

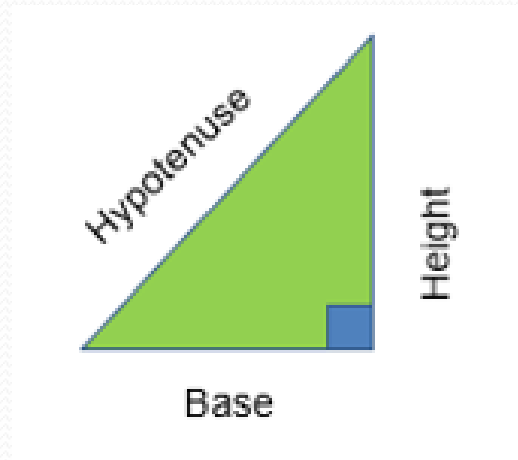
Wood Manufacturing & Finishing Pythagoras's Theorem

Phase 4

Lecturer Jennifer Byrne

Pythagoras's Theorem

- **Pythagoras' Theorem:** The Square on the Hypotenuse is equal to the sum of the squares on the other two sides.



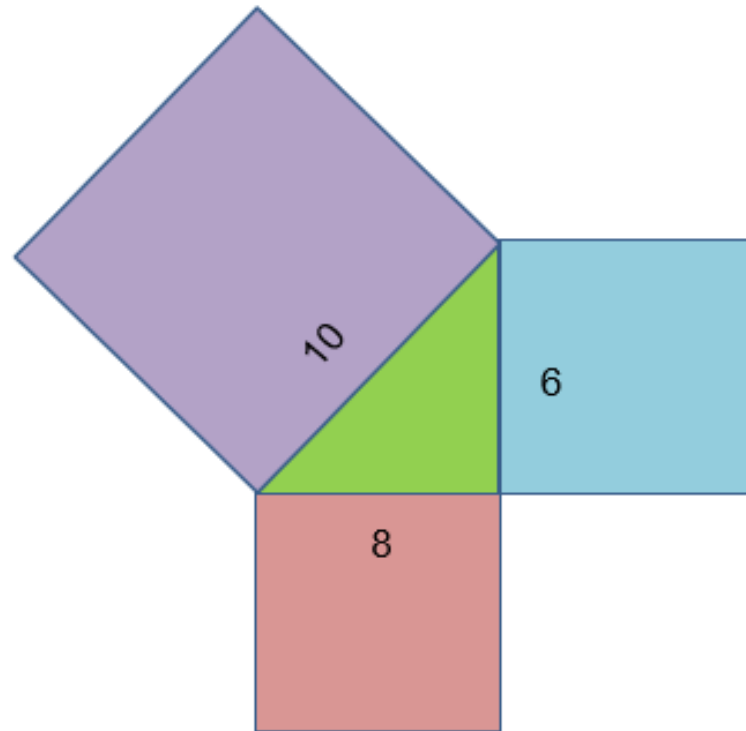
- Only works with a right-angled triangle that is a triangle with an angle of 90° .
- In any right-angled triangle, if we have two sides we can calculate the other side using Pythagoras' theorem.

Pythagoras's Theorem

- **Formula:** $a^2 + b^2 = c^2$
- $8^2 + 6^2 = 10^2$
- $64 + 36 = 100$
- $\sqrt{100} = 10$



