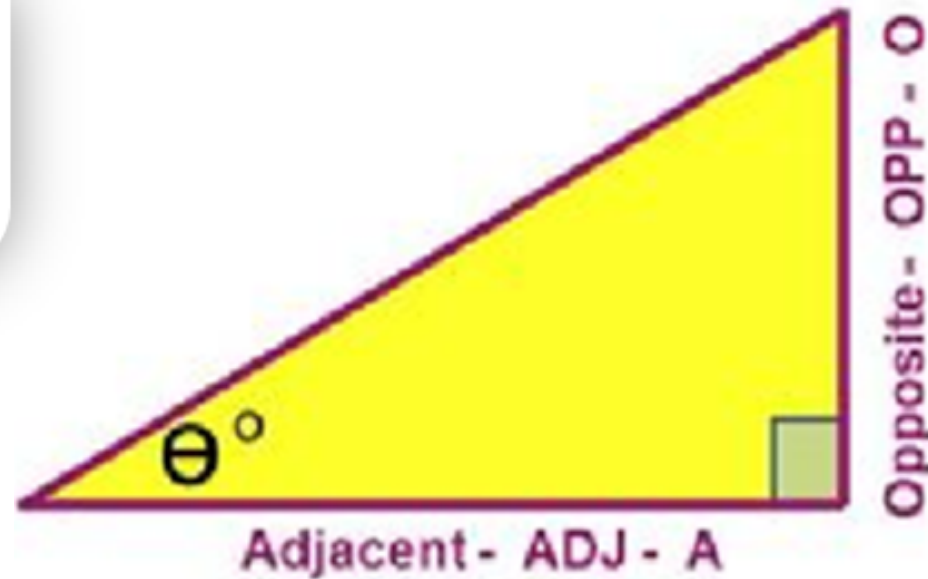


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18.1 Tangent Ratio

18.1

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



*You can use a calculator to approximate the sine, cosine, and the tangent. Make sure that your calculator is in degree mode. The table shows values of each function.



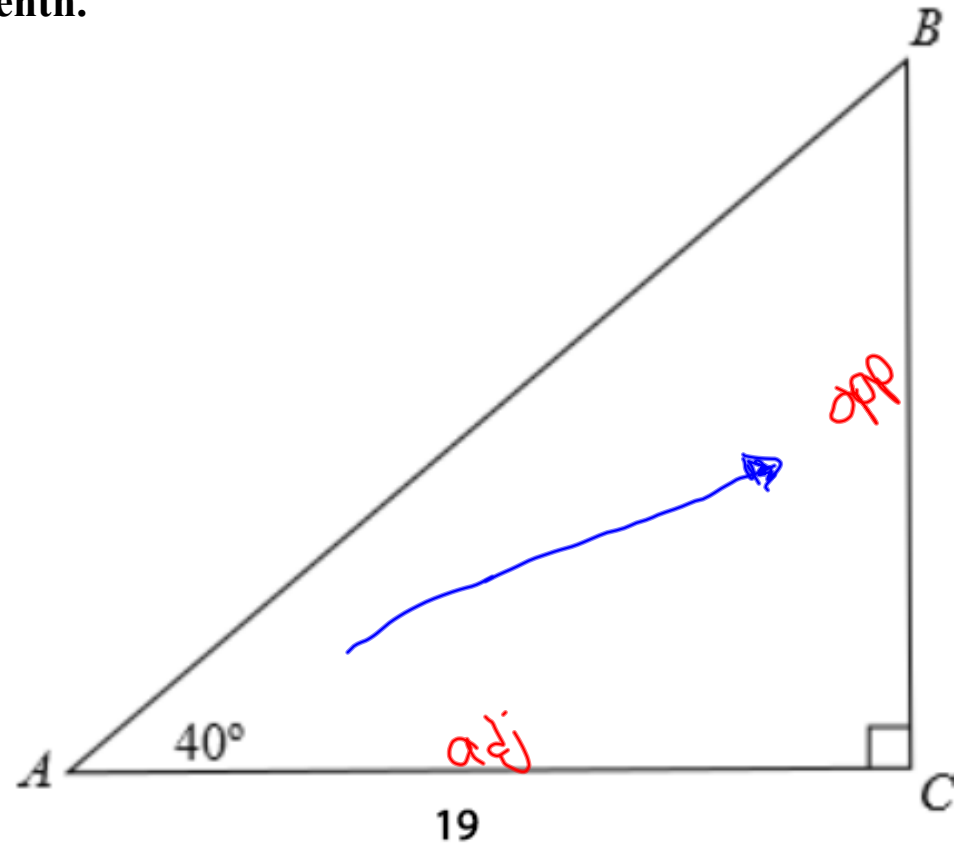
Select the equation that expresses the measure of side BC. Then solve the equation, expressing your answer to the nearest tenth.

