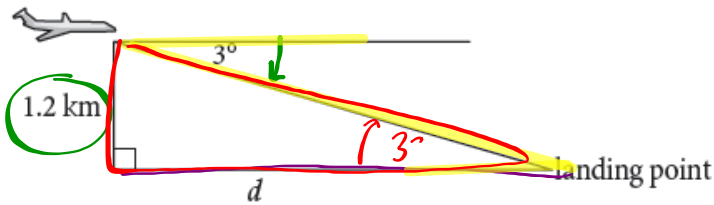# WARM UP...

1) A Bombardier CRJ700 passenger airplane flying at an altitude of 1.2 km starts its final airport approach by descending at an angle of depression of 3°. How far along the ground is the airplane from its landing point? Answer to the nearest kilometre.
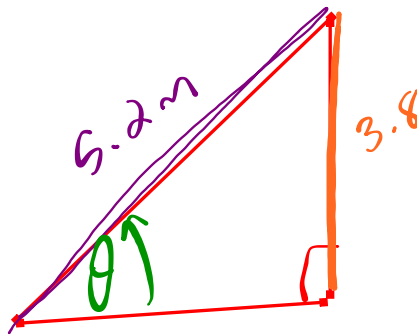
3°

1.2 km

3°

landing point

d

$$\tan 3° = \frac{1.2}{d}$$

$$d = \frac{1.2}{\tan 3°}$$

$$d = 22.9 \, km$$

2) At what angle of elevation must a 5.2 m ladder be placed to reach a vertical height of 3.8 m on a wall? *Give your answer correct to the nearest degree.*
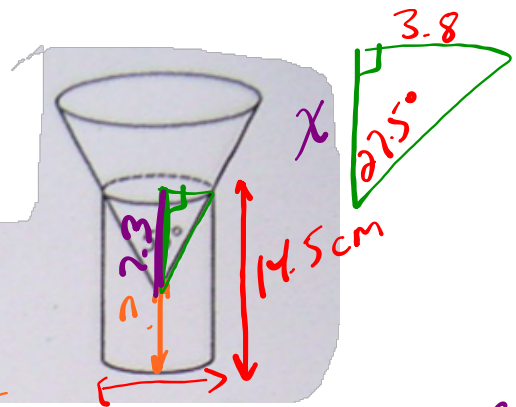
5.2 m