$\square + \square = \square$



Pythagoras's Theorem

- **Example 1**

- **Formula:** $a^2 + b^2 = c^2$

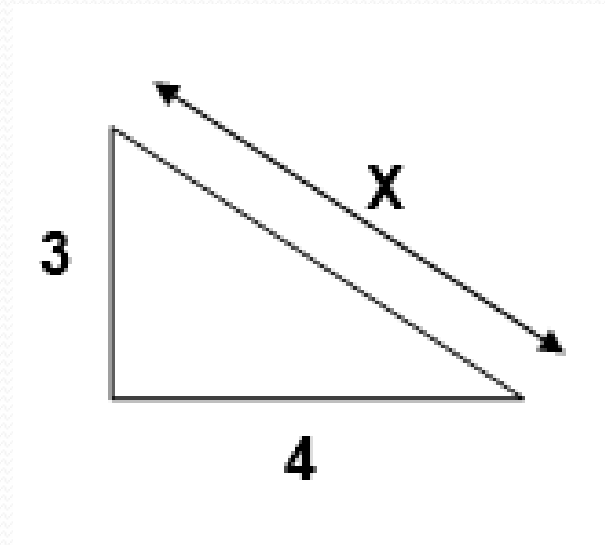
- $3^2 + 4^2 = x^2$

- $9 + 16 = x^2$

- $25 = x^2$

- $\sqrt{25} = x$

- $5 = x$



Pythagoras's Theorem

- **Example 2**

- **Formula:** $a^2 + b^2 = c^2$

- $10^2 + x^2 = 18^2$

- $100 + x^2 = 324$

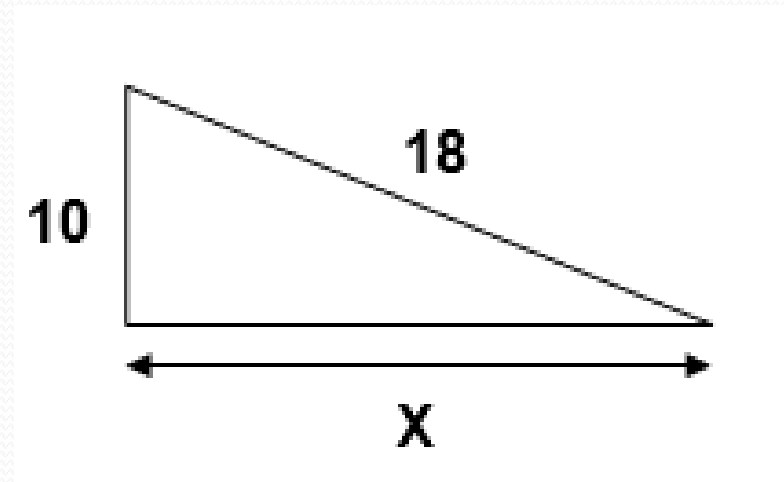
- $x^2 = 324 - 100$

- $x^2 = 224$

- $x = \sqrt{224}$

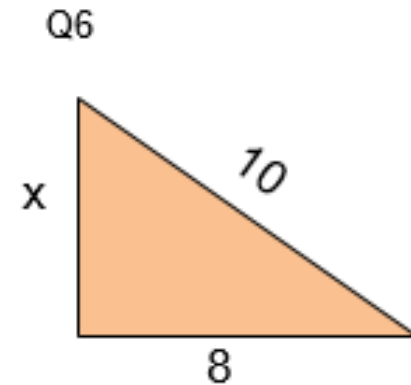
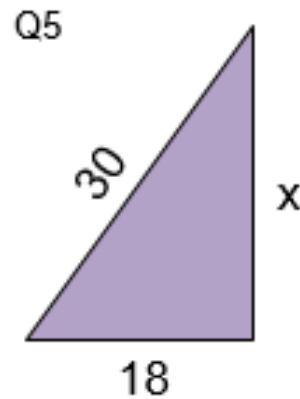
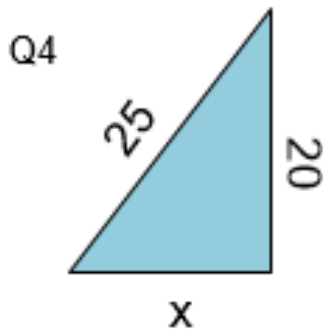
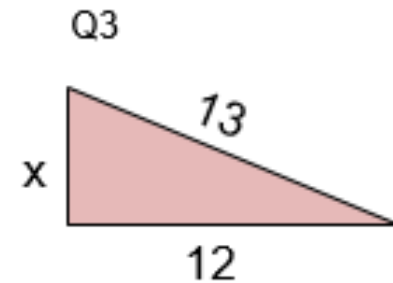
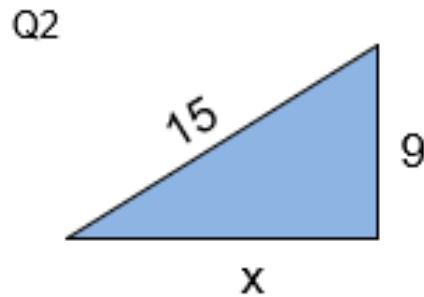
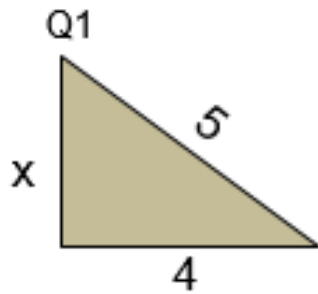
- $x = 14.96662$

