Merit Tutoring

WORKSHEET 31

Year 6 Mathematics: Measurement

Area (Hectares & Triangles)

Focus: Large Areas (Square Metres & Hectares)

Name: _____ **Date:** _____

Understanding Hectares

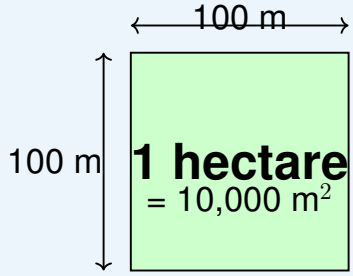
What is a Hectare?

A **hectare (ha)** is a unit of area used for measuring large land areas like farms, parks, and sports fields.

Key Conversion:

$$1 \text{ hectare (ha)} = 10,000 \text{ m}^2$$

Visual: A Square Hectare



Area of a Rectangle:

$$\text{Area} = \text{Length} \times \text{Width}$$

Example: A field is 200m long and 50m wide.

$$\text{Area} = 200 \times 50 = 10,000 \text{ m}^2 = 1 \text{ ha}$$

Converting:

- To convert ha to m^2: Multiply by 10,000
- To convert m^2 to ha: Divide by 10,000

Section 1: Conversions (Fluency)

1. 1 hectare (ha) = 10,000 m^2. How many m^2 in 2 ha?

Answer: _____

2. How many m^2 in 5 ha?

Answer: _____

3. A park is 30,000 m^2. How many hectares is that?
(Hint: Divide by 10,000)

Answer: _____

4. Convert 50,000 m^2 to hectares.

Answer: _____

5. Which is larger: 2 hectares or 15,000 m^2?
Show your working.

Answer: _____

6. Convert 0.5 ha to m^2.

Answer: _____

HECTARE HERO!

Farmer Fox

What's a farmer's favorite type of math?
Crop-ometry!

Section 2: Area of Rectangles (Reasoning)

7. Find the area of a field that is 200m long and 50m wide.
Use the formula: $A = L \times W$

Answer: _____

8. Is this field (200m $\times$ 50m) exactly 1 hectare? Explain your answer.

Answer: _____

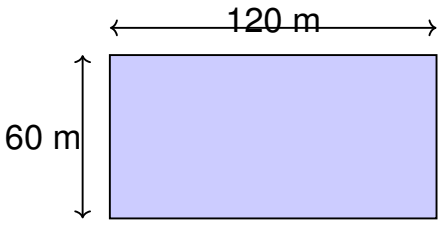
9. Calculate the area of a rectangular paddock that is 150m long and 80m wide.

Answer: _____

10. A rectangular farm is 300m by 400m. What is its area in:
(a) Square metres? _____
(b) Hectares? _____

Answers: _____

11. Look at this diagram:



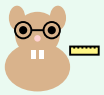
Calculate the area of this field in m^2.

Answer: _____

12. A square paddock has sides of 200m. What is its area in hectares?

Answer: _____

RECTANGLE RULER!



Geometry Gopher

Why did the rectangle go to the gym?
To work on its four corners!

Section 3: Word Problems (Challenge)

13. A farmer has a square paddock with sides of 100m. What is the area in hectares?

Answer: _____

14. A playground is 0.5 ha. How many square metres is this?

Answer: _____

15. A school oval is 180m long and 110m wide.
(a) What is the area in m^2? _____
(b) Is this more or less than 2 hectares? _____

Answers: _____

16. Three fields have areas of 1.5 ha, 2 ha, and 0.8 ha. What is the total area?

Answer: _____

17. A rectangular park is 250m by 160m. A square playground inside it has sides of 40m.
(a) Area of park: _____
(b) Area of playground: _____
(c) Area of remaining park: _____

Answers: _____

AREA ACE!

Land Surveyor

Why don't you do math with farmers?

Because they're always counting their chickens before they hatch!

Fantastic Work! Check your answers on the next page.

ANSWER KEY

Worksheet 31: Large Areas (Square Metres & Hectares)

Section 1: Conversions

1. 20,000 m^2 (2 $\times$ 10,000 = 20,000)
2. 50,000 m^2 (5 $\times$ 10,000 = 50,000)
3. 3 ha (30,000 $\div$ 10,000 = 3)
4. 5 ha (50,000 $\div$ 10,000 = 5)
5. 2 hectares is larger (2 ha = 20,000 m^2, which is greater than 15,000 m^2)
6. 5,000 m^2 (0.5 $\times$ 10,000 = 5,000)

