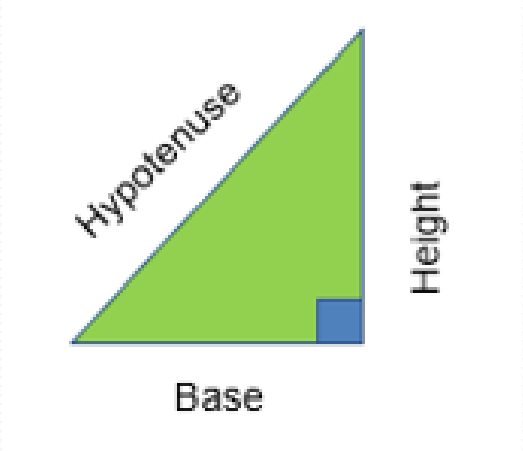
Wood Manufacturing & Finishing Pythagoras's Theorem

Phase 4

Lecturer Jennifer Byrne

Pythagoras's Theorem

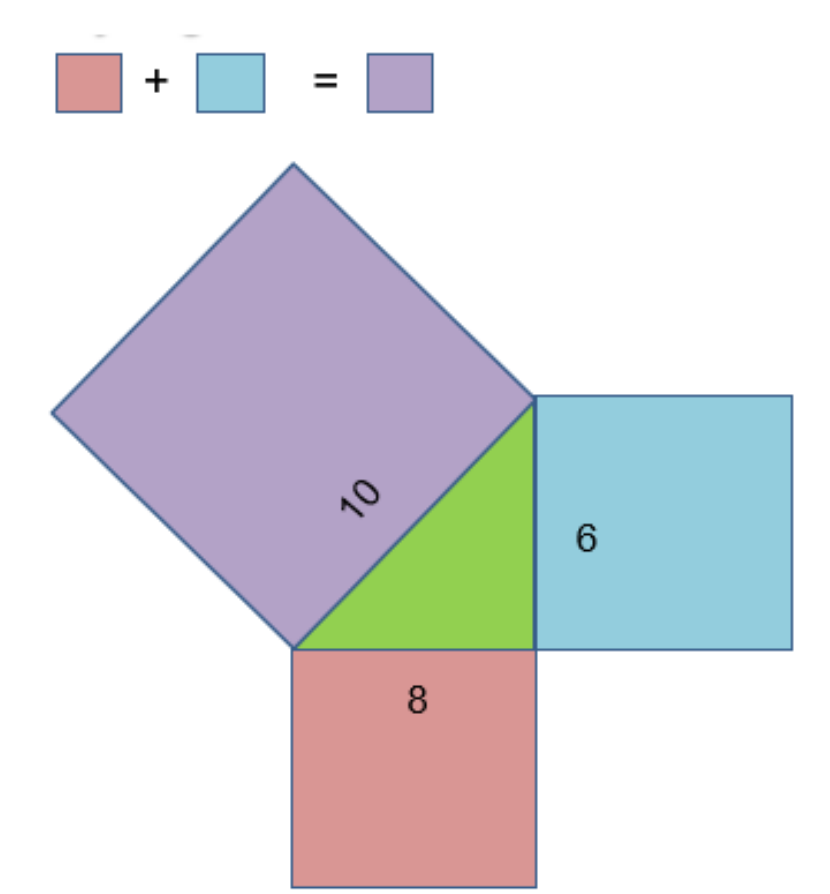
- **Pythagoras' Theorem:** The Square on the Hypotenuse is equal to the sum of the squares on the other two sides.



- 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.