$$19 \cdot \tan 40 = \frac{BC}{19} \cdot 19$$



$$BC = 19 \times \tan 40^\circ$$

$$BC \approx 15.9$$

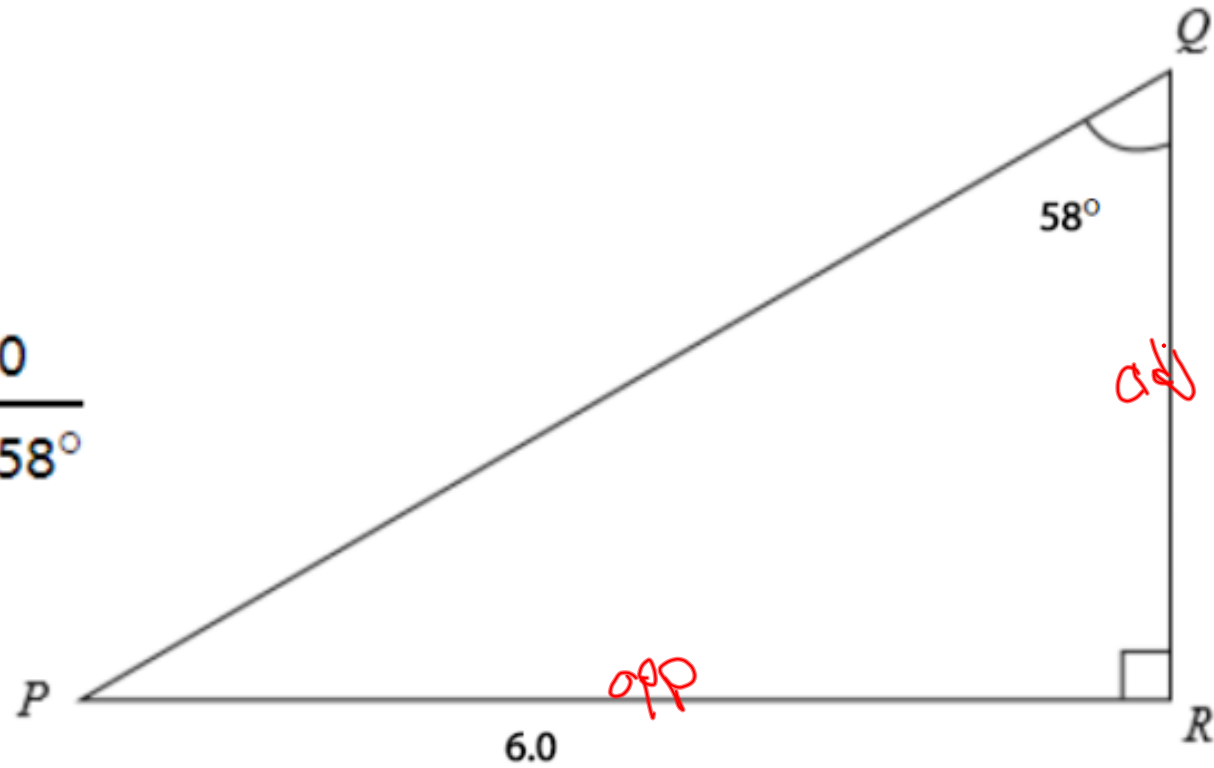


2

Use the tangent to find the length of side QR . Express your answer to the nearest tenth.

