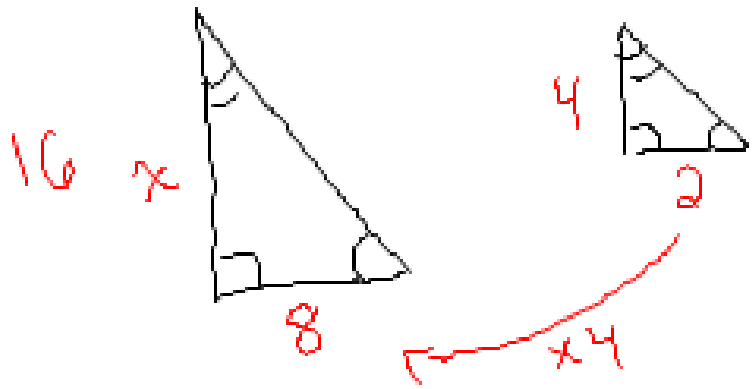
Similar Triangle

- same shape



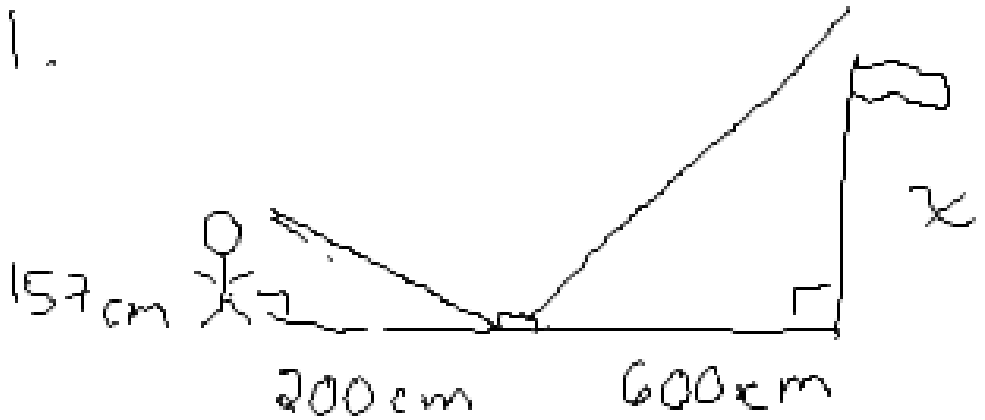
$$\frac{2}{8} = \frac{4}{x}$$

$$2x = 32$$

$$x = 16$$

12
1
16
15
2

1.