Section 2: Area of Rectangles

7. 10,000 m^2 (200 $\times$ 50 = 10,000)
8. Yes, exactly 1 hectare (10,000 m^2 = 1 ha)
9. 12,000 m^2 (150 $\times$ 80 = 12,000)
10. (a) 120,000 m^2 (300 $\times$ 400 = 120,000); (b) 12 ha (120,000 $\div$ 10,000 = 12)
11. 7,200 m^2 (120 $\times$ 60 = 7,200)
12. 4 ha (200 $\times$ 200 = 40,000 m^2; 40,000 $\div$ 10,000 = 4 ha)

Section 3: Word Problems

13. 1 ha (100 $\times$ 100 = 10,000 m^2 = 1 ha)
14. 5,000 m^2 (0.5 $\times$ 10,000 = 5,000)
15. (a) 19,800 m^2 (180 $\times$ 110 = 19,800); (b) Less than 2 ha (2 ha = 20,000 m^2)
16. 4.3 ha (1.5 + 2 + 0.8 = 4.3)
17. (a) 40,000 m^2 (250 $\times$ 160 = 40,000); (b) 1,600 m^2 (40 $\times$ 40 = 1,600); (c) 38,400 m^2 (40,000 - 1,600 = 38,400)

Merit Tutoring

WORKSHEET 32

Year 6 Mathematics: Measurement

Area (Hectares & Triangles)

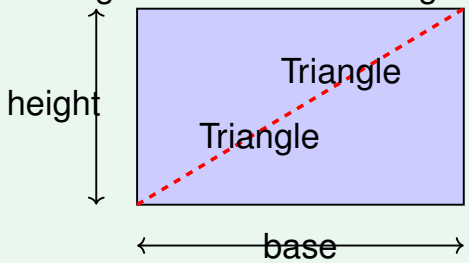
Focus: Area of Triangles

Name: _____ **Date:** _____

Understanding Triangle Area

Deriving the Triangle Formula:

A triangle is **half** of a rectangle!

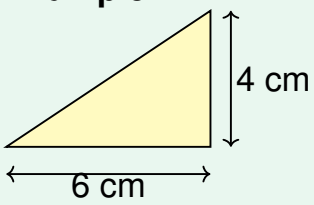


Area of Rectangle: $A = \text{base} \times \text{height}$

Area of Triangle: $A = \frac{1}{2} \times \text{base} \times \text{height}$

Or: $A = \frac{b \times h}{2}$

Example:

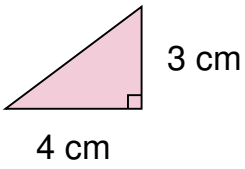


$$A = \frac{1}{2} \times 6 \times 4 = \frac{24}{2} = 12 \text{ cm}^2$$

Key Point: The height must be **perpendicular** (at right angles) to the base!

Section 1: Right-Angled Triangles (Fluency)

1. Calculate the area of a right-angled triangle with base 4 cm and height 3 cm.
Use the formula: $A = \frac{1}{2} \times \text{base} \times \text{height}$

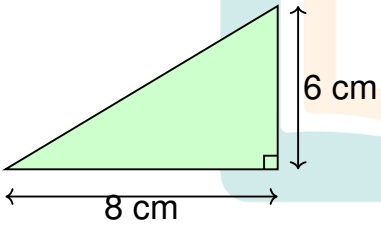


Answer: _____

2. Calculate the area of a triangle with base 10 m and height 5 m.

Answer: _____

3. Calculate the area of this triangle:



Answer: _____

4. A triangle has a base of 12 m and height of 7 m. Find its area.

Answer: _____

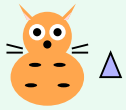
5. Calculate the area of a triangle with base 9 cm and height 4 cm.

Answer: _____

6. Which has a larger area: a triangle with base 10 cm and height 8 cm, or a triangle with base 12 cm and height 6 cm?
Show your working.

Answer: _____

TRIANGLE CHAMPION!

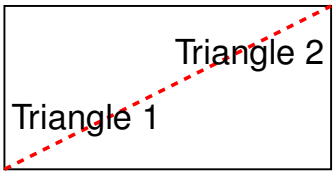


Triangle Tiger

What do you call a triangle with two sides the same?
I-saw-sceles! (Isosceles)

Section 2: Understanding The Formula (Reasoning)

7. Why is the area of a triangle half of a rectangle? Look at this diagram and explain.



These two triangles are equal!

Answer: _____

8. A triangle has an area of 10 cm^2. Its base is 4 cm. What is its height?

(Hint: Use the formula backwards! If $A = \frac{1}{2} \times b \times h$, then $h = \frac{2 \times A}{b}$)

Answer: _____

9. A triangle has an area of 24 m^2 and a base of 6 m. Find the height.

Answer: _____

10. A triangle has an area of 30 cm^2 and a height of 10 cm. Find the base.

Answer: _____

11. True or False: If you double the base of a triangle (keeping height the same), the area doubles.
Explain your reasoning.

