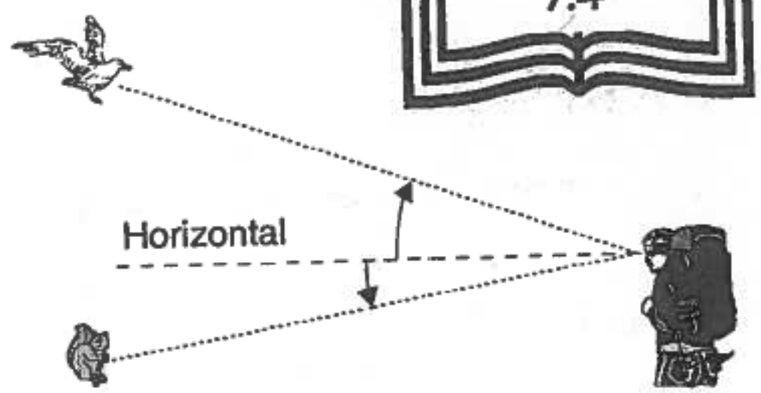
Name: March 25 Date: _____

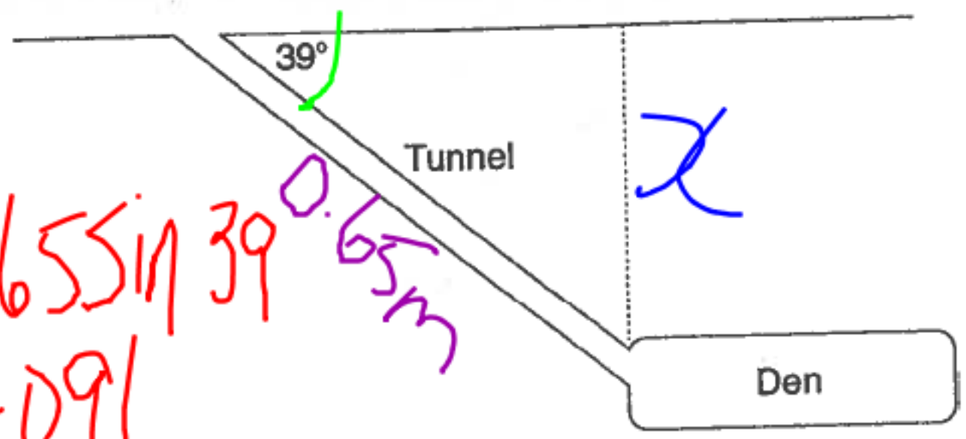
Practise: Applying Trigonometry

The angle between the horizontal and a straight line from the viewer to an object is an angle of elevation when the object is above the horizontal.
The angle between the horizontal and a straight line from the viewer to an object is an angle of depression when the object is below the horizontal.



1. A chipmunk dug a tunnel at an angle of depression of 39°. The tunnel is 0.65 m long with a small den at the end. How far below the surface is the den?

Let x represent the depth of the den. Mark this depth and the known length on the diagram.



$\sin 39° = \frac{Opp}{Hyp}$

$\sin 39° = \frac{x}{0.65}$

$x = 0.65 \sin 39°$ 0.65m

$x = 0.4091$

$x = 0.41$ m

Therefore, the den is 0.41 m below the surface.

Therefore, the den is _____ _____ below the surface.

2. Cedar shingles may leak if used on a roof with a pitch of less than 1:3. Maia is about to reshingle a roof that slopes at an angle of 16°. Can she use cedar shingles for this roof?

Pitch 1:3

Hint
A roof with a pitch of 1:3 has a rise of 1 unit for a run of 3 units.

$m = \frac{\text{Rise}}{\text{Run}}$

$\tan x = \frac{opp}{adj}$

$\tan x = \frac{1}{3}$

$\tan x = 0.3333$

$\tan^{-1} = 18.4^{\circ}$

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continued ....

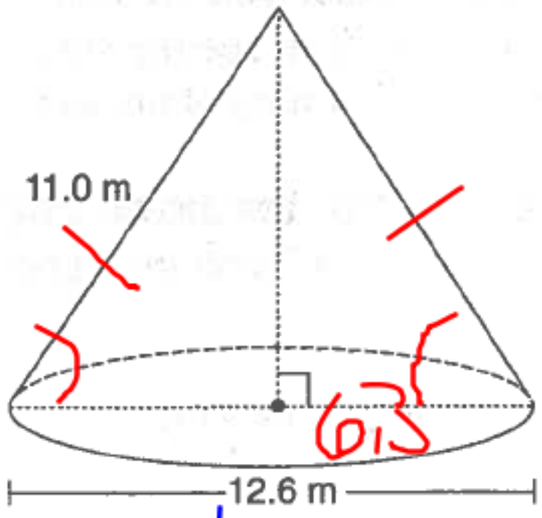
Yes, she can use cedar shingles

Section 7.4

3. A town stores sand for winter road maintenance in a cone-shaped building. At what angle does the side of the building meet the ground, to the nearest degree?