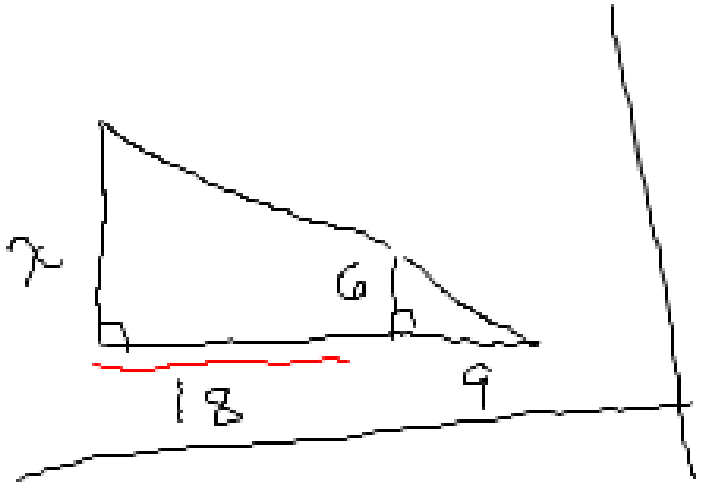
$$\frac{200}{600} = \frac{157}{x}$$

$$\frac{600}{200} = \frac{x}{157}$$

$$\frac{200x}{200} = \frac{94200}{200}$$

$$x = 471 \text{ cm}.$$

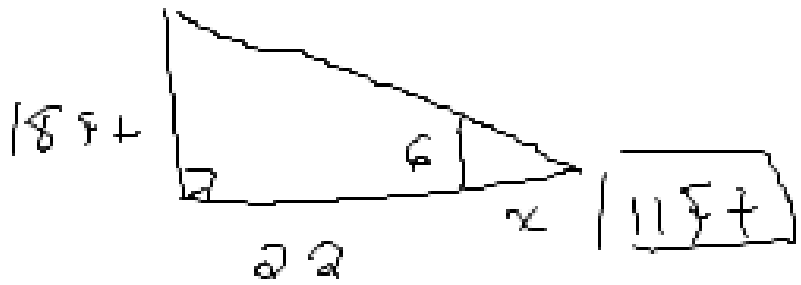
7.



$$\frac{x}{6} = \frac{27}{9}$$

$$(6)\frac{x}{6} = 3(6)$$

$$x = 18 \text{ ft}$$



$$\frac{x}{(22+x)} = \frac{6}{18}$$

$$18x = 6(22 + x)$$

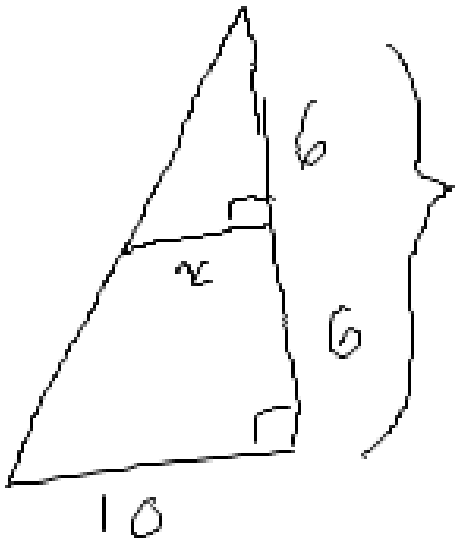
$$18x = 132 + 6x$$

$$-6x \quad\quad -6x$$

$$12x = 132$$

$$x = 11 \text{ ft}.$$

15.

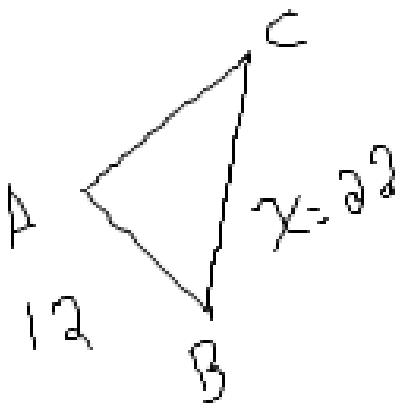


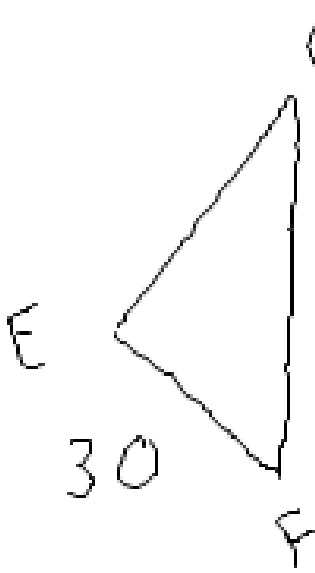
$$\frac{x}{10} = \frac{6}{12}$$

$$\frac{12x}{12} = \frac{60}{12}$$

$$x = 5$$

16.





