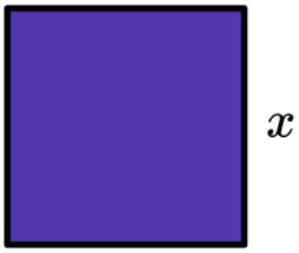
Forming and Solving Equations - Worksheet

Skill

Group A - Squares

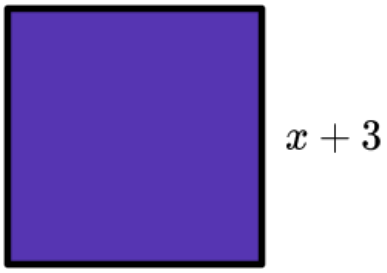
Form an equation for the perimeter in terms of x. Solve the equation and find x:

1) Perimeter is 20

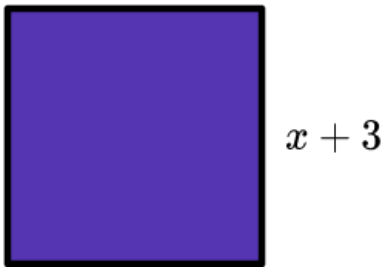


2) Perimeter is 26

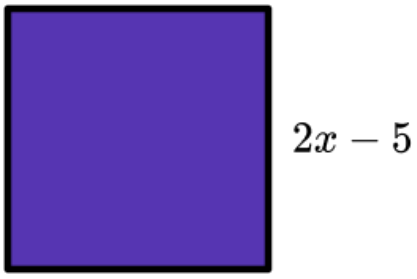
3) Perimeter is 52



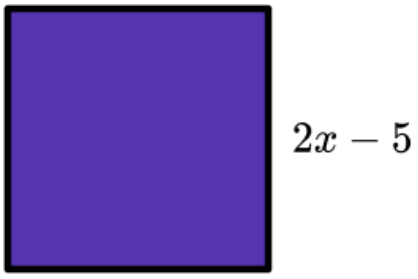
4) Perimeter is 58



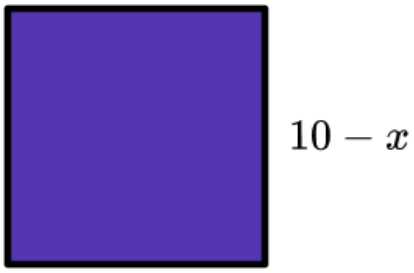
5) Perimeter is 48



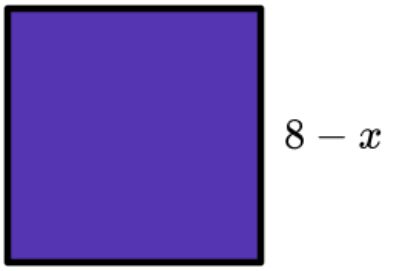
6) Perimeter is 64



7) Perimeter is 24



8) Perimeter is 24

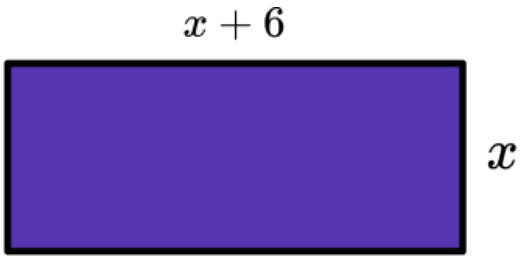


Forming and Solving Equations - Worksheet

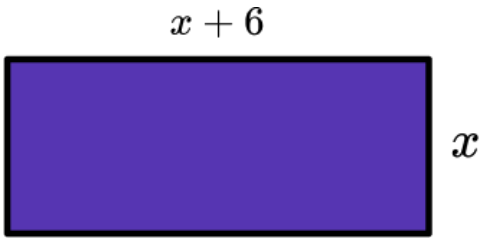
Group B - Rectangles

Form an equation for the perimeter in terms of x. Solve the equation and find x:

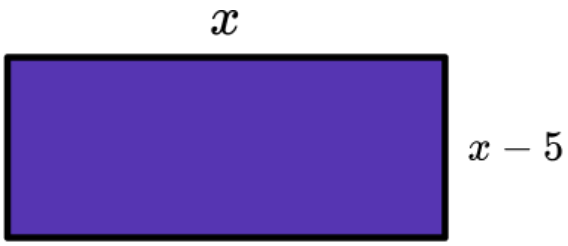
1) Perimeter is 40



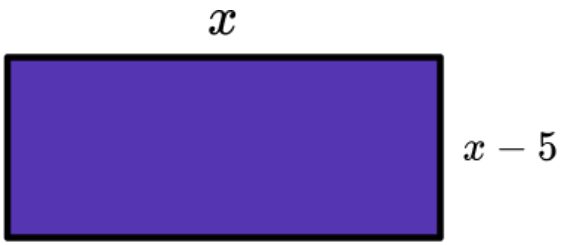
2) Perimeter is 46



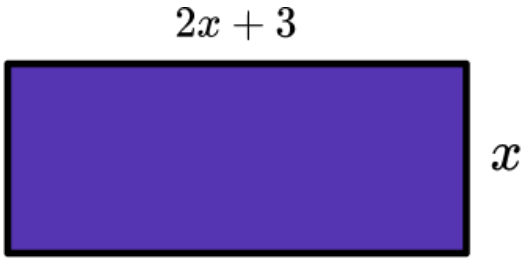
3) Perimeter is 42



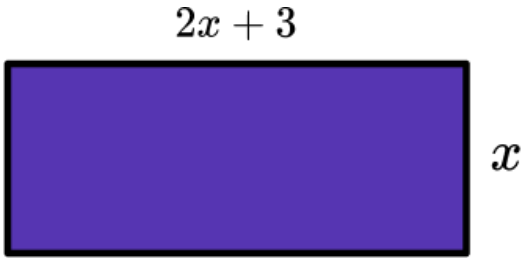
4) Perimeter is 52



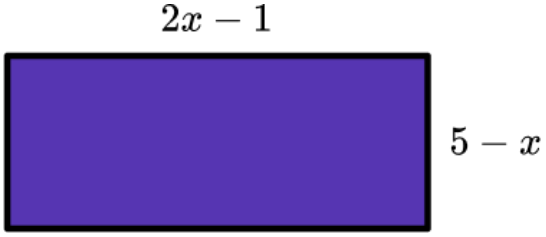
5) Perimeter is 60



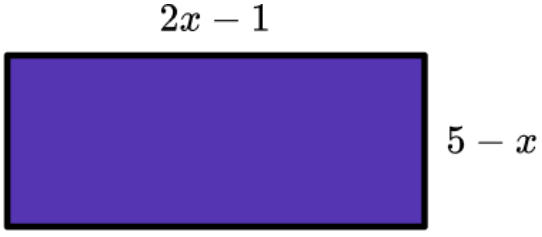
6) Perimeter is 75



7) Perimeter is 14



8) Perimeter is 17

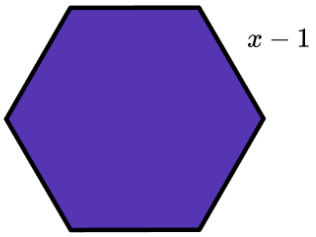


Forming and Solving Equations - Worksheet

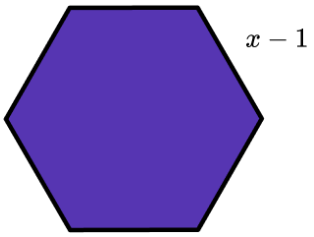
Group C - Regular polygons

Form an equation for the perimeter in terms of x. Solve the equation and find x:

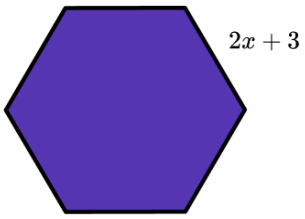
1) Perimeter is 42



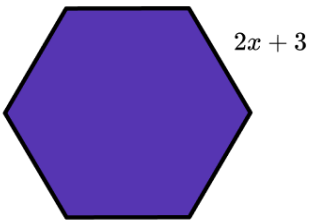
2) Perimeter is 50



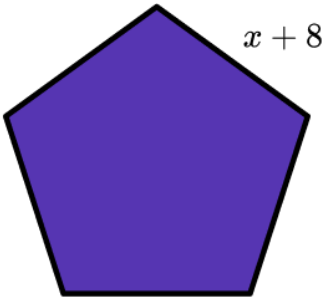
3) Perimeter is 120



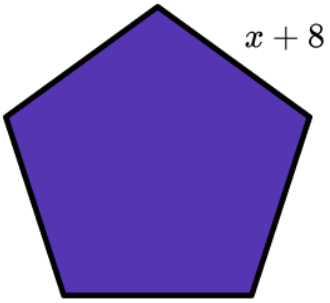
4) Perimeter is 135



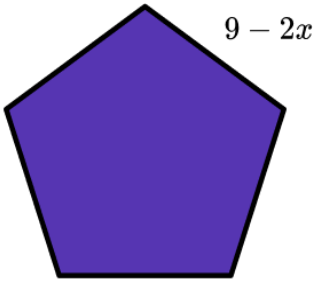
5) Perimeter is 75



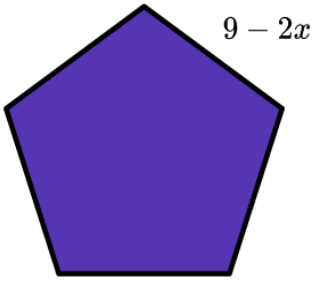
6) Perimeter is 79



7) Perimeter is 15



8) Perimeter is 18



Forming and Solving Equations - Worksheet

Applied

1) **(a)** Eden has x sweets. Fen has 3 more sweets than Eden.
Gio has twice as many sweets as Eden.

Form an expression in terms of x for the total number of sweets.
Give your answer in its simplest form.

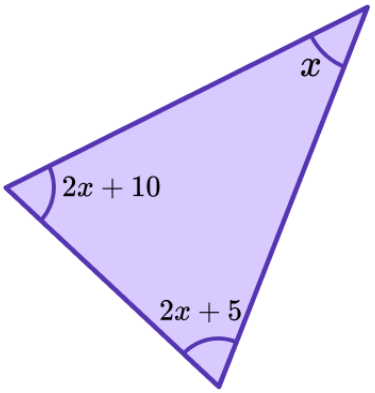
(b) Altogether there are 51 sweets. Form an equation and solve to find x.

2) **(a)** A jumper costs £x.
A shirt costs £5 less than the coat.
A pair of jeans costs twice as much as the shirt.

Form an expression in terms of x for the total cost of the clothes.
Give your answer in its simplest form.

(b) Altogether the clothes cost £135.
Form an equation to solve and find the price of the jeans.

3) The diagram shows a triangle with angles $x°$, $(2x + 5)°$ and $(2x + 10)°$.

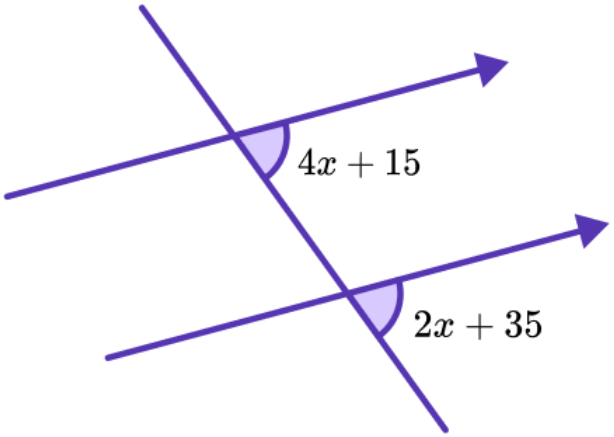


(a) Explain why $5x + 15 = 180$.

(b) Solve to find x.

Forming and Solving Equations - Worksheet

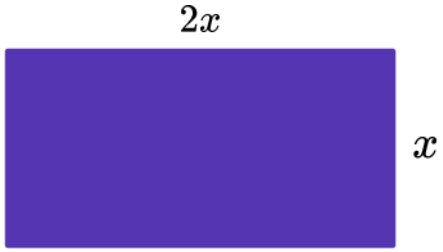
4) The diagram shows a pair of parallel lines.



(a) Explain why $4x + 15 = 2x + 35$.

(b) Solve to find the angle marked $2x + 35$.

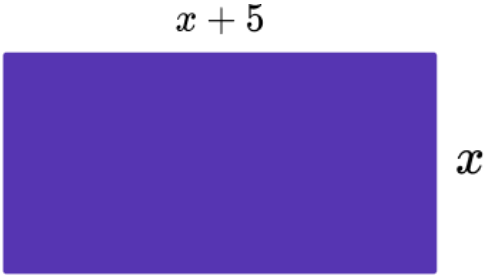
5) **(a)** The diagram shows a rectangle with sides x and $2x$ cm.



