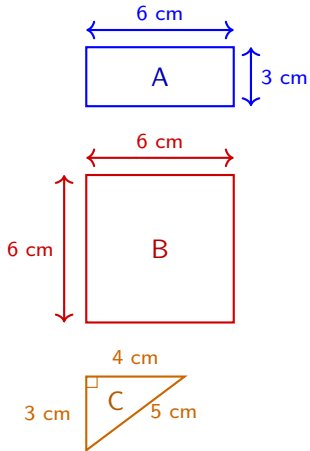


Areas, Perimeters & Averages: Worked Solutions

Contents

- ▶ **Starter 1: Shapes A, B and C**
 - ▶ Questions and Short Answers
 - ▶ First Worked Solution
- ▶ **Starter 2: Shapes D, E and F**
 - ▶ Questions and Short Answers
 - ▶ First Worked Solution

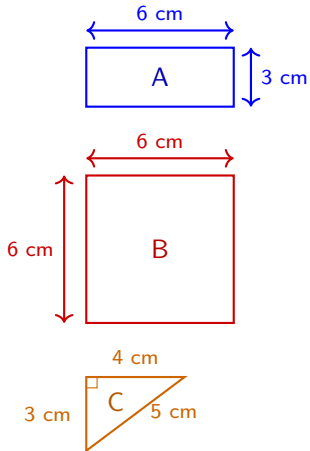
Starter 1: Questions and Short Answers



1. $6 \times 3 = ?$
2. $\frac{3}{24} + \frac{5}{24} = ?$
3. $\frac{1}{2} \times 4 \times 3 = ?$
4. $-3 \times -2 = ?$

5. Find the mean of 8, 14, 20.
6. What fraction of 60 is 6? Simplify fully.
7. Find the **area** of each shape A, B and C. _____, _____, _____.
8. Find the **perimeter** of each shape A, B and C. _____, _____, _____.
9. Find the **mean area** of the three shapes. ____.
10. Find the **mean perimeter** of the three shapes. ____.
11. What fraction of the total area does shape C make up? _____.

Starter 1: Questions and Short Answers



1. $6 \times 3 = 18$

2. $\frac{3}{24} + \frac{5}{24} = \frac{1}{3}$

3. $\frac{1}{2} \times 4 \times 3 = 6$

4. $-3 \times -2 = 6$

5. Find the mean of 8, 14, 20. **14**

6. What fraction of 60 is 6? Simplify fully. **$\frac{1}{10}$**

7. Find the **area** of each shape A, B and C. **$A = 18$, $B = 36$, $C = 6$.**

8. Find the **perimeter** of each shape A, B and C. **$A = 18$, $B = 24$, $C = 12$.**

9. Find the **mean area** of the three shapes. **20.**

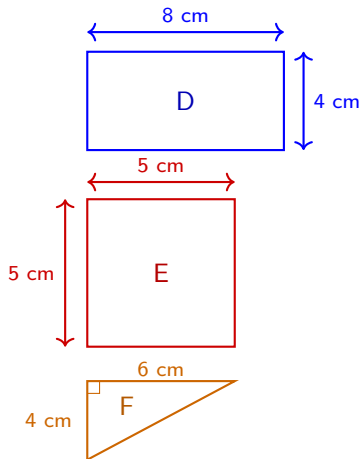
10. Find the **mean perimeter** of the three shapes. **18.**

