# Forming and Solving Equations

## Section A

For each question:

1. Form an equation to represent the situation.
2. Solve your equation to find the value of the variable.

1. Perimeter of triangle is 29

x x

7

1. 2p + 1 Perimeter of the rectangle is 32

4

3. Perimeter of triangle is 33

8 2d + 1

d

1. 2q – 1 **Area** of the rectangle is 20

3

5. Each side of the square is 2g – 1

Perimeter = 22

## Section B



1. The perimeter of this triangle is 23.
   1. Form an equation.
   2. Work out the value of x
   3. Find the length of each side.
2. These two rectangles have the same area.
   1. Find an expression for the area of each rectangle.
   2. Form an equation by equating your two expressions.
   3. Find the area of each rectangle.
3. Use angle rules to form an equation, then solve it, for each shape.

D+70

2D

D

D–30

A

A+40

A+20

1. Two rectangular lawns, shown, are made so that each has the same sized perimeter. Find the area of each rectangle.

a + 6

a

3a

2a

1. The formula  can be used to convert temperatures from degrees Celsius (C) to degrees Fahrenheit (F). What is the temperature in Celsius when it is 86o Fahrenheit?
2. Use angle rules to form an equation and solve it for each shape

3*b* - 20°

2*b* + 10°

3*a*

2*a* + 55°

1. A pentagon has five sides. The second side is equal in length to the first side, and the other three sides are all 5cm longer than the first side. The perimeter of the pentagon is 30cm. Find the length of all the sides of the pentagon.

## Section C

1 Pauline chooses a 2x3 rectangle of dates from the calendar below:



She adds up all six numbers in the rectangle.

Let’s call the number in the top left of her rectangle *P*.

a Copy and complete this table with expressions for all six numbers in her rectangle:

*P*

*P* + 1

b Find an expression for the total of her six numbers

c Pauline’s tells you that the total of her numbers is 93. Write down a balance problem involving *P* and use it to find the number in the top left of her rectangle.

2 A rectangle has a width of *M* cm. The length is 1 cm longer than the width.

a Write an expression for the distance around the perimeter.

b The perimeter of the rectangle is in fact 6cm.

Write down a balance problems involving *M* and solve it.

3 A student buys 5 fountain pens for *F* pence each.

The next day he returns to the shop and finds that the pens have increased in price by 4 pence each. He buys 3 fountain pens at this new price.

a Write down an expression for the total cost of the 8 fountain pens.

b Simplify your expression as far as possible.

c The student spent £5.72 in total on the fountain pens.

Write down a balance problem involving *F* and solve it.

5 The area of a circle is found from the radius of that circle using the formula

area = 

The area of a circle is 60cm2. Let’s call the radius of this circle *R*.

a Write down a balance problem involving *R*.

b Solve the equation.

6 Ian is 3 times as old as his son Joshua. Joshua is *J* years old.

In 10 years time Ian will be twice as old as Joshua.

a Explain why 

b How old are Ian and Joshua now?

7 Albert’s age next year will be twice his age last year. If *K* is the Albert’s age *this* year,

a write down an expression for Albert’s age next year

b write down an expression for twice Albert’s age last year

c write down a balance problem involving *K* and use it to determine Albert’s age.

8 Ian is 3 times as old as his son Joshua. Joshua is r years old. In 10 years time Ian will be twice as old as Joshua. How old are Ian and Joshua now?

# Forming and Solving Equations - Homework

1. Two rectangular lawns, shown, are made so that each has the same sized perimeter. The first has dimensions 2*a* metres by 3*a* metres. The second has dimensions *a* metre by (*a* + 6) metres.
   1. Use this information to form an equation
   2. Solve the equation, and hence find the perimeter of each lawn.
   3. State the dimensions of each lawn.

3a

2a

a + 6

a

Write down a balance problem resulting from each picture, and hence find *A*, *B*, *C*.

A +15°

3A – 35°

B

4B – 70°

3B – 20°

2B + 30°

2 A rectangle is shown below.

*T* + 8 cm

*T* cm

a How much longer is this rectangle than it is wide?

The perimeter of the rectangle is 36cm.

b Faced with this problem, a pupil correctly writes down



Explain where this balance problem comes from.

c Solve the balance problem above.

d What is the area of the rectangle?

3 In another rectangle, the length is 12cm longer than the width.

a If the width is *W* cm, write down an **algebraic expression** for the length.

b Draw a picture of a rectangle, labelling the width *W* cm and the length using your answer to part a.

The perimeter of the rectangle is 52cm.

c Write down a balance problem involving *W*, solve it, and hence find the area of the rectangle.

5 A heptagon has seven sides. The first, second and third sides have equal lengths. The remaining sides are all 8cm **shorter** than the first side.

*H* is the length of the first side, and the perimeter of the heptagon is 45cm.

a Write down a balance problem for *H*.

b Find the length of each of the sides of the heptagon.

6 Use an equation to find each of a and b

*b*

4*b*

6*b*

165° - *a*

*a* - 15°

2*a* - 20°

7 \*A rectangle has a width of g cm. The length is 2 cm longer than the width.

* 1. Write an expression for length of the rectangle
  2. Write an expression the distance around the perimeter,
  3. If the perimeter is 17cm, use an equation to find the length and width of the rectangle.