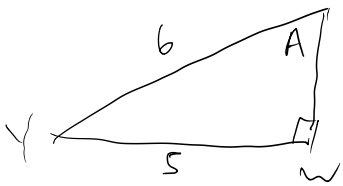
FIND ∠YXW FIRST



$\sin A = \frac{5}{6}$

$A = \sin^{-1}\left(\frac{5}{6}\right)$

$\angle X = 2 \times A$

$\angle X = 2 \times 56.44$

$= 112.89$

So $\angle X = 113^\circ$

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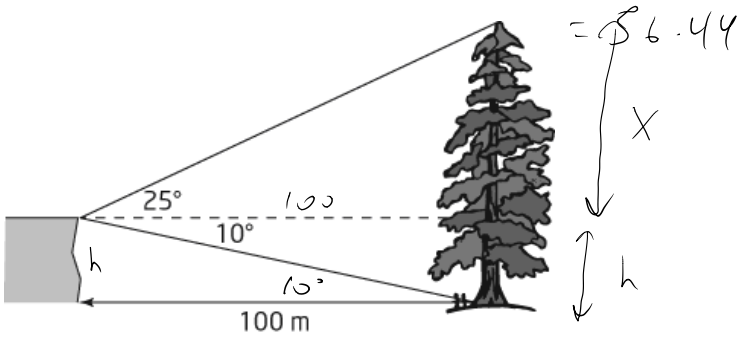
5.



A rock face is 100 m from the base of a California redwood tree. The angle of elevation from the top of the rock face to the top of the tree is 25°. The angle of depression to the bottom of the tree is 10°. (4 marks)

a) Determine the height of the rock face, to the nearest tenth of a metre.

$\tan 10^\circ = \frac{h}{100}$

$100 \times \tan 10^\circ = h$

$17.63 = h$

So $h = 17.6$m

b) Determine the height of the tree, to the nearest tenth of a metre.

FIND "X" (SEE DIAGRAM)

$\tan 25^\circ = \frac{X}{100}$

$X = 100 \times \tan 25$

$X = 46.63$m

& $h = 17.6$m (FROM PART A)

→ SO HEIGHT OF TREE

$= 46.63 + 17.6$

$= 64.2$m

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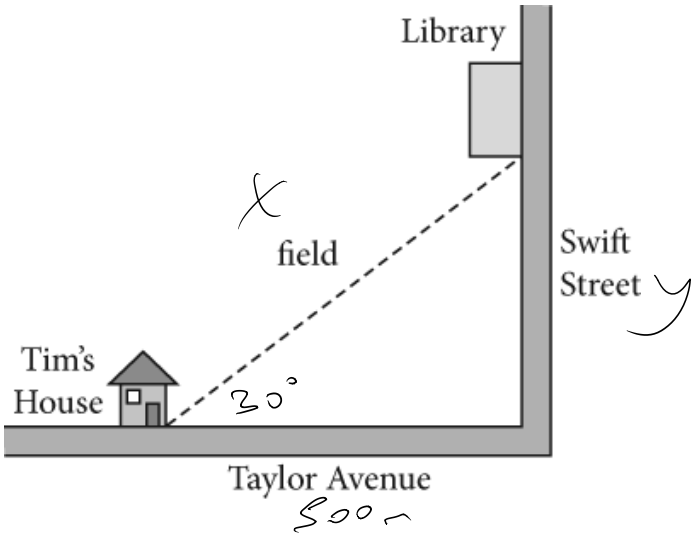
6. Tim lives on Taylor Avenue, 500 m west of where it intersects with Swift Street. The library is on Swift Street, north of the intersection. (5 marks)



a) When Tim goes from his house to the library, he walks diagonally across a field at an angle of 30° to Taylor Avenue. How far does Tim walk if he takes this route? Answer to the nearest tenth of a metre.

$\cos 30 = \frac{500}{X}$

$X \cos 30 = 500$

$X = \frac{500}{\cos 30}$

$= 577.4\text{ m}$

b) If Tim decides to walk from his house to the library along the streets, how far does he travel? Answer to the nearest tenth of a metre.

$\tan 30 = \frac{X}{500}$

$X = 500 \times \tan 30$

$= 288.68\text{ m}$

So total distance

$= 288.68 + 500$

$= 788.7\text{ m}$

c) Determine which route is shorter, and by how much.

The field is shorter by:

$788.7 - 577.4 = 211.3\text{ m}$

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