$$\tan 58^\circ = \frac{6.0}{QR}$$

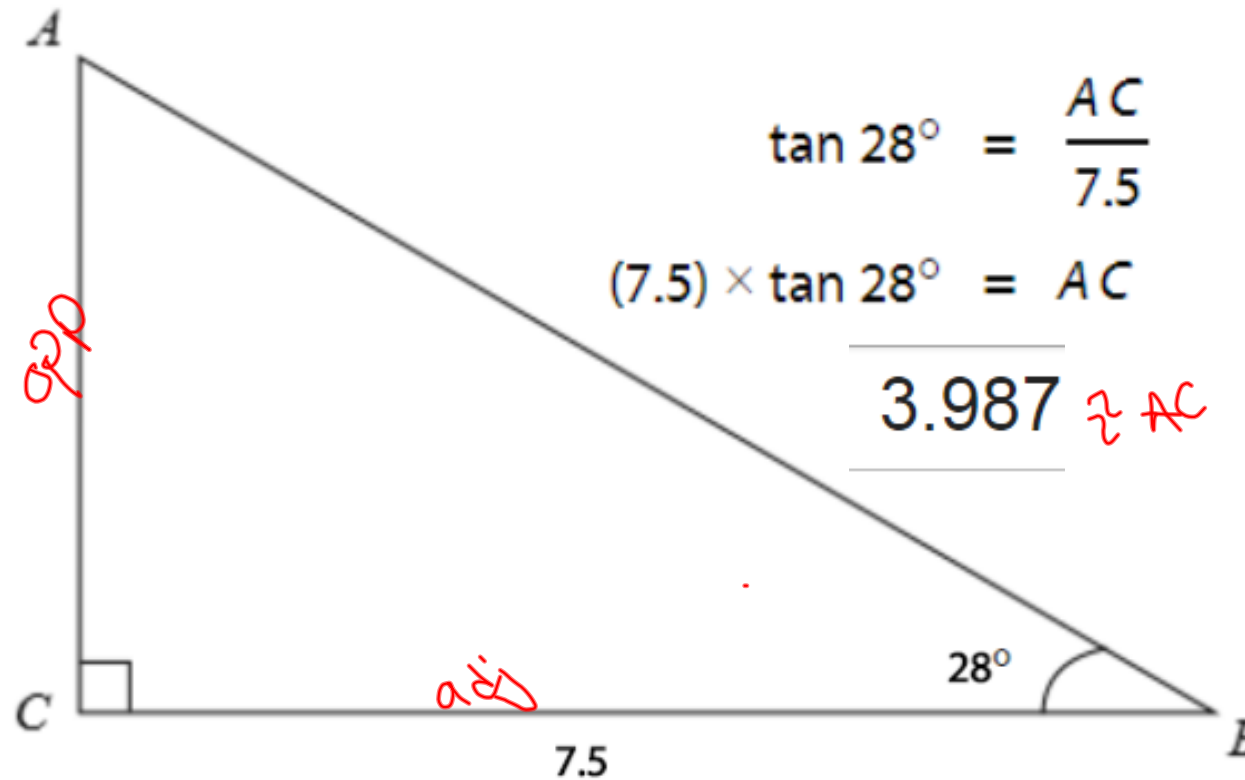
$$QR = \frac{6.0}{\tan 58^\circ}$$



The length of side QR is approximately units.