- $x = 14.967$



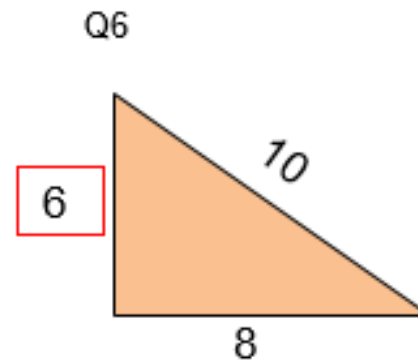
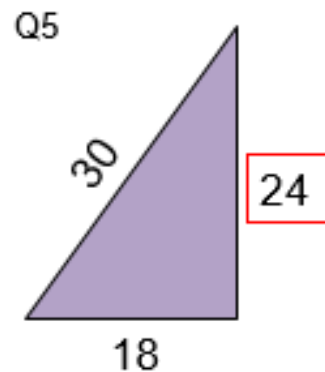
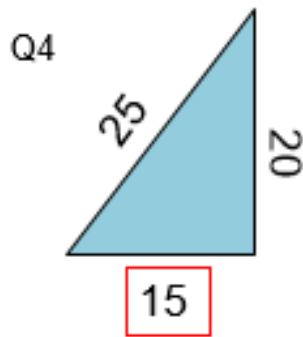
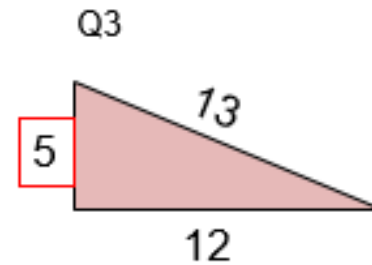
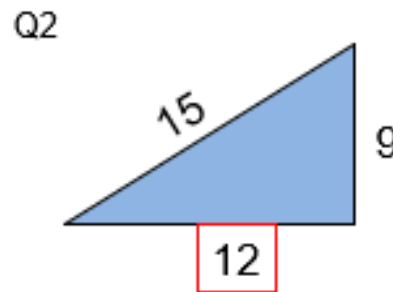
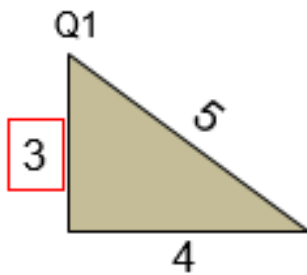
Pythagoras's Theorem

- Find the missing length of each triangle



Pythagoras's Theorem

- The missing length of each triangle shown in red box.



Pythagoras's Theorem

Solution Q1

- $5^2 = X^2 + 4^2$
- $5^2 - 4^2 = X^2$
- $25 - 16 = X^2$
- $9 = X^2$
- $\sqrt{9} = 3$

Solution Q2

- $15^2 = X^2 + 9^2$
- $15^2 - 9^2 = X^2$
- $225 - 81 = X^2$
- $144 = X^2$
- $\sqrt{144} = 12$

Pythagoras's Theorem

Solution Q3

- $13^2 = 2^2 + 12^2$
- $13^2 - 12^2 = X^2$
- $169 - 144 = X^2$
- $25 = X^2$
- $\sqrt{25} = 5$

Solution Q4

- $25^2 = X^2 + 20^2$
- $25^2 - 20^2 = X^2$
- $625 - 400 = X^2$
- $225 = X^2$
- $\sqrt{225} = 15$

Pythagoras's Theorem

Solution Q5

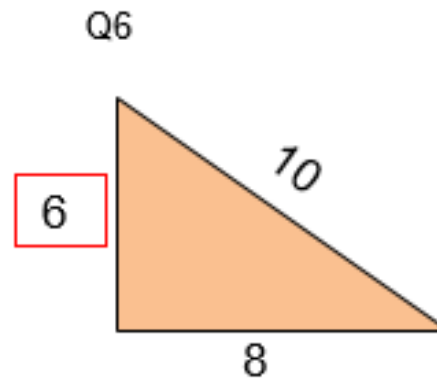
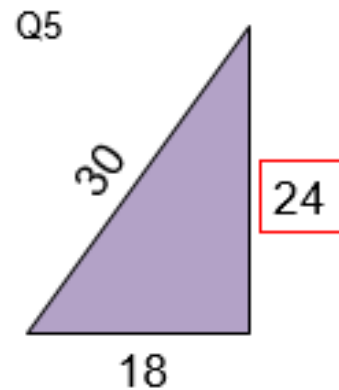
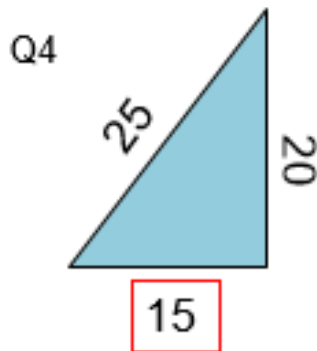
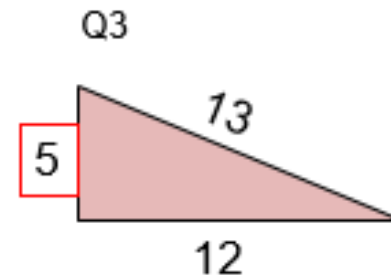
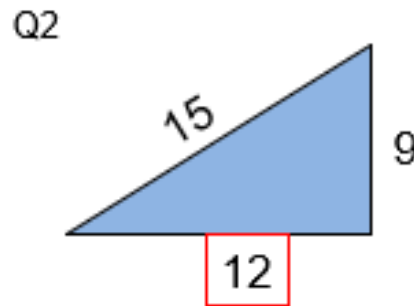
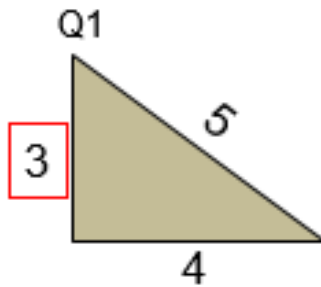
- $30^2 = X^2 + 18^2$
- $30^2 - 18^2 = X^2$
- $900 - 324 = X^2$
- $576 = X^2$
- $\sqrt{576} = 24$