$\cos X = \frac{Adj}{Hyp}$

$\cos X = \frac{6.3}{11.0}$

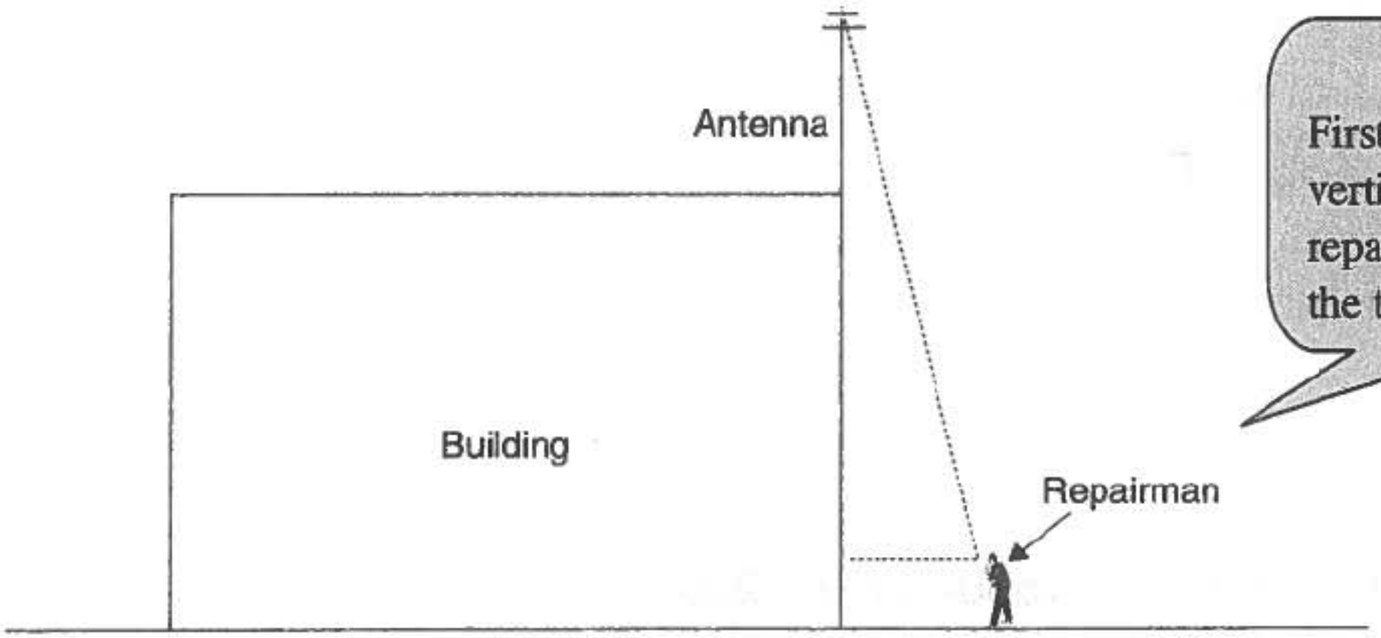


Hint
Divide the diameter by 2 to find the length of the base of the right triangle.

$\cos X = 0.5727$
$\cos^{-1} = 55°$

The building meets the ground at 55°.

4. A repairman stands 3.4 m from a building and looks up at the antenna mounted at the edge of the roof. From his eye level, 1.8 m from the ground, the angle of elevation is 77°. The roof is 11.6 m from the ground. How tall is the antenna?



Hint
First, calculate the vertical distance from the repairman's eye level to the top of the building.