11. What fraction of the total area does shape C make up? **$\frac{6}{60} = \frac{1}{10}$.**

Starter 2: Questions and Short Answers

1. $8 \times 4 = ?$ 2. $\frac{7}{20} + \frac{9}{20} = ?$

3. $\frac{1}{2} \times 6 \times 4 = ?$ 4. $-5 \times 4 = ?$



5. Find the mean of 6, 12, 18.

6. What fraction of 80 is 12? Simplify fully.

7. Find the **area** of each shape D, E and F. _____, _____, _____.

8. Find the **perimeter** of each shape D, E and F. _____, _____, _____.

9. Find the **mean area** of the three shapes. ____.

10. Find the **mean perimeter** of the three shapes. _____.

11. What fraction of the total area does shape F make up?

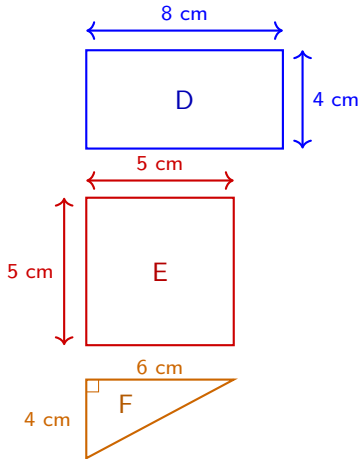
Starter 2: Questions and Short Answers

1. $8 \times 4 = 32$

2. $\frac{7}{20} + \frac{9}{20} = \frac{4}{5}$

3. $\frac{1}{2} \times 6 \times 4 = 12$

4. $-5 \times 4 = -20$



5. Find the mean of 6, 12, 18. **12**

6. What fraction of 80 is 12? Simplify fully. **$\frac{3}{20}$**

7. Find the **area** of each shape D, E and F. **$D = 32$, $E = 25$, $F = 12$.**

8. Find the **perimeter** of each shape D, E and F. **$D = 24$, $E = 20$, $F = 10 + 2\sqrt{13}$.**

9. Find the **mean area** of the three shapes. **23.**

10. Find the **mean perimeter** of the three shapes. **$\frac{54+2\sqrt{13}}{3}$.**

11. What fraction of the total area does shape E make up? **$\frac{12}{12+25+12} = \frac{4}{49}$**

Starter 1 – Q1: Multiplication

6×3 means 6 groups of 3.

$$6 \times 3 = 18$$

Final answer: 18.

Starter 1 – Q2: Adding Fractions

The denominators are already the same, so add the numerators:

$$\frac{3}{24} + \frac{5}{24} = \frac{3+5}{24} = \frac{8}{24}$$

Simplify by dividing the numerator and denominator by 8:

$$\frac{8}{24} = \frac{1}{3}$$

Final answer: $\boxed{\frac{1}{3}}$.

Starter 1 – Q3: Triangle Area

Use the triangle area formula:

$$A = \frac{1}{2} \times \text{base} \times \text{height}$$

Here the base is 4 and the height is 3:

$$\frac{1}{2} \times 4 \times 3 = 2 \times 3 = 6$$

Final answer: 6.

Starter 1 – Q4: Negative Multiplication

Multiplying two negative numbers gives a positive product:

$$-3 \times -2 = 6$$

Final answer: 6.

Starter 1 – Q5: Mean

Mean is the sum of the values divided by how many values there are:

$$\frac{8 + 14 + 20}{3} = \frac{42}{3} = 14$$

Final answer: 14.

Starter 1 – Q6: Fraction of 60

The required fraction is

$$\frac{6}{60}$$

Simplify by dividing numerator and denominator by 6:

$$\frac{6}{60} = \frac{1}{10}$$

Final answer: $\boxed{\frac{1}{10}}$.

Starter 1 – Q7: Areas of A, B and C

Shape A is a $6 \text{ cm} \times 3 \text{ cm}$ rectangle:

$$A = 6 \times 3 = 18 \text{ cm}^2$$

Shape B is a $6 \text{ cm} \times 6 \text{ cm}$ square:

$$B = 6 \times 6 = 36 \text{ cm}^2$$

Shape C is a right-angled triangle with legs 4 cm and 3 cm :

$$C = \frac{1}{2} \times 4 \times 3 = 6 \text{ cm}^2$$

Final answers: $A = 18 \text{ cm}^2$, $B = 36 \text{ cm}^2$, $C = 6 \text{ cm}^2$.

Starter 1 – Q8: Perimeters of A, B and C

Shape A rectangle:

$$A = 2(6 + 3) = 2 \times 9 = 18 \text{ cm}$$

Shape B square:

$$B = 4 \times 6 = 24 \text{ cm}$$

Shape C right-angled triangle, with hypotenuse 5 cm:

$$C = 3 + 4 + 5 = 12 \text{ cm}$$

Final answers: $A = 18 \text{ cm}, B = 24 \text{ cm}, C = 12 \text{ cm}$.

Starter 1 – Q9: Mean Area

The areas of the three shapes are 18, 36 and 6.

$$\text{Mean area} = \frac{18 + 36 + 6}{3} = \frac{60}{3} = 20 \text{ cm}^2$$

Final answer: 20 cm².