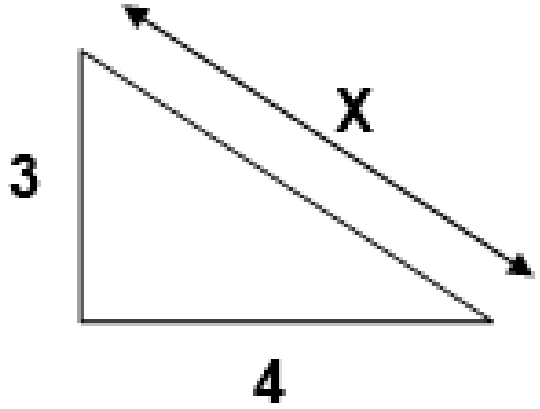
Pythagoras's Theorem

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



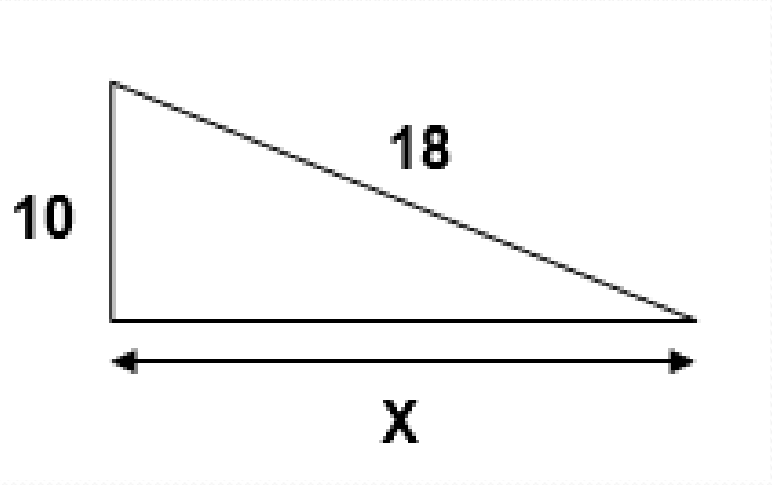
Pythagoras's Theorem

- **Example 1**
- **Formula:** $a^2 + b^2 = c^2$
- $3^2 + 4^2 = x^2$
- $9 + 16 = x^2$
- $25 = x^2$
- $\sqrt{25} = x$
- $5 = x$