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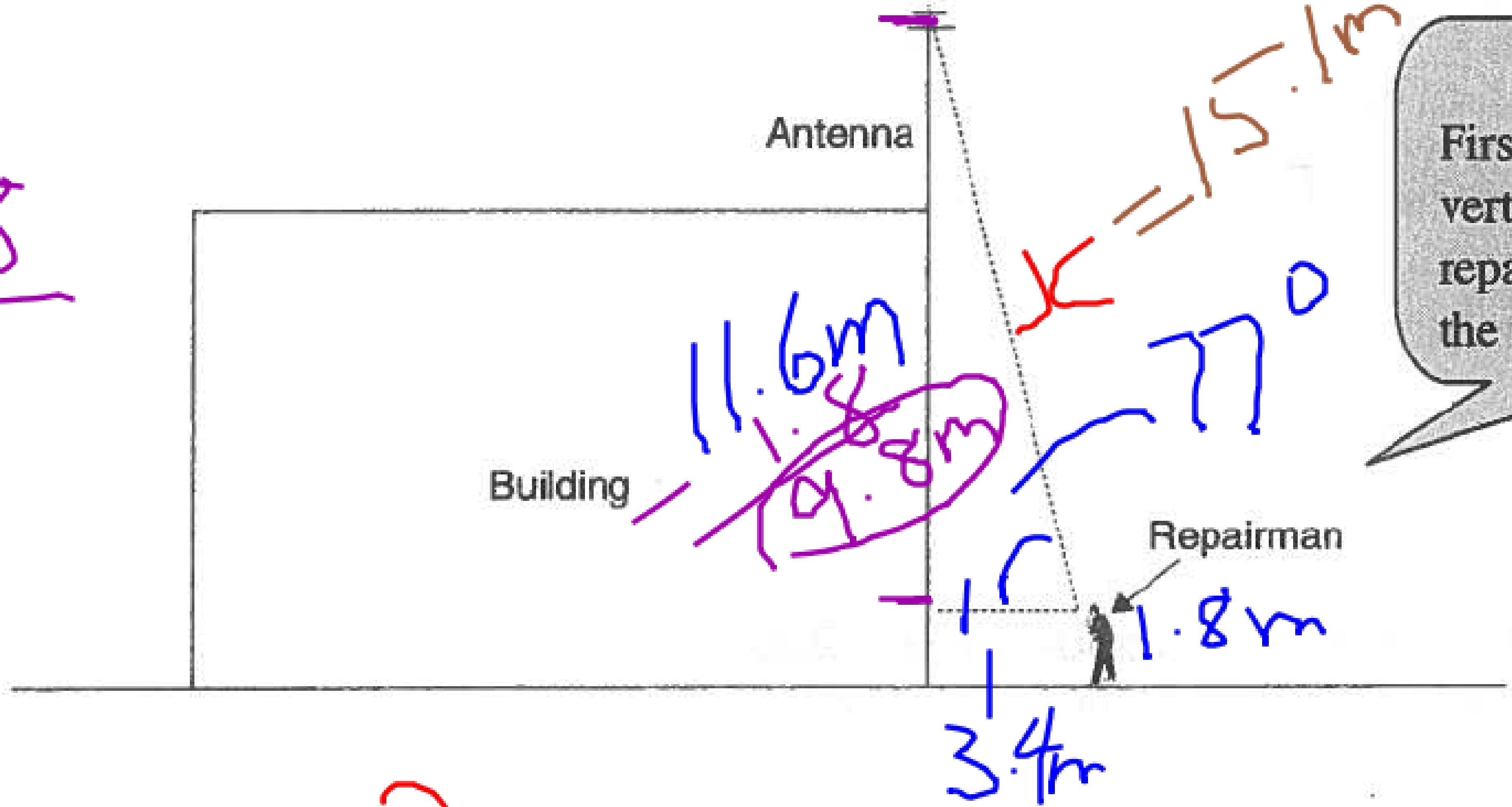
4. A repairman stands 3.4 m from a building and looks up at the antenna mounted at the edge of the roof. From his eye level, 1.8 m from the ground, the angle of elevation is 77°. The roof is 11.6 m from the ground. How tall is the antenna?



Hint
First, calculate the vertical distance from the repairman's eye level to the top of the building.

$11.6 - 1.8$

the antenna 4.9m tall

$14.7 - 9.8 = 4.9$

$\cos 77^\circ = \frac{Adj}{hyp}$

$\cos 77^\circ = \frac{3.4}{x}$

$\frac{x \cos 77^\circ}{\cos 77^\circ} = \frac{3.4}{\cos 77^\circ}$

$x = 15.1\text{m}$

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

$(3.4)^2 + b^2 = (15.1)^2$

$11.56 + b^2 = 228.01$

$b^2 = 216.45$

$b = 14.7\text{m}$