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Right Angle Triangles and the Cosine Ratio Worksheet

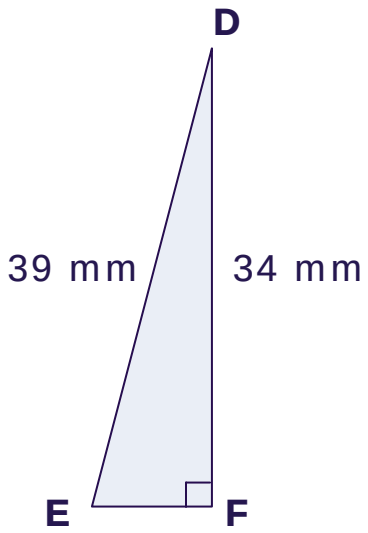
Calculate the cosine of the following angles to two decimal places.

1. cos 54° =
2. cos 78° =

Find ∠ T to the nearest degree.

3. cos T = 0.683
4. cos T = 7/9

5. Using the following triangle, calculate cos **D** to two decimal places.



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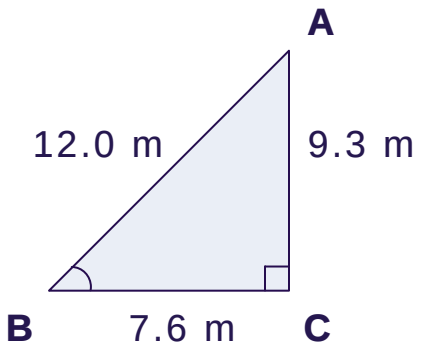
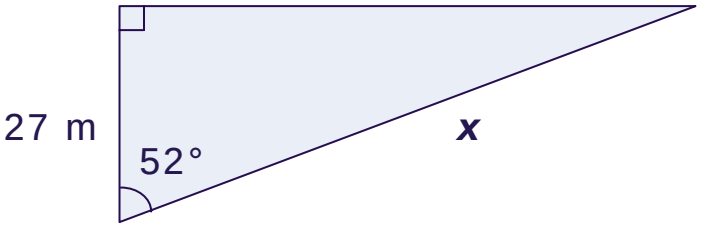
6. Calculate ∠ **B** and cos **B** for the following triangle. Round the angle measurement to the nearest degree and calculate the sin to two decimal places.



7. Find the measurement of the missing side of the triangle to the nearest tenth of a metre.



8. If a right triangle has a hypotenuse that is 18 cm long, how long is the side adjacent to the 17° angle (nearest tenth of a centimetre)?

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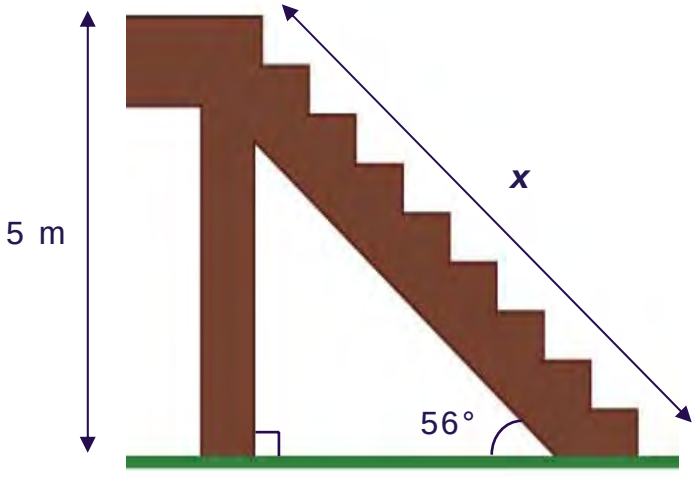
9. A family built a patio on the second storey of their home. They wanted to be able to access their backyard from this patio, so they built stairs from the patio to the grass. The incline of their staircase from the ground to the patio was 56° and the height of the staircase from the patio to the ground was 5 m. To the nearest tenth, calculate the length of the staircase.



