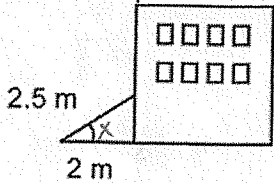


# DAY 1 - Solve Word Problems

1. A wheelchair ramp is 2.5 m. The horizontal distance from the end of the ramp to the building is 2 m. What angle does the ramp make with the ground?



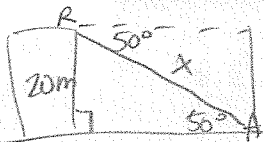
$$\cos X = \frac{2}{2.5}$$

$$X = \cos^{-1}\left(\frac{2}{2.5}\right)$$

$$X = 37^\circ$$

∴ angle with the ground is  $37^\circ$

3. Ralph is on the roof of a building, while his friend Ajay is on the ground. Ralph can see Ajay at a  $50^\circ$  angle of depression. The vertical height of the building is 20 m. What is the diagonal distance from Ralph to where Ajay is standing?



$$\sin 50^\circ = \frac{20}{x}$$

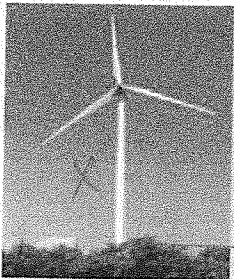
$$x(\sin 50) = 20$$

$$x = \frac{20}{\sin 50}$$

$$x = 26.1$$

∴ diagonal distance is 26.1 m

5. From a point 4.5 m from the base of a wind turbine, the angle of elevation to the top of the turbine is  $87^\circ$ . Find the height of the wind turbine to the nearest tenth of a metre.



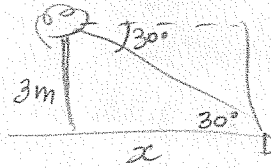
$$\tan 87^\circ = \frac{x}{4.5}$$

$$4.5(\tan 87^\circ) = x$$

$$85.9 = x$$

∴ the height is 85.9 m

2. Sheryl's tree house is 3 m above the ground. Sheryl looks down at an angle of depression of  $30^\circ$  and can see her poodle's doghouse. What is the horizontal distance from the doghouse to the tree house?



$$\tan 30^\circ = \frac{3}{x}$$

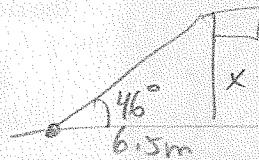
$$x(\tan 30^\circ) = 3$$

$$x = \frac{3}{\tan 30^\circ}$$

$$x = 5.2$$

∴ distance is 5.2 m

4. From a point 6.5 m from the base of the school flagpole, the angle of elevation to the top of the flagpole is  $46^\circ$ . What is the height of the flagpole?



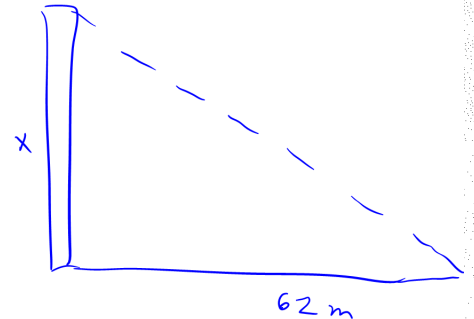
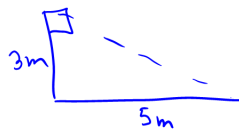
$$\tan 46^\circ = \frac{x}{6.5}$$

$$6.5(\tan 46^\circ) = x$$

$$6.7 = x$$

∴ flagpole is 6.7 m tall

6. A flagpole 3 meters tall casts a shadow 5 meters long at the same time that a building nearby casts a shadow 62 meters long. How tall is the building?



similar  $\Delta$ s

$$\frac{\text{Big } \Delta}{\text{small } \Delta} \quad \frac{x}{62} = \frac{3}{5}$$