3

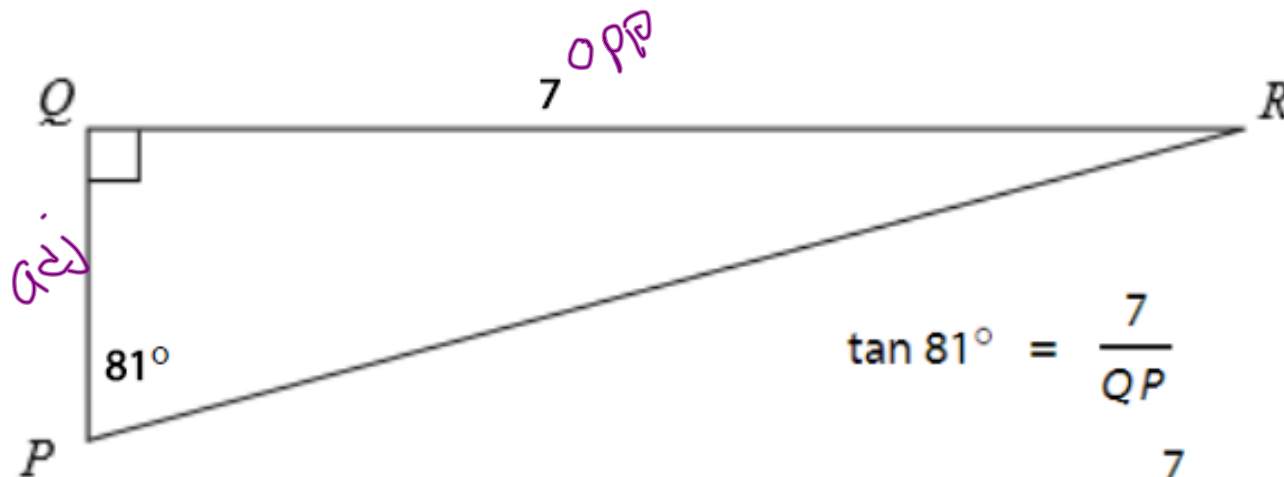
Use the tangent to find the length of side AC . Express your answer to the nearest tenth.



The length of side AC is approximately units.

4

Use the tangent to find the length of side QP . Express your answer to the nearest tenth.



$$\tan 81^\circ = \frac{7}{QP}$$

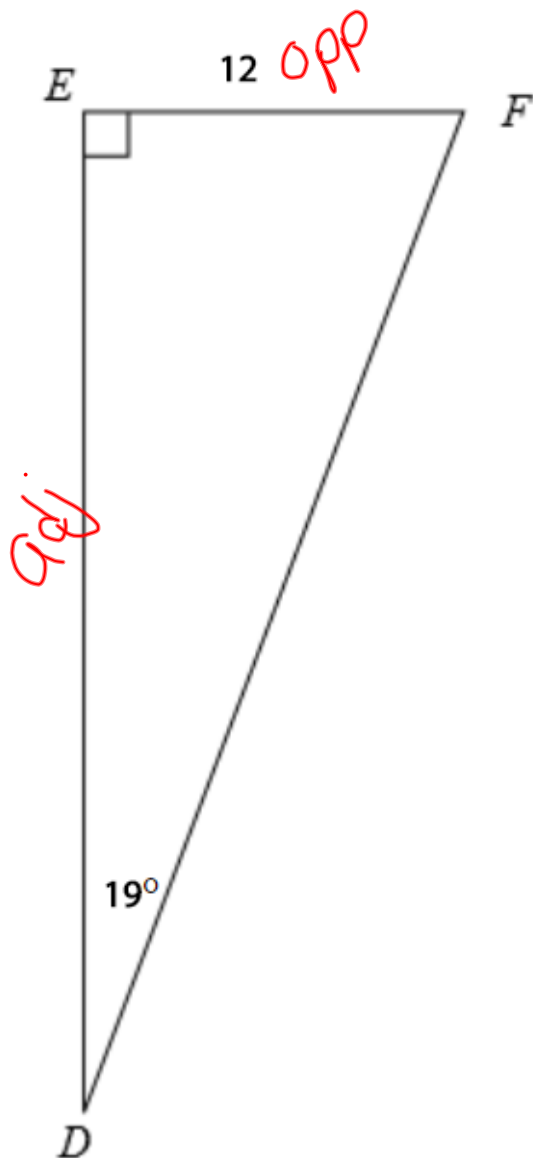
$$QP = \frac{7}{\tan 81^\circ}$$

$$QP \approx 1.1$$

The length of side QP is approximately units.

5

Use the tangent to find the length of side DE . Express your answer to the nearest tenth.