Form an expression for the area of the rectangle.

(b) The area of the rectangle is 72 cm^2.
Form an equation to find x.

6) **(a)** The diagram shows a rectangle with sides x and $(x + 5)$ cm.



Form an expression for the area of the rectangle.

(b) The area of the rectangle is 84 cm^2.
Form an equation to find x.

Forming and Solving Equations - Exam Questions

1) Robert is x years old.
Sara is 3 years older.
Tam is twice as old as Robert.

The total of their ages is 59.

(a) Write an expression for Sara's age.

.....

(1)

(b) Write an expression for Tam's age.

.....

(1)

(c) Form an equation in x and use it to find Robert's age.

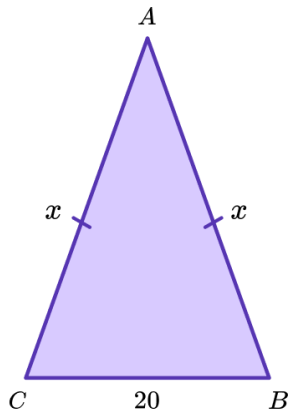
.....

(3)

(5 marks)

---

2) ABC is an isosceles triangle where: $AB = x$ cm, $BC = 20$ cm, and $AC = x$ cm.



(a) Write a simplified expression, in terms of x, for the perimeter.

.....

(2)

Forming and Solving Equations - Exam Questions

(b) The perimeter of the triangle is 90 cm. Find the value of x.

$x =$.....

(2)

(4 marks)

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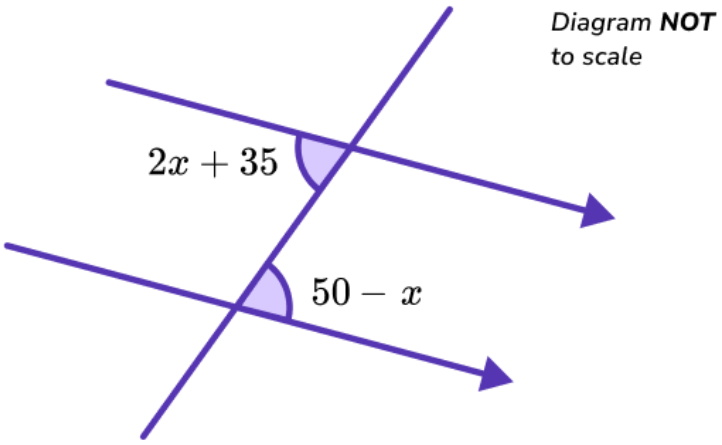
3) **(a)** Use the diagram to form an equation in terms of x. Give a reason for your equation.



.....

(2)

(b) Use your answer in part (a) to work out the value of x.

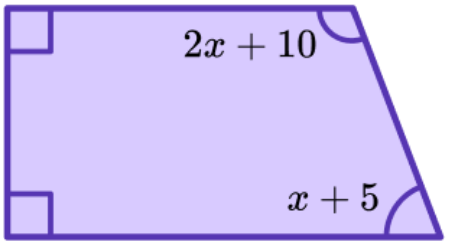
$x =$.....

(2)

(4 marks)

Forming and Solving Equations - Exam Questions

4) The diagram shows a trapezium.

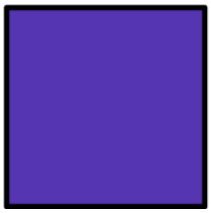
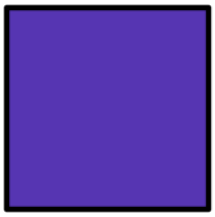
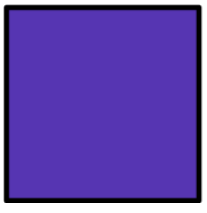


Calculate the size of the largest angle.