$\frac{12}{30} = \frac{x}{(2x+11)}$

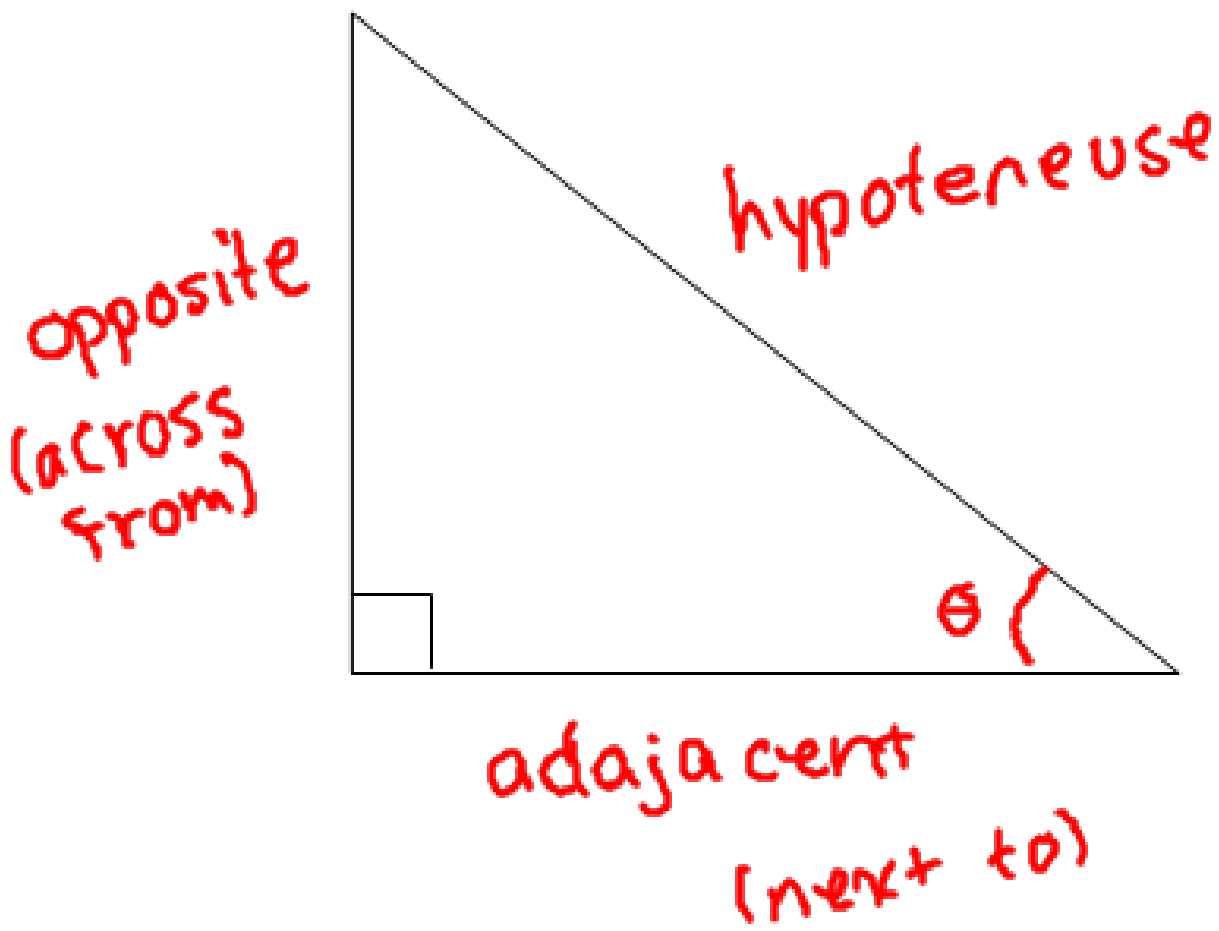
$(12)(2x+11) = 30x$

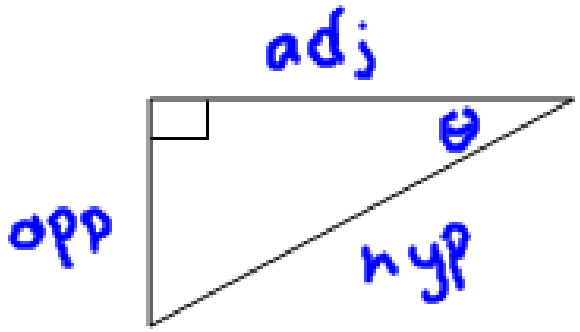
$24x + 132 = 30x$

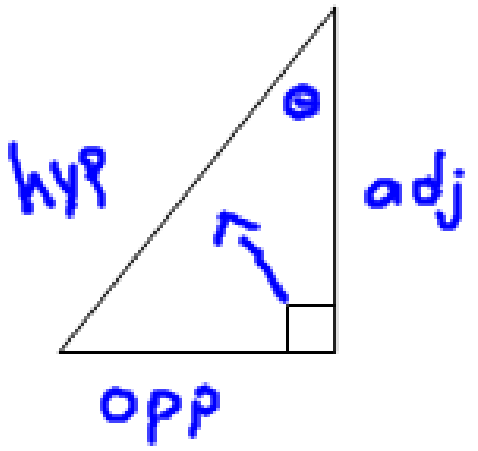
$-24x \quad -24x$

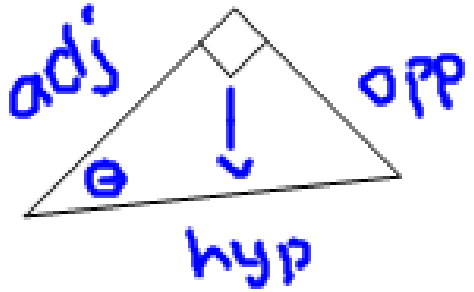