Answer: _____

12. A rectangle is 8 cm by 5 cm. It is cut diagonally to make two triangles. What is the area of each triangle?

Answer: _____

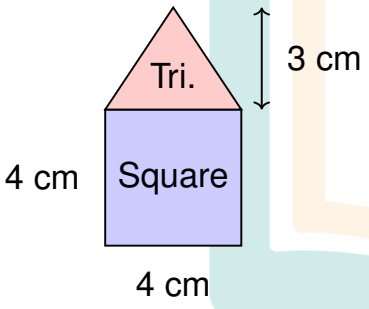
FORMULA MASTER!

Formula Wizard

What's a triangle's favorite instrument?
The triangle!

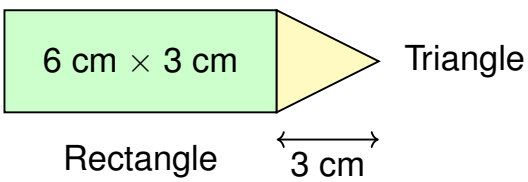
Section 3: Compound Shapes (Challenge)

13. Find the total area of this shape made of a square (side 4 cm) and a triangle on top (height 3 cm):



Answer: _____

14. Find the area of this shape:



(The triangle has base 3 cm and height 3 cm)

Answer: _____

15. A triangular sail has a base of 5 m and height of 8 m. What is its area?

Answer: _____

16. A rectangular flag is 60 cm by 40 cm. A triangular corner (base 20 cm, height 15 cm) is cut off. What is the remaining area?

Answer: _____

17. Challenge: This shape is made of a rectangle (8 m $\times$ 4 m) with two identical triangles (each with base 4 m and height 3 m) on opposite sides. Calculate the total area.

Answer: _____

AREA EXPERT!

Area Champion

What shape is usually waiting for you at school?
A line! (But we prefer triangles!)

Outstanding Work! Check your answers on the next page.

ANSWER KEY

Worksheet 32: Area of Triangles

Section 1: Right-Angled Triangles

1. 6 cm^2 ($\frac{1}{2} \times 4 \times 3 = \frac{12}{2} = 6$)

2. 25 m^2 ($\frac{1}{2} \times 10 \times 5 = \frac{50}{2} = 25$)

3. 24 cm^2 ($\frac{1}{2} \times 8 \times 6 = \frac{48}{2} = 24$)

4. 42 m^2 ($\frac{1}{2} \times 12 \times 7 = \frac{84}{2} = 42$)

5. 18 cm^2 ($\frac{1}{2} \times 9 \times 4 = \frac{36}{2} = 18$)

6. They are equal! First: $\frac{1}{2} \times 10 \times 8 = 40$ cm^2; Second: $\frac{1}{2} \times 12 \times 6 = 36$ cm^2. Actually, the first is larger (40 cm^2 ¿ 36 cm^2).

Section 2: Understanding The Formula

7. The diagonal cuts the rectangle into two equal triangles, so each triangle is half the area of the rectangle.

8. 5 cm (If $A = 10$ and $b = 4$, then $h = \frac{2 \times 10}{4} = \frac{20}{4} = 5$)

9. 8 m ($h = \frac{2 \times 24}{6} = \frac{48}{6} = 8$)

10. 6 cm ($b = \frac{2 \times 30}{10} = \frac{60}{10} = 6$)

11. True. If you double the base, the area doubles (area is directly proportional to base when height is constant).

12. 20 cm^2 each (Rectangle area = $8 \times 5 = 40$ cm^2; Each triangle = $40 \div 2 = 20$ cm^2)

Section 3: Compound Shapes

13. 22 cm^2 (Square: $4 \times 4 = 16$ cm^2; Triangle: $\frac{1}{2} \times 4 \times 3 = 6$ cm^2; Total: $16 + 6 = 22$)

14. 22.5 cm^2 (Rectangle: $6 \times 3 = 18$ cm^2; Triangle: $\frac{1}{2} \times 3 \times 3 = 4.5$ cm^2; Total: $18 + 4.5 = 22.5$)

15. 20 m^2 ($\frac{1}{2} \times 5 \times 8 = \frac{40}{2} = 20$)

16. 2,250 cm^2 (Flag: $60 \times 40 = 2,400$ cm^2; Triangle cut: $\frac{1}{2} \times 20 \times 15 = 150$ cm^2; Remaining: $2,400 - 150 = 2,250$)

17. 44 m^2 (Rectangle: $8 \times 4 = 32$ m^2; Each triangle: $\frac{1}{2} \times 4 \times 3 = 6$ m^2; Total: $32 + 6 + 6 = 44$)

Exceptional Achievement!

You've mastered Area (Hectares & Triangles)! From measuring land to calculating triangle areas - brilliant work!