3.8

θ

$$\sin^{-1} \sin \theta = \left(\frac{3.8}{5.2}\right)$$

$$\sin^{-1}\left(\frac{3.8}{5.2}\right)$$
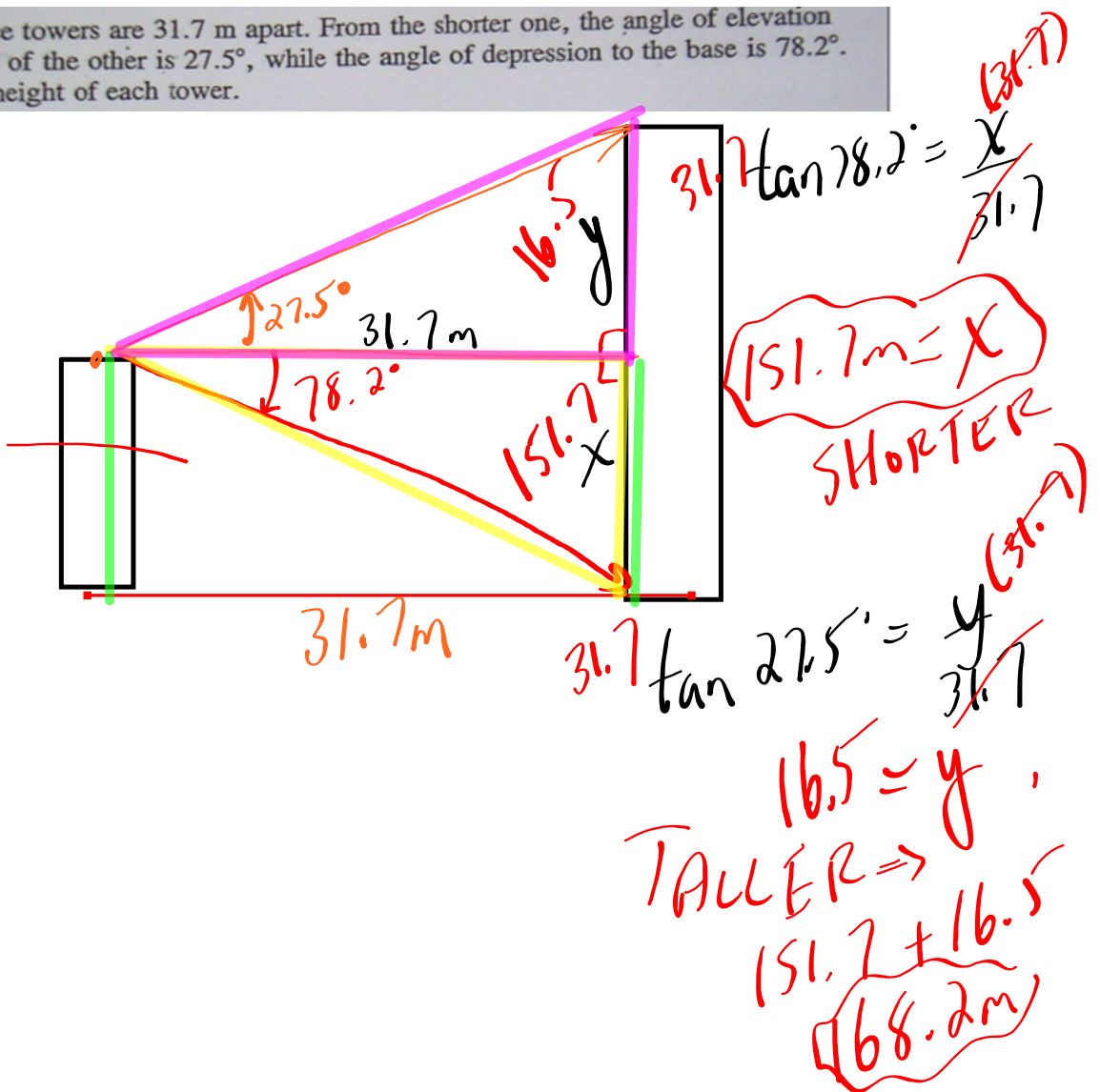
$$\theta = 47°$$

Hw???

9. A funnel is placed in a glass, as shown. If the glass is 14.5 cm tall and 7.6 cm in diameter, how high is the vertex of the funnel above the bottom of the glass?

3.8

x

27.5°

14.5 cm

7.6 cm

Distance ⇒ 14.5
− 7.3
7.2 cm

$\tan 27.5° = \dfrac{3.8}{x}$

$x = \dfrac{3.8}{\tan 27.5}$

$x \approx 7.3$

11. Two office towers are 31.7 m apart. From the shorter one, the angle of elevation to the top of the other is 27.5°, while the angle of depression to the base is 78.2°. Find the height of each tower.

$31.7 \tan 78.2° = \dfrac{x}{31.7}$

$151.7 m = x$

SHORTER

$31.7 \tan 27.5° = \dfrac{y}{31.7}$

$16.5 = y$

TALLER ⟹

$151.7 + 16.5$

$168.2 m$

Example 1 — Calculating a Side Length Using More than One Triangle

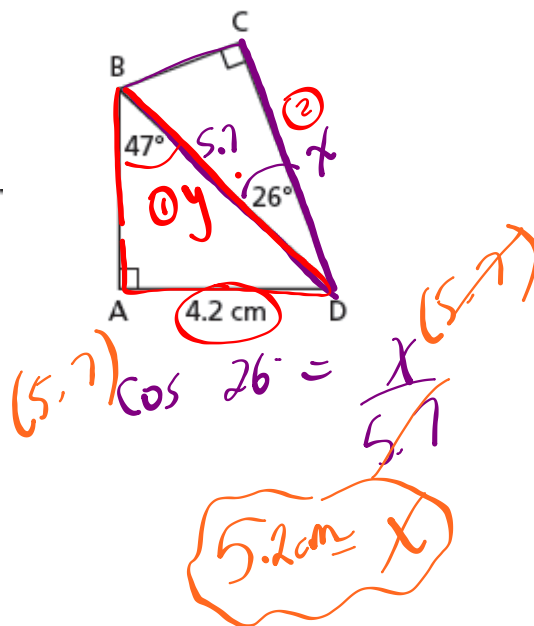Calculate the length of CD to the nearest tenth of a centimetre.