$\frac{132}{6} = \frac{6x}{6}$

$22 = x$


hypotenuse
opposite
(across
from)
θ
adjacent
(next to)

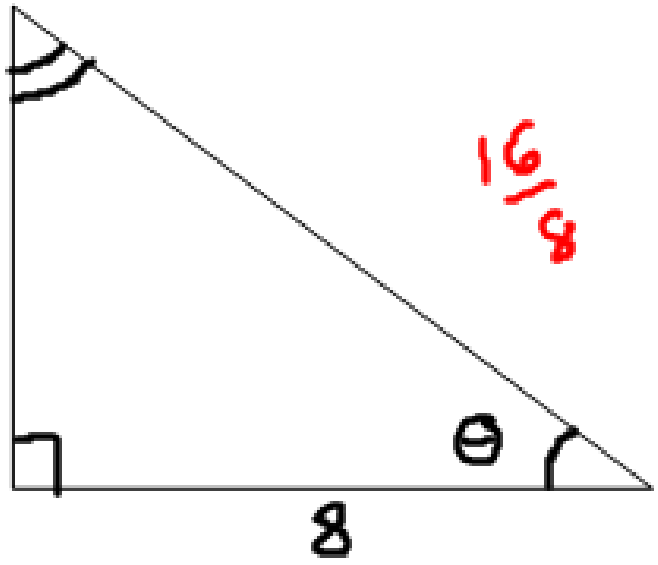

adj
θ
opp
hyp

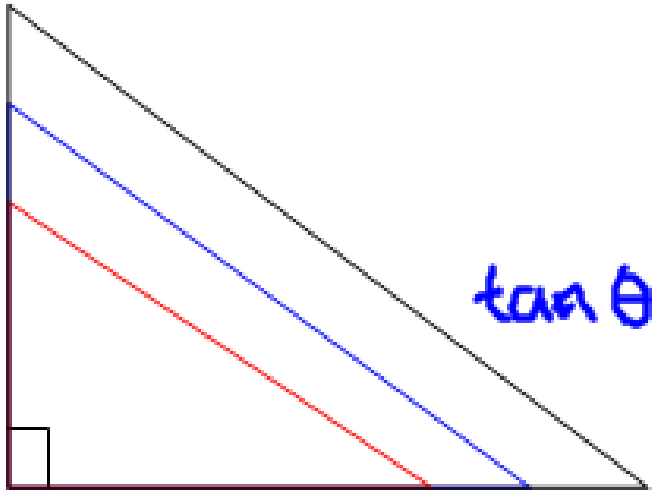

θ
hyp
adj
opp


adj
opp
θ
hyp

Similar Triangles.....