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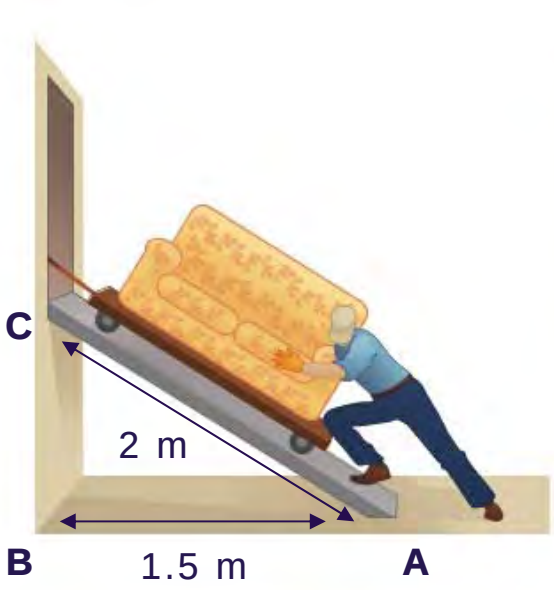
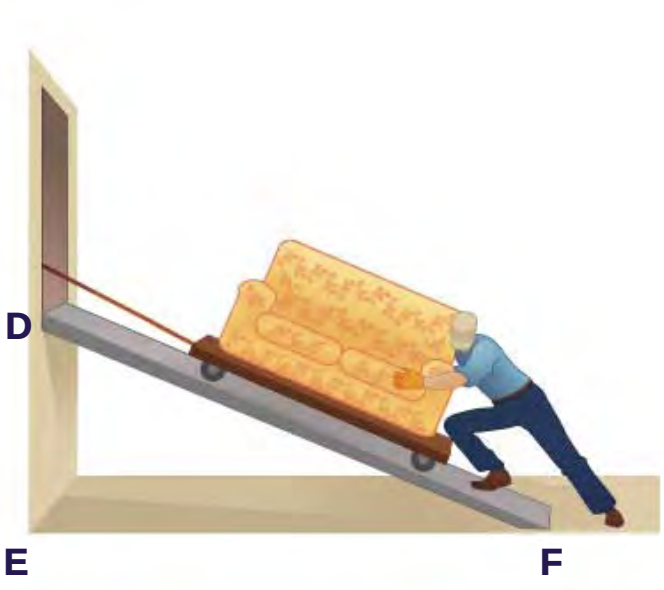
10. A furniture company purchased a new warehouse loading ramp because the employees were having a hard time carrying the furniture up the old ramp due to the steep incline. The old ramp was 2 meters long and the distance from the base of the ramp, where the employee is standing, to the building wall is **1.5m. The new ramp is 1 meter** longer than the old ramp. What is the difference in the incline on the new and old ramp?

Check your work using Pythagorean Theorem



OLD RAMP



NEW RAMP

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Right Angle Triangles and the Cosine Ratio Worksheet Solutions

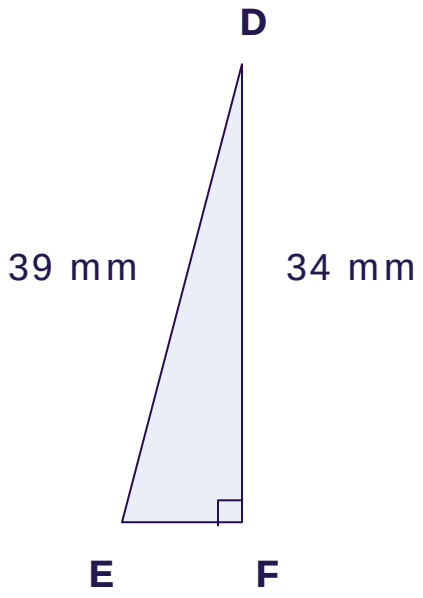
Calculate the cosine of the following angles to two decimal places.

1. cos 54° = **0.59**
2. cos 78° = **0.21**

Find ∠ **T** to the nearest degree.