SOLUTION

(erase to reveal)

~~CD is~~ approximately 5.2 cm.

$$\sin 47° = \frac{4.2}{y}$$

$$y = \frac{4.2}{\sin 47}$$

$$y = 5.7$$

Figure labels: C, B, 47°, 5.7, ②, x, 26°, y, A, 4.2 cm, D

$$(5.7)\cos 26° = \frac{x}{5.7}\,(5.7)$$

$$5.2\,cm = x$$

CHECK YOUR UNDERSTANDING

#3. $\sin\theta = \dfrac{8}{17}$ ← opp   ← hyp

$\cos\theta = \dfrac{15}{17}$

$\tan\theta = \dfrac{8}{15}$
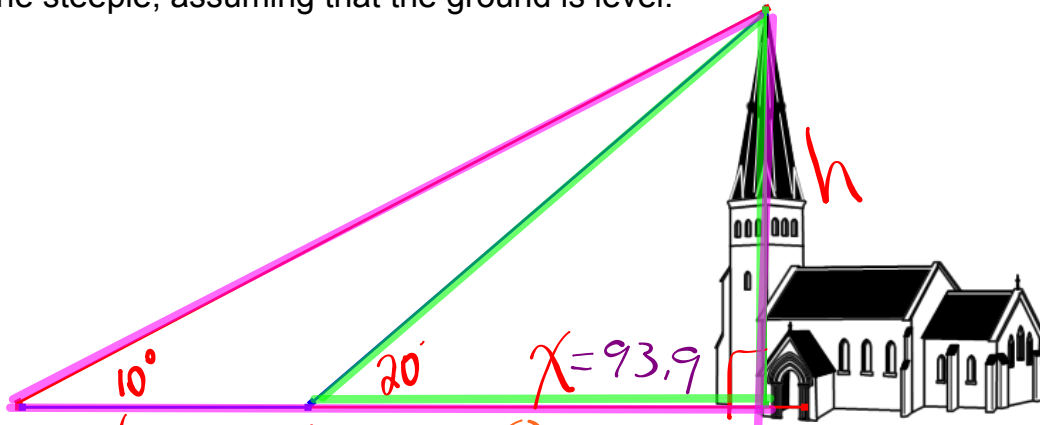
8   17 θ $x = 15$

$\sqrt{x^2} = \sqrt{17^2 - 8^2}$

$\boxed{x = 15}$

EXAMPLE #2:

Anita Sumtrig measured the angle of elevation of a church steeple and found it to be 10°. Then, she walked 100 m towards the steeple and measured the angle of elevation again; this time it was 20° Find the height of the steeple, assuming that the ground is level.

h

$10°$ $20°$ $x = 93.9$

$\leftarrow 100\,m \rightarrow$

$(100+x)\tan 10° = \dfrac{h(100+x)}{(100+x)}$

$x\tan 20° = \dfrac{h \cdot x}{x}$

$x\tan 20° = h$

$(100+x)\tan 10° = h$

$h = h$

$*\ (100+x)\tan 10° = x\tan 20°$

Work with the trig

x switch into decimals

$(100+x)(0.1763) = x(0.3640)$

$100\tan 10 + x\tan 10 = x\tan 20$

$17.63 + 0.1763x = 0.3640x$

$100\tan 10 = x\tan 20 - x\tan 10$

$17.63 = 0.3640x - 0.1763x$

$\dfrac{100\tan 10}{(\tan 20 - \tan 10)} = \dfrac{x(\tan 20 - \tan 10)}{(\tan 20 - \tan 10)}$

$\dfrac{17.63}{0.1877} = \dfrac{0.1877x}{0.1877}$

$93.9 = x$

$93.9 = x$

So, $93.9\tan 20° = \dfrac{h(93.9)}{93.9}$

$\boxed{34.2m = h}$

Homework...

Do #3 b d f from last night   Test => Tues

Worksheet - Applications of Trig Ratios.doc

#1-4
#7-10
#12 , #15 , #16

Attachments

Worksheet - Applications of Trig Ratios.doc