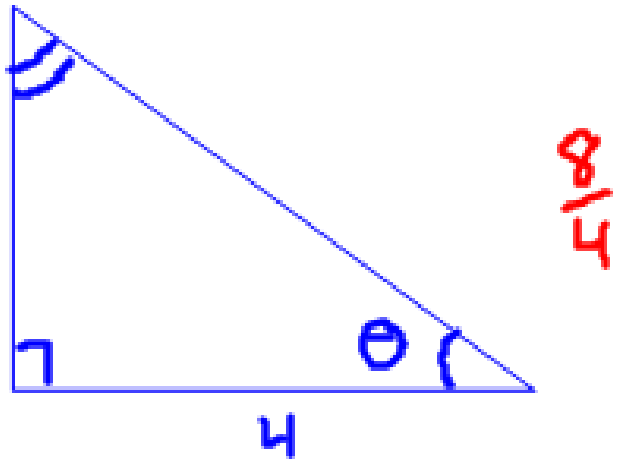
$\tan\theta = \frac{opp}{adj} = \frac{16}{8} = 2$





$\tan\theta = \frac{8}{4} = 2$

8



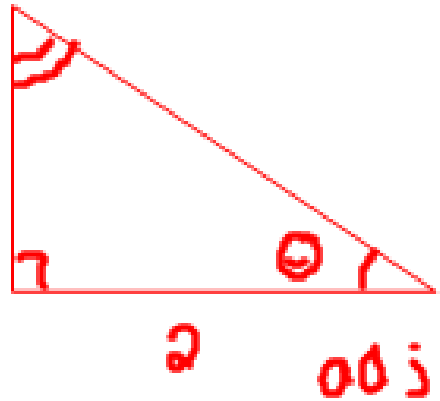
tangent ratio

θ: theta

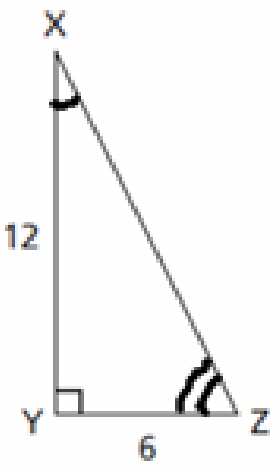
$\tan\theta = \frac{opp}{adj} = \frac{4}{2} = 2$

opp

4



1. Determine tan X and tan Z.



$$\tan X = \frac{opp}{adj} = \frac{6}{12} = 0.5$$

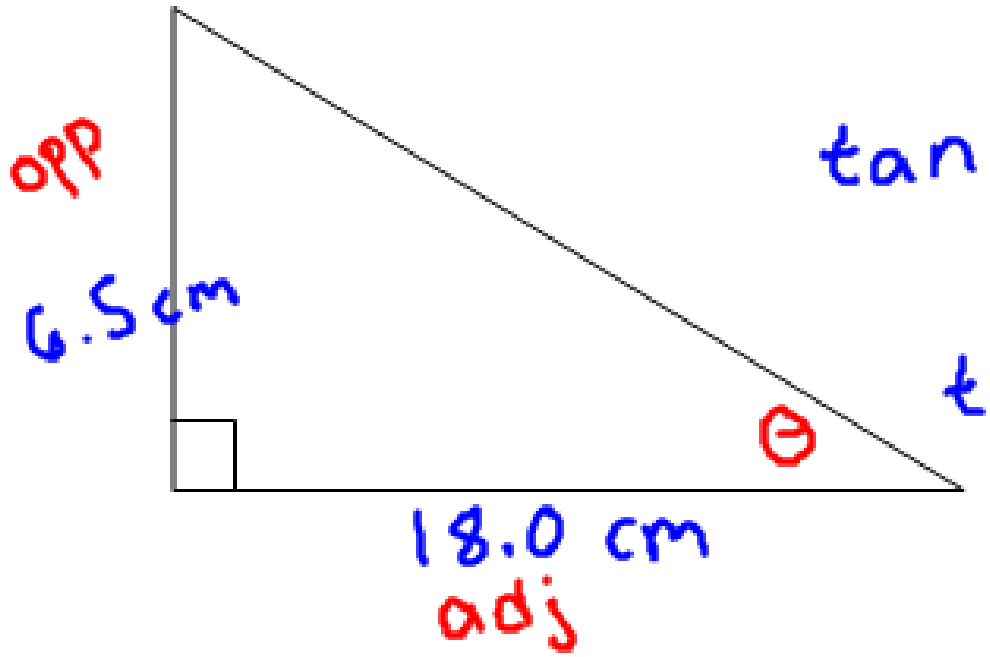
$$\tan Z = \frac{opp}{adj} = \frac{12}{6} = 2$$