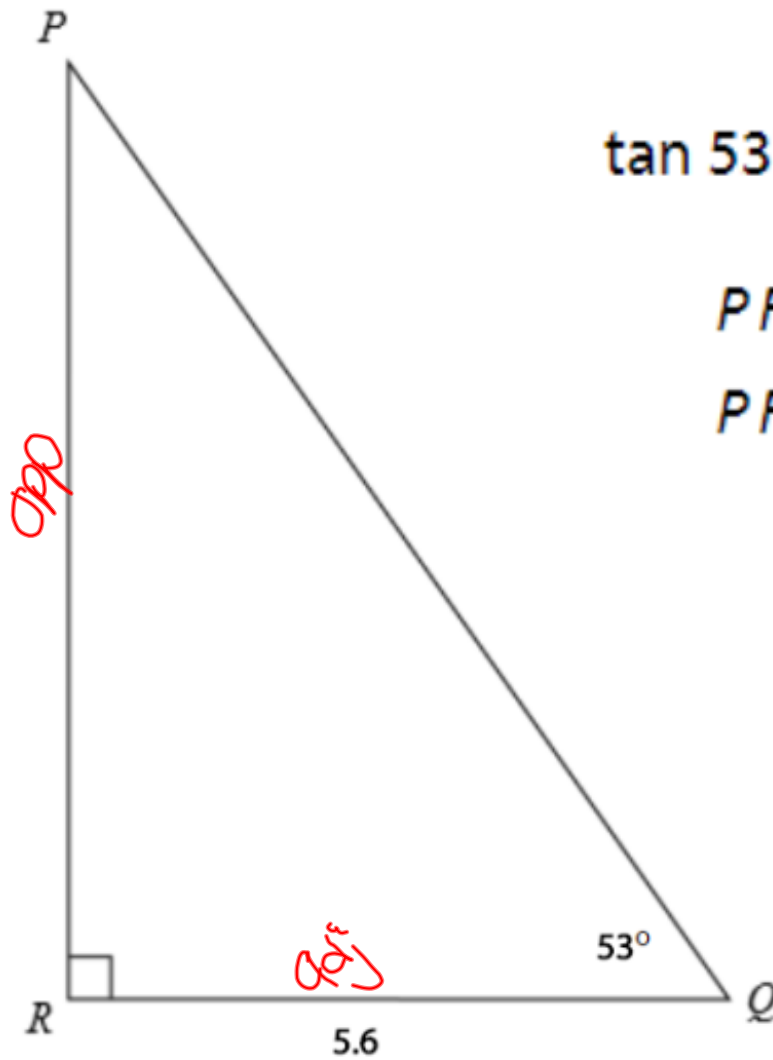
$$\tan 19^\circ = \frac{12}{DE}$$

$$DE = \frac{12}{\tan 19^\circ}$$

$$DE \approx 34.9$$

6

Use the tangent to find the length of side PR . Express your answer to the nearest tenth.