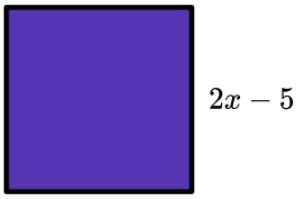
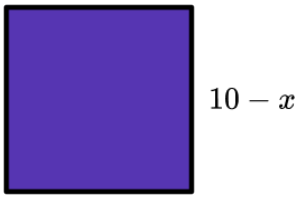
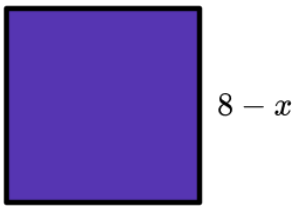
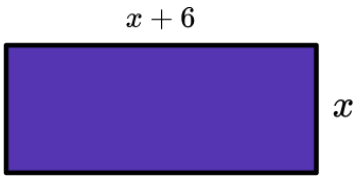
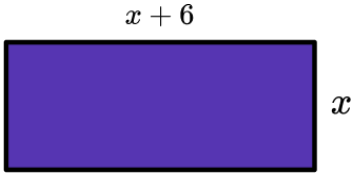
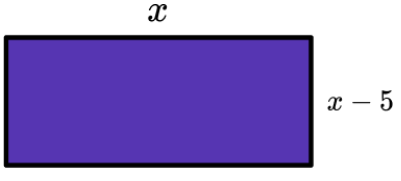
.....

(4 marks)

Forming and Solving Equations - Answers

	Question	Answer
	Skill Questions	
Group A	Form an equation for the perimeter in terms of x. Solve the equation and find x:	
	1) Perimeter is 20 	**1)** $4x = 20$ $x = 5$
	2) Perimeter is 26 	**2)** $4x = 26$ $x = 6.5$
	3) Perimeter is 52 	**3)** $4(x + 3) = 52$ **or** $4x + 12 = 52$ $x = 10$
	4) Perimeter is 58 	**4)** $4(x + 3) = 58$ **or** $4x + 12 = 58$ $x = 11.5$
	5) Perimeter is 48 	**5)** $4(2x - 5) = 48$ **or** $8x - 20 = 48$ $x = 8.5$

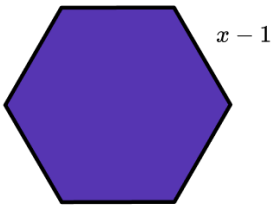
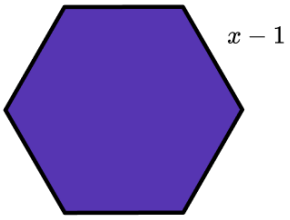
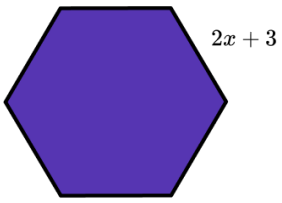
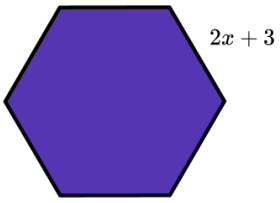
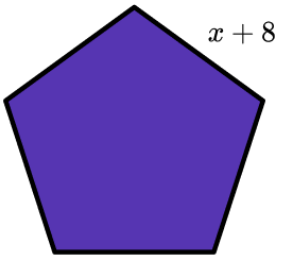
Forming and Solving Equations - Answers

Group A contd	**6)** Perimeter is 64 	**6)** $4(2x - 5) = 64$ **or** $8x - 20 = 64$ $x = 10.5$
	7) Perimeter is 24 	**7)** $4(10 - x) = 24$ **or** $40 - 4x = 24$ $x = 4$
	8) Perimeter is 24 	**8)** $4(8 - x) = 24$ **or** $32 - 4x = 24$ $x = 2$
Group B	Form an equation for the perimeter in terms of x. Solve the equation and find x: **1)** Perimeter is 40 	**1)** $4x + 12 = 40$ $x = 7$
	2) Perimeter is 46 	**2)** $4x + 12 = 46$ $x = 8.5$
	3) Perimeter is 42 	**3)** $4x - 10 = 42$ $x = 13$

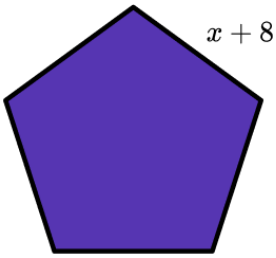
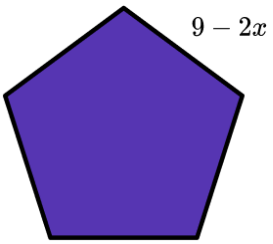
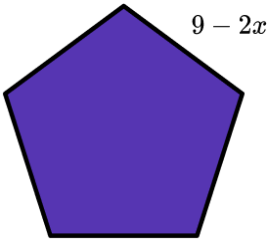
Forming and Solving Equations - Answers