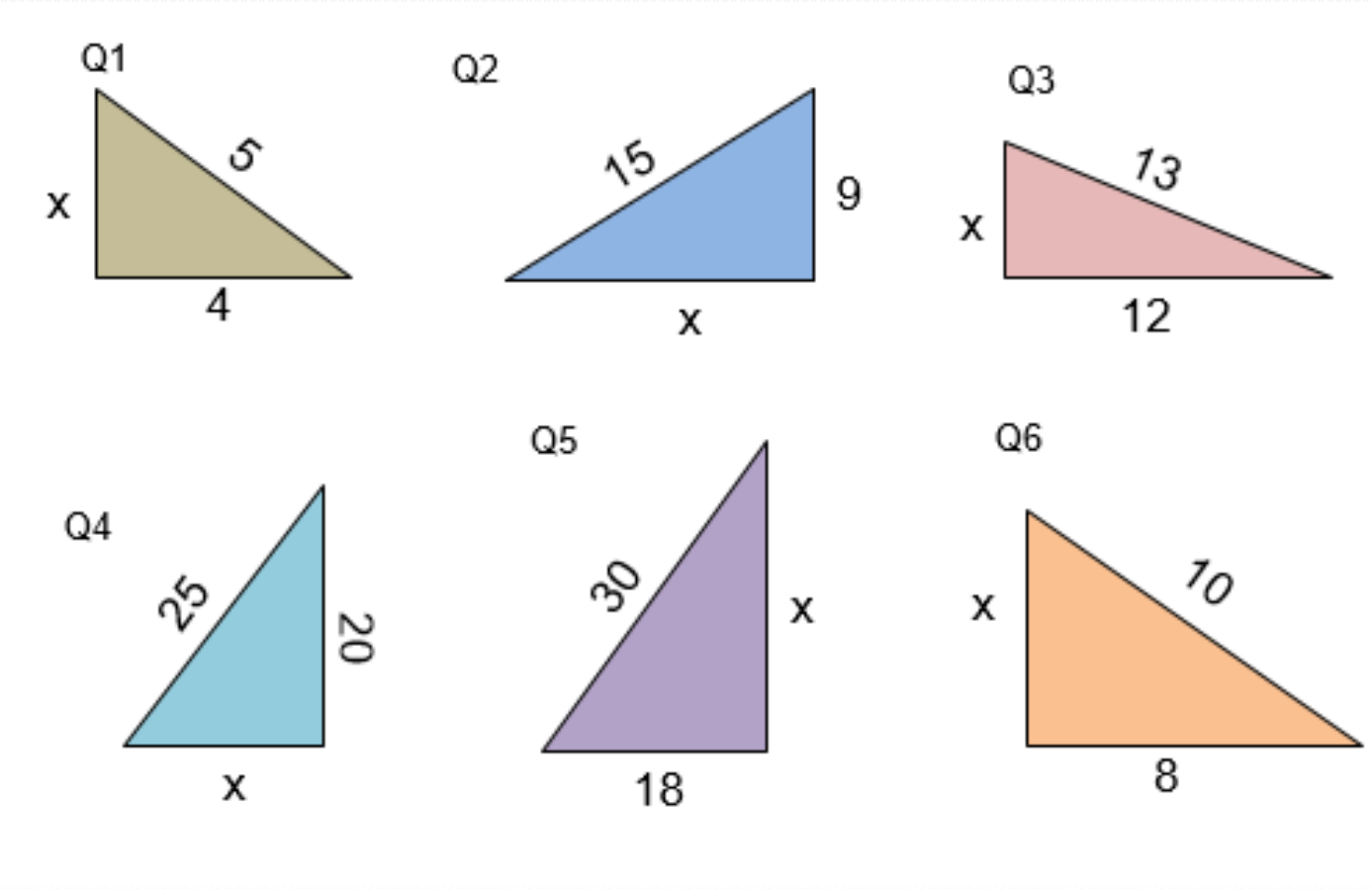
Pythagoras's Theorem

- **Example 2**
- **Formula:** $a^2 + b^2 = c^2$
- $10^2 + x^2 = 18^2$
- $100 + x^2 = 324$
- $x^2 = 324 - 100$
- $x^2 = 224$
- $x = \sqrt{224}$
- $x = 14.96662$
- $x = 14.967$