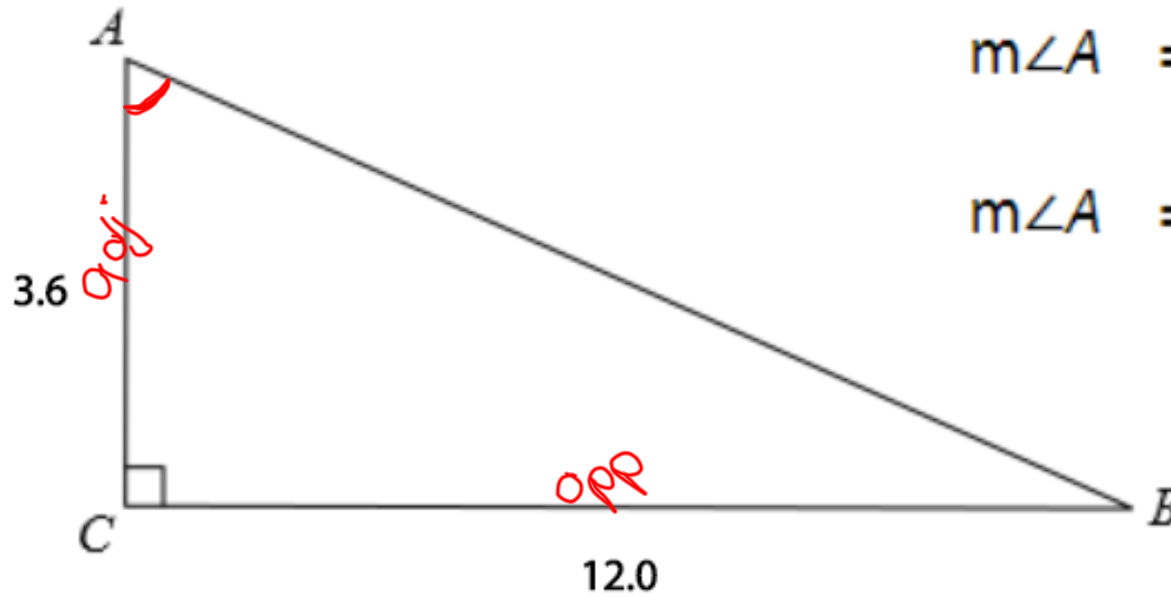
$$\tan 53^\circ = \frac{PR}{5.6}$$

$$PR = 5.6 \times \tan 53^\circ$$

$$PR \approx 7.4$$

7

Find the measure of $\angle A$. Use the inverse tangent (\tan^{-1}) function of your calculator. Express your answer to the nearest degree.