Solution Q6

- $10^2 = X^2 + 8^2$
- $10^2 - 8^2 = X^2$
- $100 - 64 = X^2$
- $36 = X^2$
- $\sqrt{36} = 6$

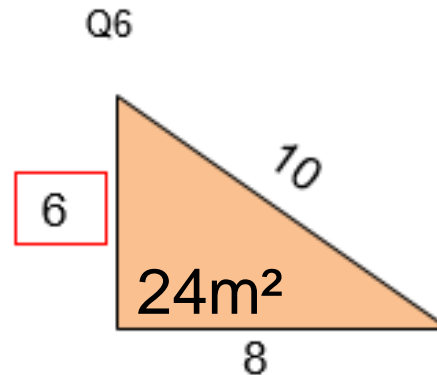
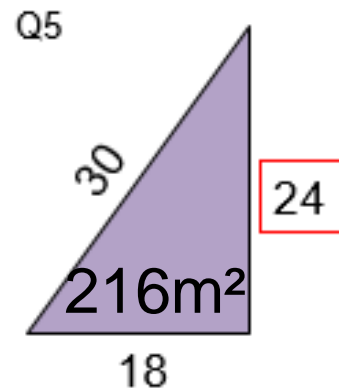
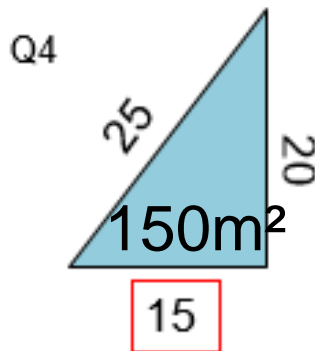
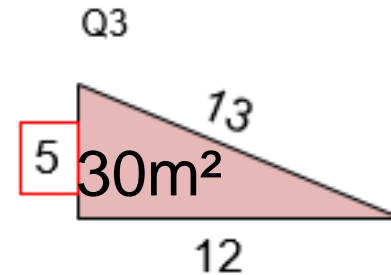
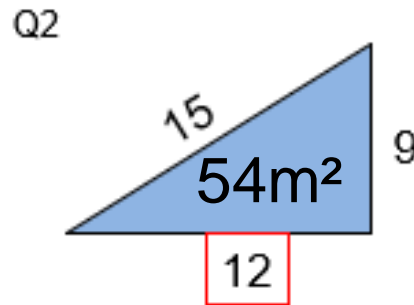
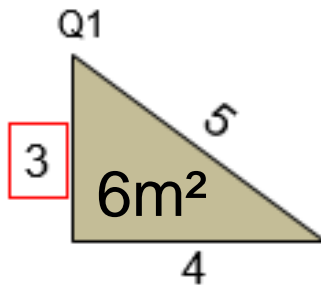
Area of Triangles

- Find the area of each triangle.



Area of Triangles

- The area of each triangle.



Area of Triangle

$\frac{1}{2}$ base x perp. Height = area

Solutions

- Q 1 $\frac{1}{2} (4) \times 3 =$ or $(4/2) \times 3 = 2 \times 3 = 6\text{m}^2$
- Q 2 $\frac{1}{2} (9) \times 12 =$ or $(9/2) \times 12 = 4.5 \times 12 = 54\text{m}^2$
- Q 3 $\frac{1}{2} (5) \times 12 =$ or $(5/2) \times 12 = 2.5 \times 12 = 30\text{m}^2$
- Q 4 $\frac{1}{2} (20) \times 15 =$ or $(20/2) \times 15 = 10 \times 15 = 150\text{m}^2$
- Q 5 $\frac{1}{2} (18) \times 30 =$ or $(18/2) \times 30 = 9 \times 30 = 270\text{m}^2$
- Q 6 $\frac{1}{2} (6) \times 8 =$ or $(6/2) \times 10 = 3 \times 8 = 24\text{m}^2$