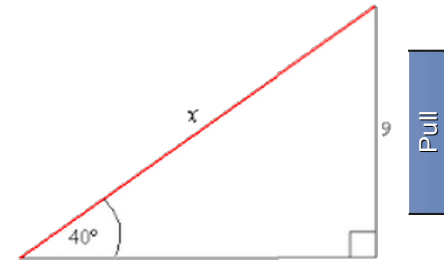


Solving Problems with Trigonometry

Learning Goal

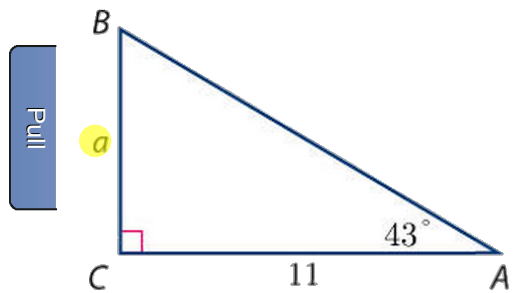
Minds on Math

1. To solve for indicated length, would you use \sin , \cos , or \tan ?



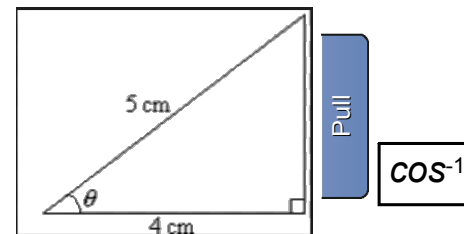
Minds on Math

2. To solve for indicated length, would you use \sin , \cos , or \tan ?



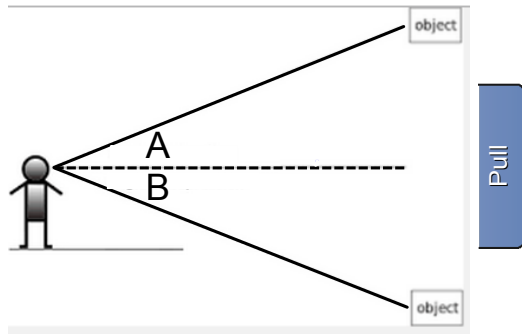
Minds on Math

3. Which inverse trig ratio would you use to find θ : \sin^{-1} , \cos^{-1} , or \tan^{-1} ?



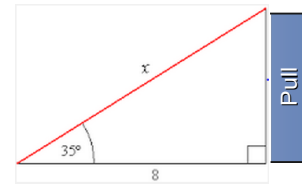
Minds on Math

4. Which correctly depicts an angle of depression--A or B?



Minds on Math

5. Which solution matches the process for finding x --A or B?



A

$$\cos 35^\circ = \frac{x}{8}$$

$$8 \cdot \cos 35^\circ = \frac{x}{8} \cdot 8$$

$$8 \cos 35^\circ = x$$

$$6.6 = x$$

B

$$\cos 35^\circ = \frac{8}{x}$$

$$x \cdot \cos 35^\circ = \frac{8}{x} \cdot x$$

$$x \cos 35^\circ = 8$$

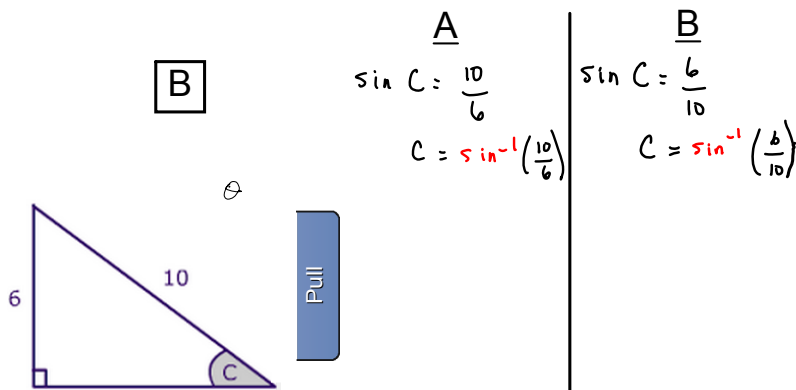
$$\frac{x \cos 35^\circ}{\cos 35^\circ} = \frac{8}{\cos 35^\circ}$$

$$x = \frac{8}{\cos 35^\circ}$$

$$x = 9.8$$

Minds on Math

6. Which solution matches the process for finding θ --A or B?

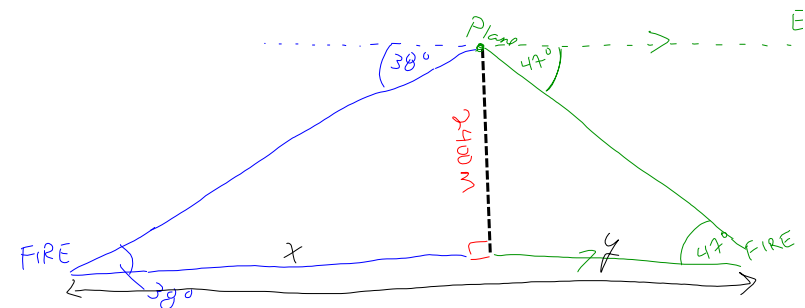


Solving Problems with Trigonometry

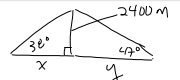
E.g., 1. Angles of Depression

A plane is flying at an altitude of 2400 m. From its position, a forest fire is spotted due east at an angle of depression of 47° . Another fire, due west, is spotted at an angle of depression of 38° .

To the nearest metre, what is the distance between the two fires?



E.g., 1. Solution



$$\tan 38^\circ = \frac{2400}{x}$$

$$\frac{2400}{\tan 38^\circ} = \frac{x}{1} \cdot 2400$$

$$\frac{2400}{\tan 38^\circ} = \frac{2400x}{12400}$$

$$3072 = x$$

$$\tan 47^\circ = \frac{2400}{y}$$

$$y \tan 47^\circ = \frac{2400}{\tan 47^\circ}$$

$$y = 2238$$

$$x + y = 3072 + 2238$$

$$= 5310$$

Therefore, the distance between the fires is about 5310 m.

E.g., 2. Solution

Solving Problems with Trigonometry

E.g., 2. Area of a Triangle (Height Unknown)

A triangular-shaped area will be covered with sod.

- two of the side lengths measure 100 m and 120 m
- these sides meet at 40°
- cost is $\$1.50/\text{m}^2$

How much will it cost to cover the area?

① Find the area.

$$A = \frac{bh}{2}$$

$$= \frac{100(100 \sin 40^\circ)}{2}; h = 100 \sin 40^\circ$$

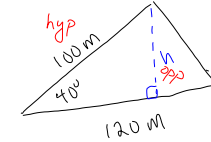
$$= 6000 \sin 40^\circ$$

$$= 3840$$

$$\therefore A = 3840 \text{ m}^2$$

$$\text{Cost} = 3840 \text{ m}^2 \times \frac{\$1.50}{\text{m}^2}$$

$$= \$5760$$



Practice

Textbook: pp. 412-414 #5, 6, 8, 13, 15, 16