Group B contd	**4)** Perimeter is 52 x  $x - 5$	**4)** $4x - 10 = 52$ $x = 15.5$
	5) Perimeter is 60 $2x + 3$  x	**5)** $6x + 6 = 60$ $x = 9$
	6) Perimeter is 75 $2x + 3$  x	**6)** $6x + 6 = 75$ $x = 11.5$
	7) Perimeter is 14 $2x - 1$  $5 - x$	**7)** $2x + 8 = 14$ $x = 3$
	8) Perimeter is 17 $2x - 1$  $5 - x$	**8)** $2x + 8 = 17$ $x = 4.5$

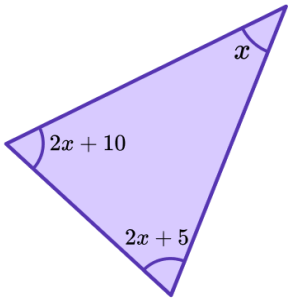
Forming and Solving Equations - Answers

Group C	Form an equation for the perimeter in terms of x. Solve the equation and find x:	
	1) Perimeter is 42 	**1)** $6(x-1)=42$ or $6x-6=42$ $x=8$
	2) Perimeter is 50 	**2)** $6(x-1)=50$ or $6x-6=50$ $x=9\frac{1}{3}$
	3) Perimeter is 120 	**3)** $6(2x+3)=120$ **or** $12x+18=120$ $x=8.5$
	4) Perimeter is 135 	**4)** $6(2x+3)=135$ **or** $12x+18=135$ $x=9.75$
	5) Perimeter is 75 	**5)** $5(x+8)=75$ **or** $5x+40=75$ $x=7$

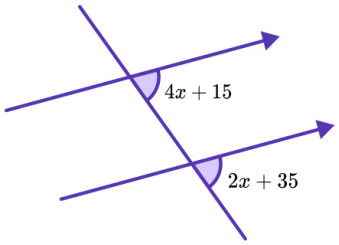
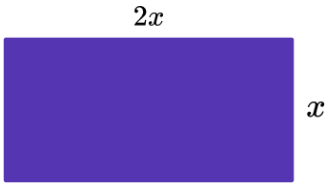
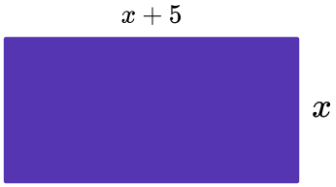
Forming and Solving Equations - Answers

Group C contd	**6)** Perimeter is 79 	**6)** $5(x + 8) = 79$ **or** $5x + 40 = 79$ $x = 7.8$
	7) Perimeter is 15 	**7)** $5(9 - 2x) = 15$ **or** $45 - 10x = 15$ $x = 3$
	8) Perimeter is 18 	**8)** $5(9 - 2x) = 18$ **or** $45 - 10x = 18$ $x = 2.7$

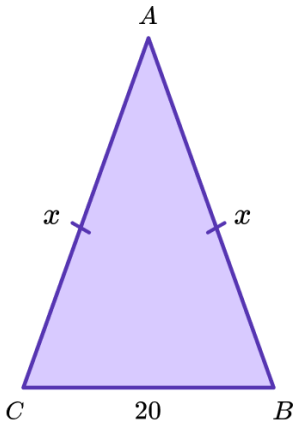
Forming and Solving Equations - Answers

	Question	Answer
	Applied Questions	
1)	**a)** Eden has x sweets. Fen has 3 more sweets than Eden. Gio has twice as many sweets as Eden. Form an expression in terms of x for the total number of sweets. Give your answer in its simplest form. **b)** Altogether there are 51 sweets. Form an equation and solve to find x.	**a)** $4x + 3$ **b)** $4x + 3 = 51$ $x = 12$
2)	**a)** A jumper costs £x. A shirt costs £5 less than the coat. A pair of jeans costs twice as much as the shirt. Form an expression in terms of x for the total cost of the clothes. Give your answer in its simplest form. **b)** Altogether the clothes cost £135. Form an equation to solve and find the price of the jeans.	**a)** $4x - 15$ **b)** $4x - 15 = 135$ $x = 37.5$ The jeans cost £65
3)	The diagram shows a triangle with angles $x°$, $(2x + 5)°$ and $(2x + 10)°$.  **a)** Explain why $5x + 15 = 180$. **b)** Solve to find x.	**a)** Angles in a triangle add up to 180 degrees, so $x + 2x + 5 + 2x + 10 = 180$ $5x + 15 = 180$ **b)** $x = 33$