Starter 1 – Q10: Mean Perimeter

The perimeters of the three shapes are 18, 24 and 12.

$$\text{Mean perimeter} = \frac{18 + 24 + 12}{3} = \frac{54}{3} = 18 \text{ cm}$$

Final answer: 18 cm.

Starter 1 – Q11: Fraction of Total Area

Total area:

$$18 + 36 + 6 = 60$$

Shape C has area 6, so the fraction is:

$$\frac{6}{60} = \frac{1}{10}$$

Final answer: $\boxed{\frac{1}{10}}$.

Starter 2 – Q1: Multiplication

$$8 \times 4 = 32$$

Final answer: 32.

Starter 2 – Q2: Adding Fractions

The denominators are the same, so add the numerators:

$$\frac{7}{20} + \frac{9}{20} = \frac{7+9}{20} = \frac{16}{20}$$

Simplify by dividing numerator and denominator by 4:

$$\frac{16}{20} = \frac{4}{5}$$

Final answer: $\boxed{\frac{4}{5}}$.

Starter 2 – Q3: Triangle Area

Use the triangle area formula:

$$A = \frac{1}{2} \times \text{base} \times \text{height}$$

Here the base is 6 and the height is 4:

$$\frac{1}{2} \times 6 \times 4 = 3 \times 4 = 12$$

Final answer: 12.

Starter 2 – Q4: Negative Multiplication

A negative number multiplied by a positive number gives a negative product:

$$-5 \times 4 = -20$$

Final answer: -20.

Starter 2 – Q5: Mean

$$\frac{6 + 12 + 18}{3} = \frac{36}{3} = 12$$

Final answer: 12.

Starter 2 – Q6: Fraction of 80

The required fraction is

$$\frac{12}{80}$$

Simplify by dividing numerator and denominator by 4:

$$\frac{12}{80} = \frac{3}{20}$$

Final answer: $\boxed{\frac{3}{20}}$.

Starter 2 – Q7: Areas of D, E and F

Shape D is an $8\text{ cm} \times 4\text{ cm}$ rectangle:

$$D = 8 \times 4 = 32\text{ cm}^2$$

Shape E is a $5\text{ cm} \times 5\text{ cm}$ square:

$$E = 5 \times 5 = 25\text{ cm}^2$$

Shape F is a right-angled triangle with legs 6 cm and 4 cm :

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

Final answers: $D = 32\text{ cm}^2$, $E = 25\text{ cm}^2$, $F = 12\text{ cm}^2$.

Starter 2 – Q8: Perimeters of D, E and F

Shape D rectangle:

$$D = 2(8 + 4) = 2 \times 12 = 24 \text{ cm}$$

Shape E square:

$$E = 4 \times 5 = 20 \text{ cm}$$

Shape F right-angled triangle. First find the hypotenuse using Pythagoras:

$$\text{hypotenuse} = \sqrt{6^2 + 4^2} = \sqrt{36 + 16} = \sqrt{52} = 2\sqrt{13}$$

So the perimeter is:

$$F = 6 + 4 + 2\sqrt{13} = 10 + 2\sqrt{13} \text{ cm}$$

Final answers: $D = 24 \text{ cm}, E = 20 \text{ cm}, F = 10 + 2\sqrt{13} \text{ cm}.$

Starter 2 – Q9: Mean Area

The areas of the three shapes are 32, 25 and 12.

$$\text{Mean area} = \frac{32 + 25 + 12}{3} = \frac{69}{3} = 23 \text{ cm}^2$$

Final answer: 23 cm².

Starter 2 – Q10: Mean Perimeter

The perimeters of the three shapes are 24, 20 and $10 + 2\sqrt{13}$.

$$\text{Mean perimeter} = \frac{24 + 20 + 10 + 2\sqrt{13}}{3} = \frac{54 + 2\sqrt{13}}{3}$$

Final answer: $\boxed{\frac{54 + 2\sqrt{13}}{3}}.$

Starter 2 – Q11: Fraction of Total Area

Total area:

$$32 + 25 + 12 = 69$$

Shape F has area 12, so the fraction is:

$$\frac{12}{69}$$

Simplify by dividing numerator and denominator by 3:

$$\frac{12}{69} = \frac{4}{23}$$

Final answer: $\boxed{\frac{4}{23}}$.