3. cos T = 0.683 ∠ **T = 47°**
4. cos T = 7/9 ∠ **T = 39°**

5. Using the following triangle, calculate cos **D** to two decimal places.



cos D = $\frac{\text{adjacent}}{\text{hypotenuse}}$ **cos D = $\frac{34\text{ mm}}{39\text{ mm}}$** **cos D = 0.87**

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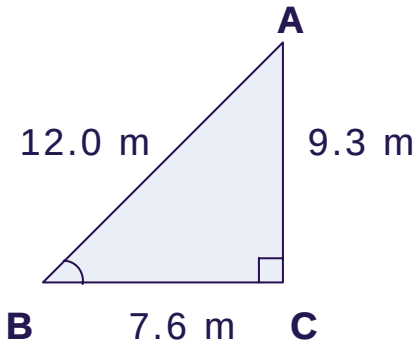
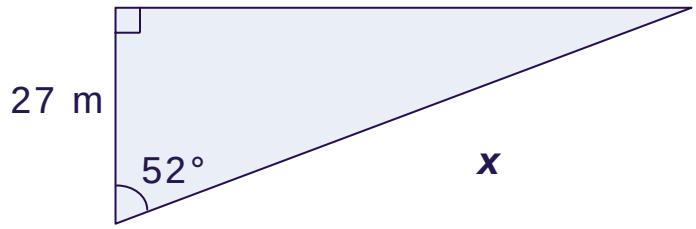
6. Calculate ∠ **B** and cos **B** for the following triangle. Round the angle measurement to the nearest degree and calculate cos to two decimal places.



cos B = $\frac{\text{adjacent}}{\text{hypotenuse}}$ **cos B = $\frac{7.6}{12.0}$** **cos B = 0.63** **∠B = 53°**

7. Find the measurement of the missing side of the triangle to the nearest tenth of a metre.



cos = $\frac{\text{adjacent}}{\text{hypotenuse}}$ **cos 52° = $\frac{27}{x}$** **0.616 = $\frac{27}{x}$**

0.616(x) = 27 **$x = \frac{27}{0.616}$** **x = 43.8 m**

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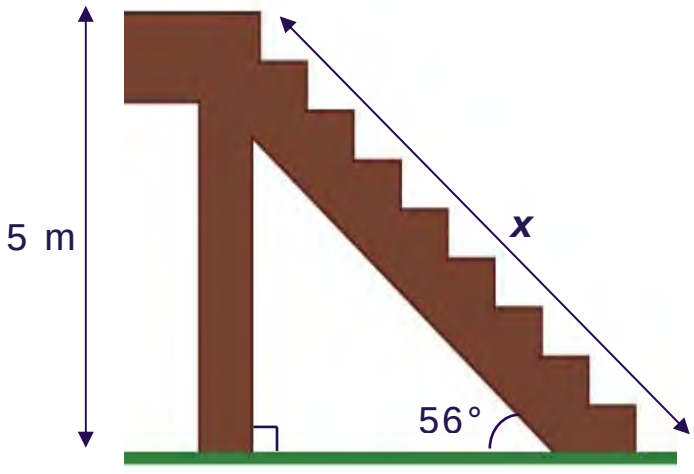
8. If a right triangle has a hypotenuse that is 18 cm long, how long is the side adjacent to the 17° angle (nearest tenth of a centimetre)?

$$\cos = \frac{\text{adjacent}}{\text{hypotenuse}} \qquad \cos 17^\circ = \frac{x}{18\text{cm}}$$

$$0.9563\,(18) = x \qquad x = 17.2 \text{ cm}$$

9. A family built a patio on the second storey of their home. They wanted to be able to access their backyard from this patio, so they built stairs from the patio to the grass. The incline of their staircase from the ground to the patio was 56° and the height of the staircase from the patio to the ground was 5 m. To the nearest tenth, calculate the length of the staircase.