Solve for θ in degrees.

(1) write tangent ratio

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

$$\tan\theta = \frac{6.5}{18.0}$$



$$\tan^{-1}\tan\theta = \tan^{-1}\left(\frac{6.5}{18.0}\right)$$

$$\theta = \tan^{-1}\left(\frac{6.5}{19.0}\right)$$

2ND TAN

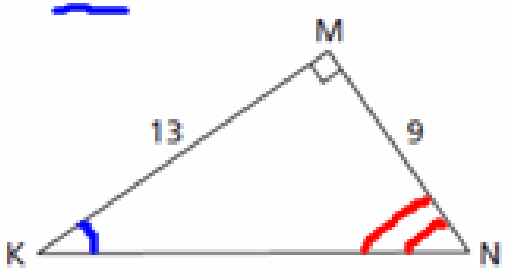
$\tan^{-1}(6.5/18.0) = 19.85^{\circ}$ ← unit symbol

DEG

on graphing calc

MODE make sure degree is highlighted.

2. Determine the measures of $\angle K$ and $\angle N$ to the nearest tenth of a degree.



$\tan K = \frac{O}{A}$

$\tan K = \frac{9}{13}$

$\angle K = \tan^{-1}\left(\frac{9}{13}\right)$

$\angle K = 34.7°$

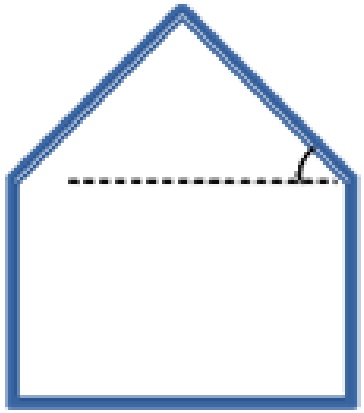
* $\tan N = \frac{O}{A}$

$\tan N = \frac{13}{9}$

$\angle N = \tan^{-1}\left(\frac{13}{9}\right)$

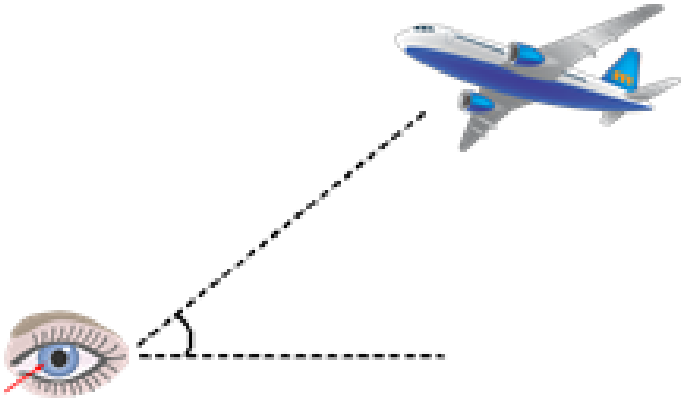
$\angle N = 55.3°$

2.1 The Tangent Ratio



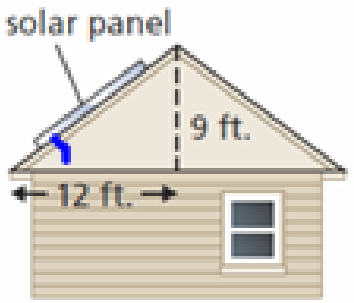
The **angle of inclination** of a line or line segment is the acute angle it makes with the horizontal