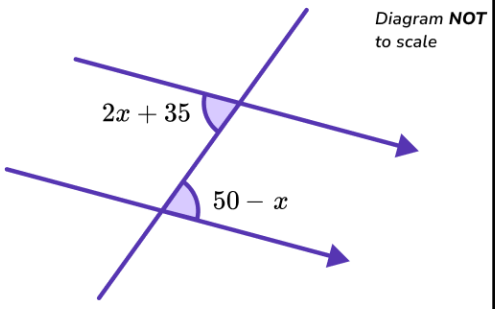
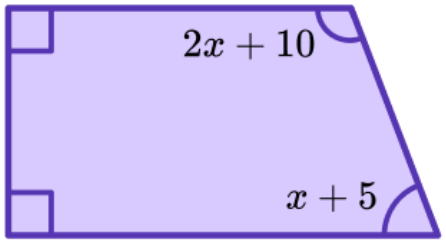
Forming and Solving Equations - Answers

4)	The diagram shows a pair of parallel lines.  **a)** Explain why $4x + 15 = 2x + 35$. **b)** Solve to find $2x + 35$.	**a)** Corresponding angles are equal so: $4x + 15 = 2x + 35$ **b)** $x = 10$ $2x + 35 = 55$
5)	**a)** The diagram shows a rectangle with sides x and $2x$ cm.  Form an expression for the area of the rectangle. **b)** The area of the rectangle is 72 cm^2. Form an equation to find x.	**a)** $2x^2$ **b)** $2x^2 = 72$ $x = 6$
6)	The diagram shows a rectangle with sides x and $(x + 5)$ cm.  **a)** Form an expression for the area of the rectangle. **b)** The area of the rectangle is 84 cm^2. Form an equation to find the x.	**a)** $x(x + 5)$ or $x^2 + 5x$ **b)** $x^2 + 5x = 84$ $x^2 + 5x - 84 = 0$ $(x - 7)(x + 12) = 0$ $x = 7$ or $x = -12$ (impossible) $x = 7$

Forming and Solving Equations - Mark Scheme

	Question	Answer	
	Exam Questions		
1) (a)	Robert is x years old. Sara is 3 years older. Tam is twice as old as Robert. The total of their ages is 59. Write an expression for Sara's age.	**(a)** $x + 3$	**(1)**
(b)	Write an expression for Tam's age.	**(b)** $2x$	**(1)**
(c)	Form an equation in x and use it to find Robert's age.	**(c)** $4x + 3 = 59$ $x = 14$ $2x = 28$ **or** Robert's age is 28 **oe**	**(1)** **(1)** **(1)**
2)	ABC is an isosceles triangle where $AB = x$, $BC = 20$, and $AC = x$. 		
(a)	Write a simplified expression, in terms of x, for the perimeter.	**(a)** $x + x + 20$ $2x + 20$	**(1)** **(1)**
(b)	The perimeter of the triangle is $90cm$. Find the value of x.	**(b)** $2x + 20 = 90$ $x = 35$	**(1)** **(1)**

Forming and Solving Equations - Mark Scheme

3) (a)	Use the diagram to form an equation in terms of x. Give a reason for your equation.  	**(a)** $2x + 35 = 50 - x$ Alternate angles are equal	**(1)** **(1)**
(b)	Use your answer in part (a) to work out the value of x.	**(b)** $3x = 15$ $x = 5$	**(1)** **(1)**
4)	The diagram shows a trapezium.  Calculate the size of the largest angle.	$90 + 90 + 2x + 10 + x + 5 = 360$ **or** $2x + 10 + x + 5 = 180$ **or** $3x + 15 = 180$ $3x = 165$ $x = 55$ $2x + 10 = 120$	 **(1)** **(1)** **(1)** **(1)**