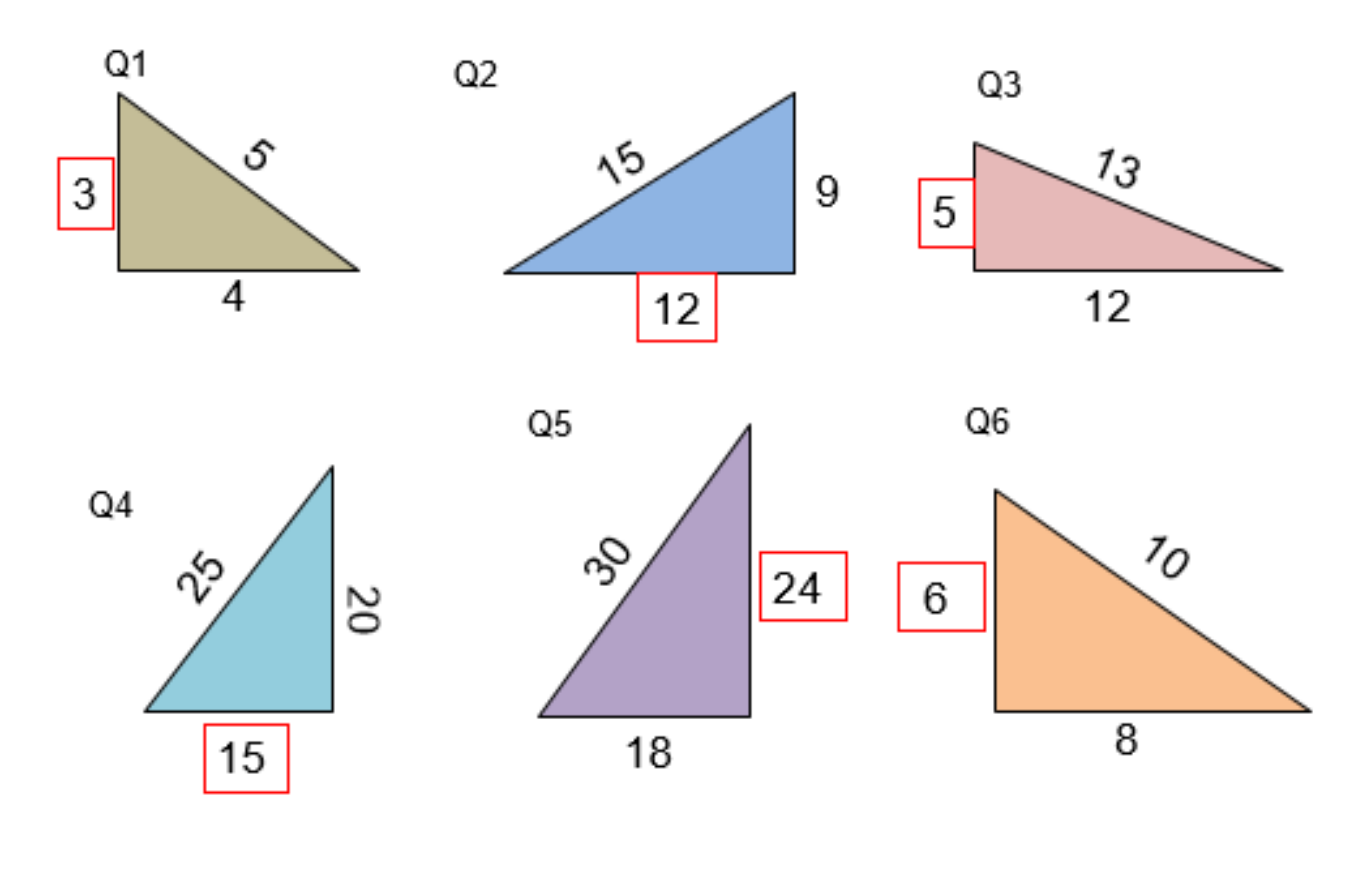
Pythagoras's Theorem

- **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

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

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

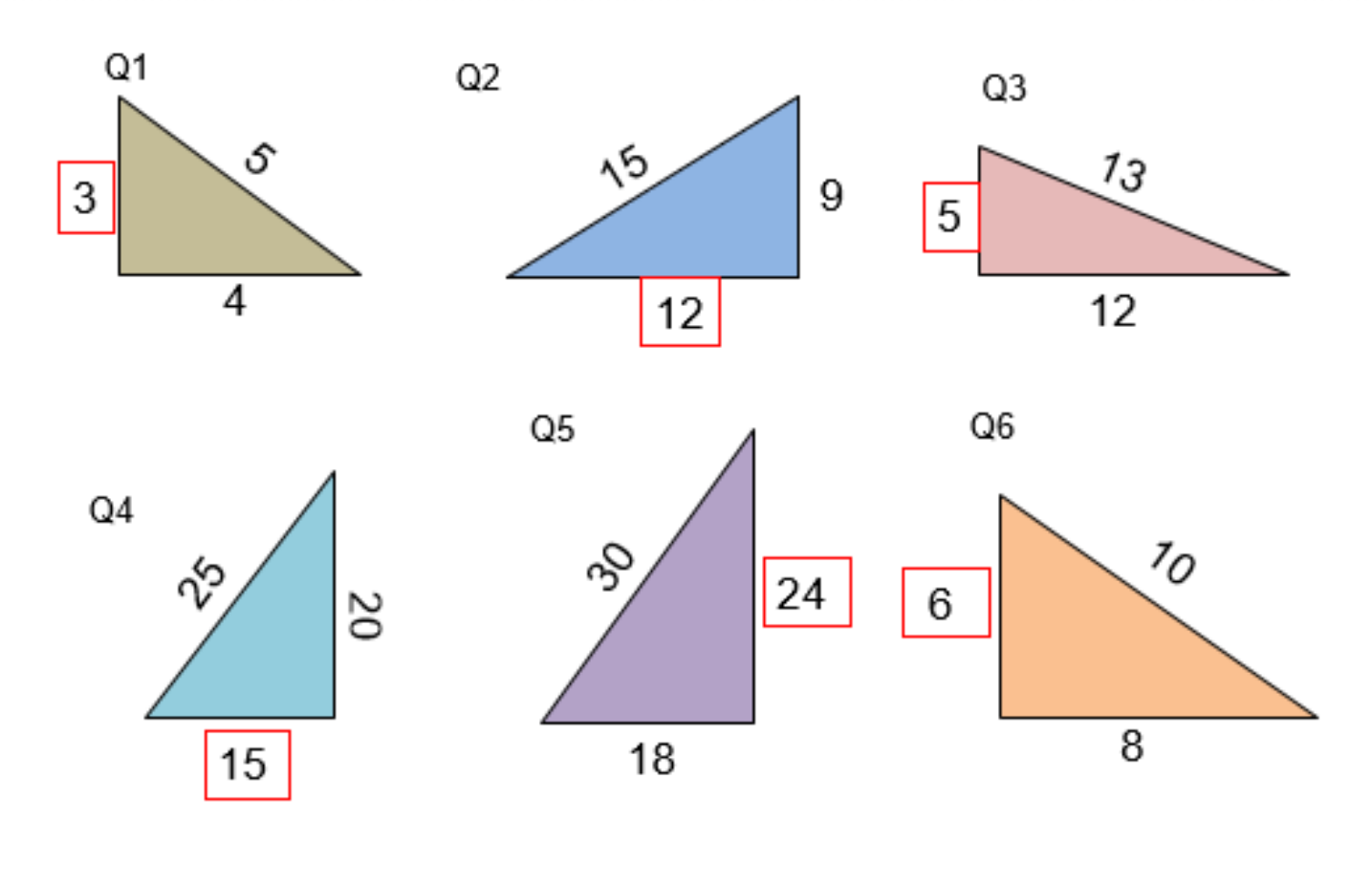
- $30^2 = X^2 + 18^2$
- $30^2 - 18^2 = X^2$
- $900 - 324 = X^2$
- $576 = X^2$
- $\sqrt{576} = 24$