roof or ramp -

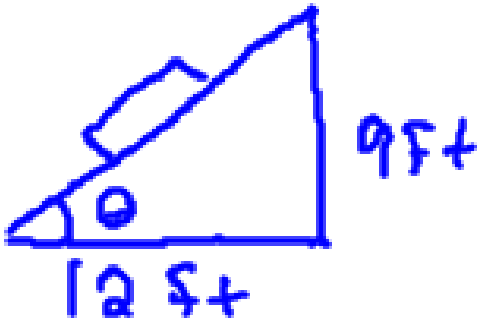


The **angle of elevation** of an object above the horizontal is the angle between the horizontal and the line of sight from an observer

The latitude of Fort Smith, NWT, is approximately 60°. Determine whether this design for a solar panel is the best for Fort Smith. Justify your answer.



If it was a good design, the angle of the solar panel ~ 60°



$\tan\theta = \frac{o}{a}$

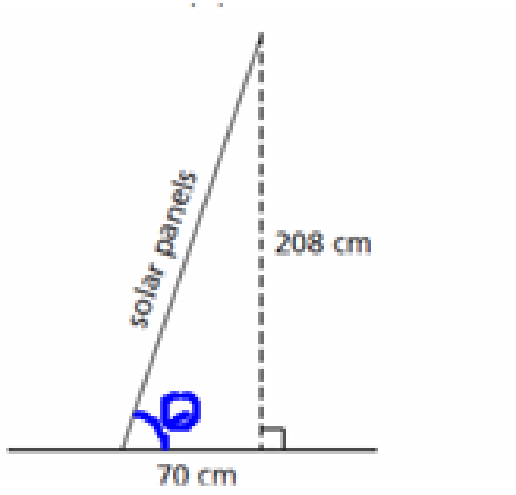
$\tan\theta = \frac{9}{12}$

$\theta = \tan^{-1}\left(\frac{9}{12}\right)$

$\theta = 36.86°$

Not a good design!

3. Clyde River on Baffin Island, Nunavut, has a latitude of approximately 70°. The diagram shows the side view of some solar panels. Determine whether this design for solar panels is the best for Clyde River. Justify your answer.



$\tan\theta = \frac{O}{A}$

$\tan\theta = \frac{208}{70}$

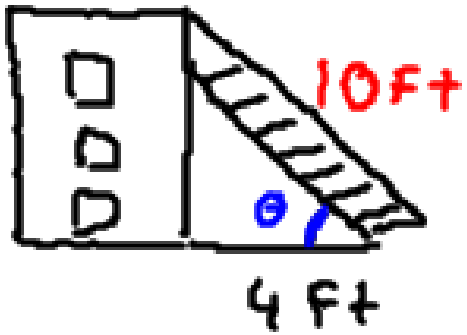
$\theta = \tan^{-1}\left(\frac{208}{70}\right)$

$\theta = 71.39°$

Yes, good design

A 10-ft. ladder leans against the side of a building with its base 4 ft. from the wall.

What angle, to the nearest degree, does the ladder make with the ground?

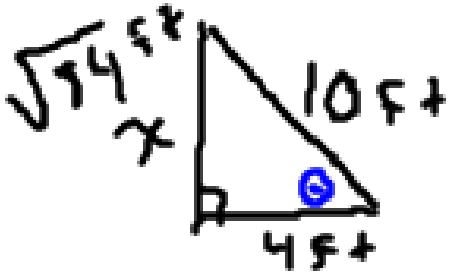


$\tan\theta = \frac{O}{A}$

$\tan\theta = \frac{\sqrt{84}}{4}$

$\theta = \tan^{-1}\left(\frac{\sqrt{84}}{4}\right)$

$\theta = 66°$



$x^2 = 10^2 - 4^2$

$x^2 = 100 - 16$

$\sqrt{x^2} = \sqrt{84}$

$x = \sqrt{84}$ ft.

p. 75

3-5, 8-11, 14, 15