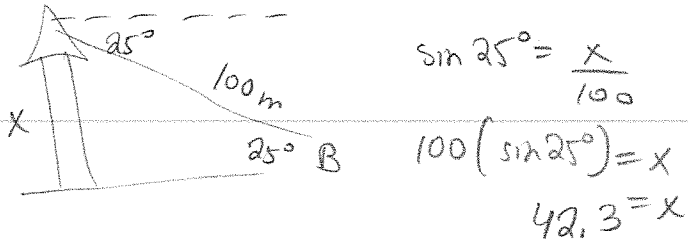
$$5x = 62(3)$$

$$5x = 186$$

$$x = 37.2$$

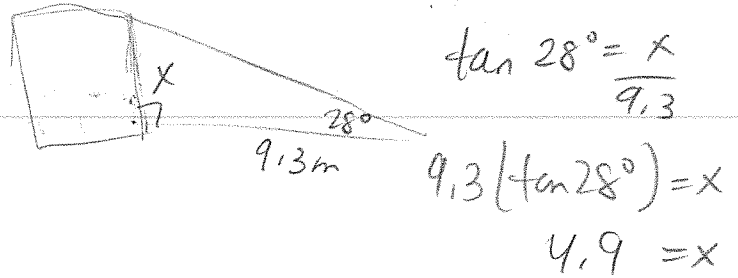
∴ the building is 37.2 m

7. The angle of depression from the top of a castle to a boat is  $25^\circ$ . If the distance from the top of the castle to the boat is determined to be 100 m, how high is the castle?



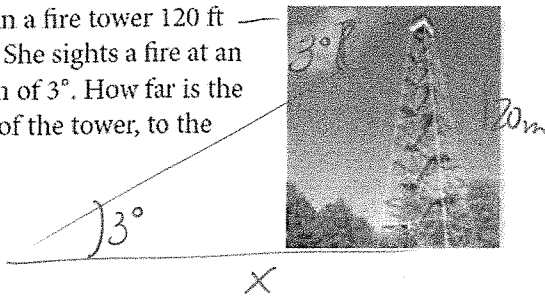
$\therefore$  castle is 42.3m high

8. From a point 9.3 m from the base of a billboard, the angle of elevation to the top of the billboard is  $28^\circ$ . Find the height of the billboard to the nearest tenth of a metre.



$\therefore$  height is 4.9m

9. A forest ranger is in a fire tower 120 ft above the ground. She sights a fire at an angle of depression of  $3^\circ$ . How far is the fire from the base of the tower, to the nearest foot?



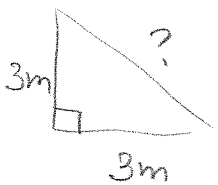
$$\tan 3^\circ = \frac{120}{x}$$

$$x(\tan 3^\circ) = 120$$

$$x = \frac{120}{\tan 3^\circ}$$

$$x = 2289.7 \quad \therefore \text{fire is } 2290 \text{ ft away}$$

11. Marlene is making a pen in her backyard for her daughter's pet rabbits. She makes the pen in the shape of a right triangle. Two sides of the pen each measure 3 m. What is the length of the third side?



$$3^2 + 3^2 = x^2$$

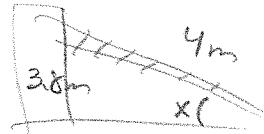
$$9 + 9 = x^2$$

$$18 = x^2$$

$$4.2 = x$$

$\therefore$  3<sup>rd</sup> side is 4.2m long.

10. A 4-m long ladder is leaning up against the side of a garage. It reaches 3.8 m up the side of the garage wall. Find the angle the ladder makes with the ground, to the nearest degree.



$$\sin x = \frac{3.8}{4}$$

$$x = \sin^{-1}\left(\frac{3.8}{4}\right)$$

$$x = 72^\circ$$

$\therefore$  ladder makes  $72^\circ$  with the ground.

12. Ron is building a skateboard ramp for his granddaughter Alexis. Ron wants the ramp to rise at an angle of  $12^\circ$ . If he also wants the ramp to rise vertically 0.5 m how long will the ramp need to be?



$$\sin 12^\circ = \frac{0.5}{x}$$

$$x(\sin 12^\circ) = 0.5$$

$$x = \frac{0.5}{\sin 12^\circ}$$

$$x = 2.4 \text{ m}$$

$\therefore$  the ramp needs to be 2.4m long.