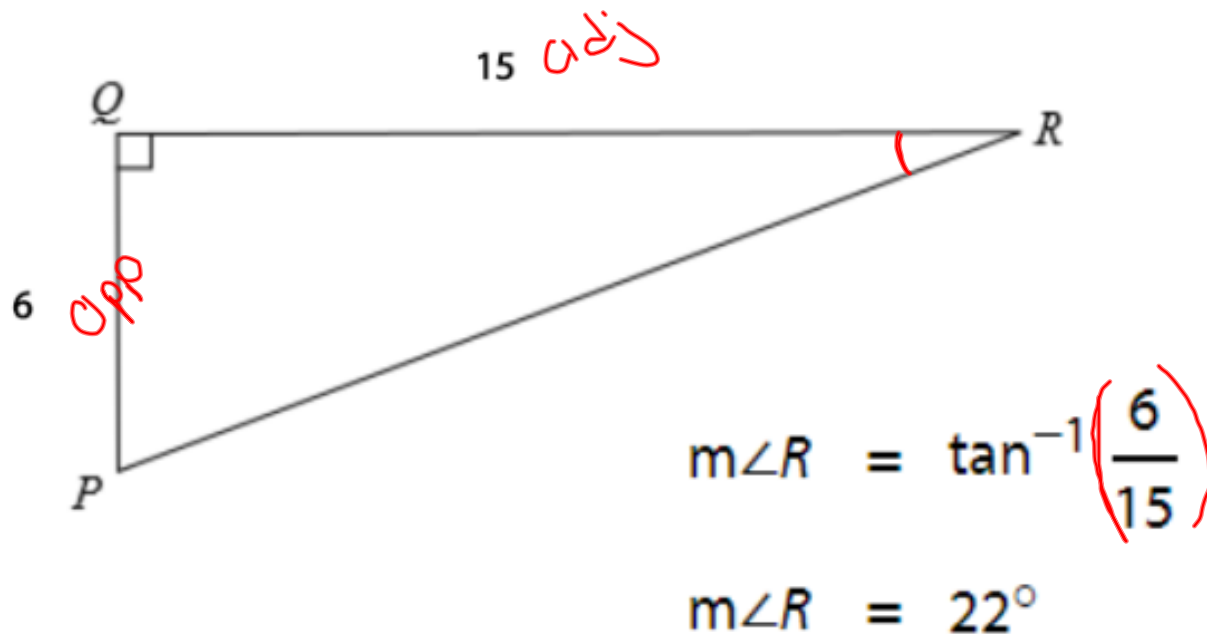


$$m\angle A = \tan^{-1}\left(\frac{12.0}{3.6}\right)$$

$$m\angle A = 73^\circ$$

8

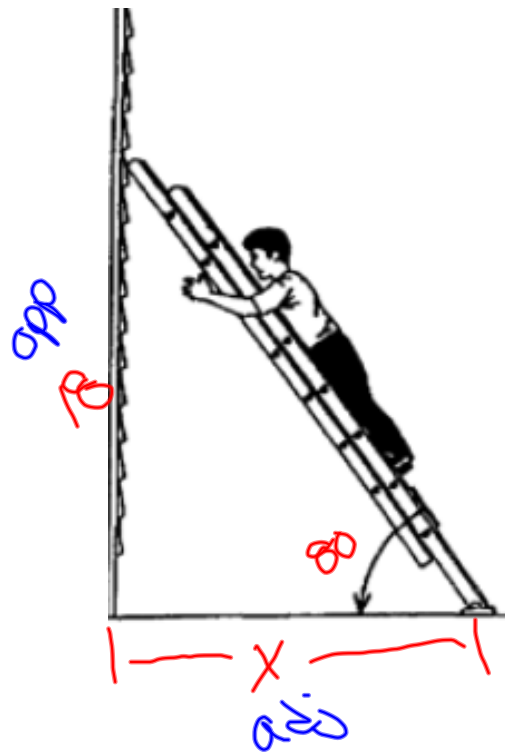
Find the measure of $\angle R$. Use the inverse tangent (\tan^{-1}) function of your calculator. Express your answer to the nearest degree.



9

A painter is placing a ladder to reach the third story window, which is 18 feet above the ground and makes an angle with the ground of 80° .

How far out from the building does the base of the ladder need to be positioned? Round your answer to the nearest tenth.



$$\tan 80^\circ = \frac{18}{x}$$

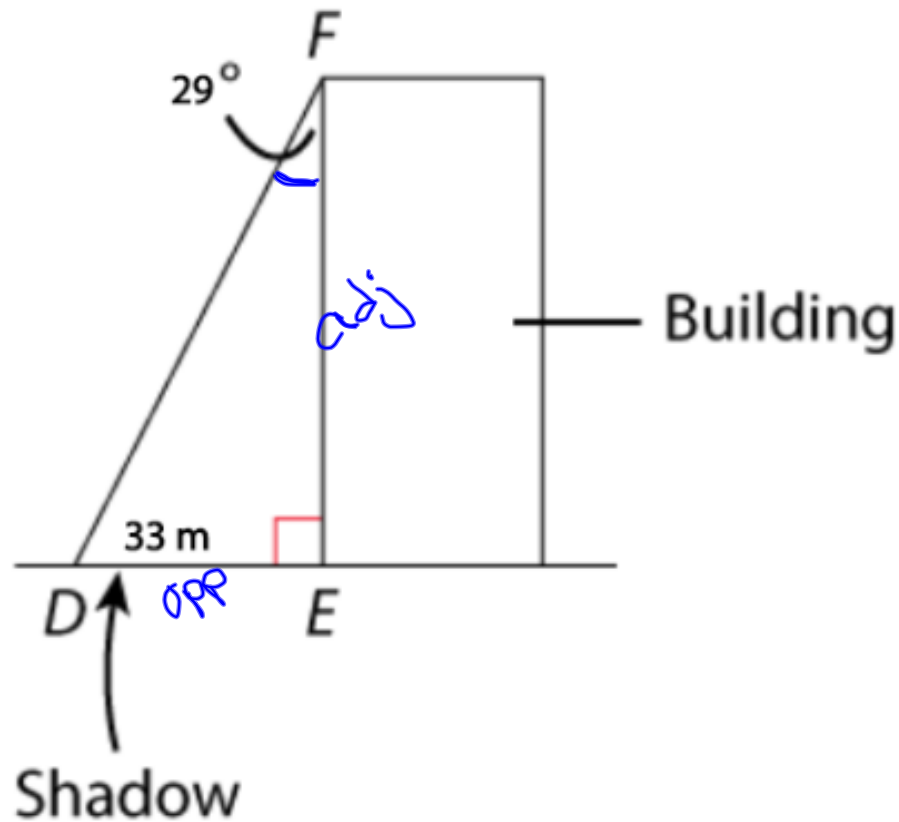
$$x = \frac{18}{\tan 80^\circ}$$

$$x \approx 3.2$$

10

Use a trigonometric ratio to find the distance EF .

A building casts a 33 m shadow when the Sun is at an angle of 29° to the vertical. How tall is the building, to the nearest meter? Use a trigonometric ratio to find the distance FE .



$$\tan F = \frac{DE}{EF}$$

$$\tan 29^\circ = \frac{33}{EF}$$

$$EF = \frac{33}{\tan 29^\circ}$$

$$EF \approx 60 \text{ m}$$