Solution Q6

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

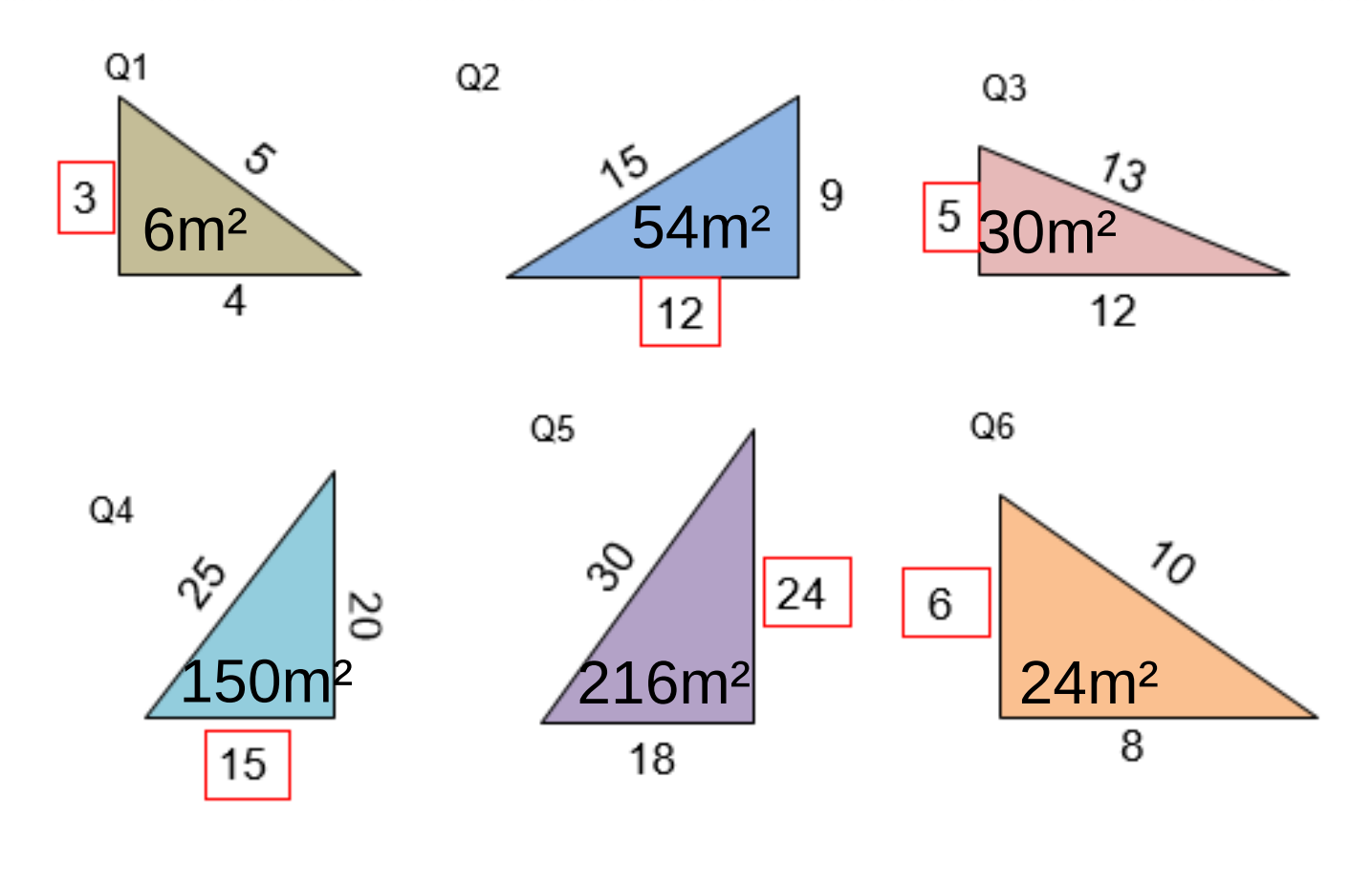
Area of Triangles

- **Find the area of each triangle.**



Area of Triangles

- **The area of each triangle.**



Area of Triangle

½ base x perp. Height = area

Solutions

- Q 1 ½ (4) x 3 = or (4/2) x 3 = 2 x 3 = 6m²
- Q 2 ½ (9) x 12 = or (9/2) x 12 = 4.5 x 12 = 54m²
- Q 3 ½ (5) x 12 = or (5/2) x 12 = 2.5 x 12 = 30m²
- Q 4 ½ (20) x 15 = or (20/2) x 15 = 10 x 15 = 150m²
- Q 5 ½ (18) x 30 = or (18/2) x 30 = 9 x 30 = 270m²
- Q 6 ½ (6) x 8 = or (6/2) x 10 = 3 x 8 = 24m²