The sum of the angles of a triangle is 180°

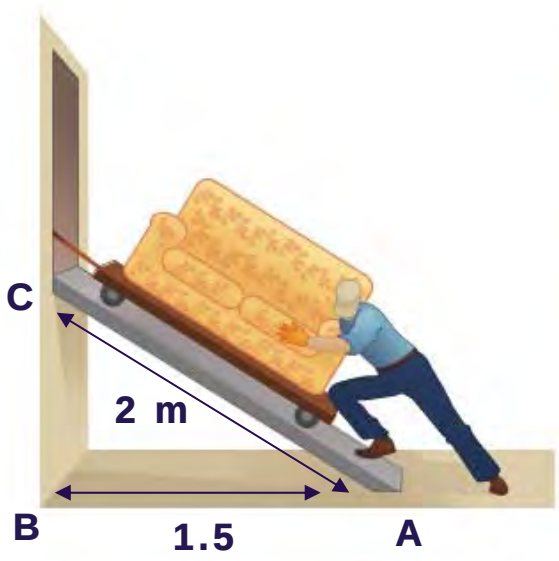
180° – 90° – 56° = 34°

$\cos = \frac{\text{adjacent}}{\text{hypotenuse}}$ $\cos 34° = \frac{5m}{x}$ $0.8290 = \frac{5m}{x}$

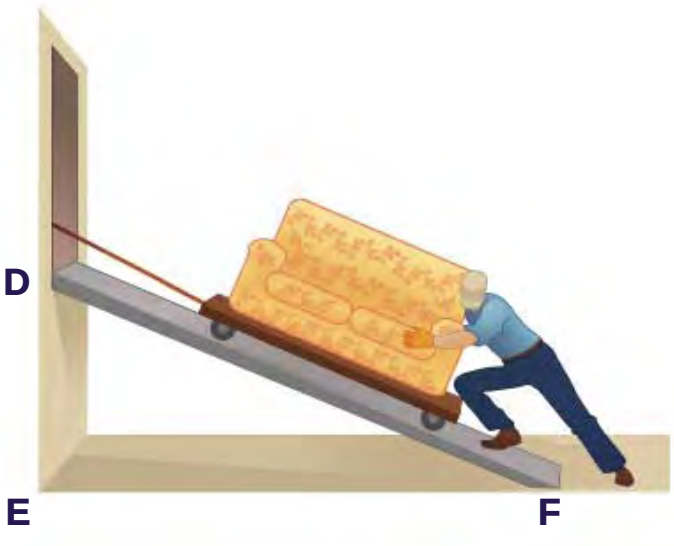
$0.8290\,(x) = 5$ $x = \frac{5}{0.8290}$

$x = 6.0$ m **The length of the staircase is approximately 6.0 m.**

10. A furniture company purchased a new warehouse loading ramp because the employees were having a hard time carrying the furniture up the old ramp due to the steep incline. The old ramp was 2 meters long and the distance from the base of the ramp, where the employee is standing, to the building wall is 1.5m. The new ramp is 1 meter longer than the old ramp. What is the difference in the incline on the new and old ramp?



OLD RAMP



NEW RAMP

$\cos A = \frac{\text{adjacent}}{\text{hypotenuse}}$ $\cos A = \frac{1.5\ m}{2\ m}$ $\cos A = 0.75$ $\angle A = 41°$

The incline of the old ramp was 41°

We need to figure out the height of the ramps now in order to calculate the incline of the new ramp.

We can do this two ways:

The sum of the angles of a triangle is 180°

180° – 90° - 41° = 49°

$\cos 49° = \frac{\text{adjacent}}{2\ m}$ $0.6561 = \frac{\text{ramp height}}{2\ m}$

0.6561 (2) = ramp height **1.3121 = ramp height**

1.3 m = ramp height

We can now enter this into our formula for cosine, using the length of the new ramp:

$\cos D = \frac{1.3\ m}{3\ m}$ $\cos D = 0.4333$ $\angle D = 64°$

We can add up the angles in our triangle to find the incline from point D.

Sum of triangle angles = 180°

180 – 90 – 64 = 26°

$\angle F = 26°$