Stewards Academy

Maths Summer 1

Year 10 Foundation

Blended Learning Booklet

Name:

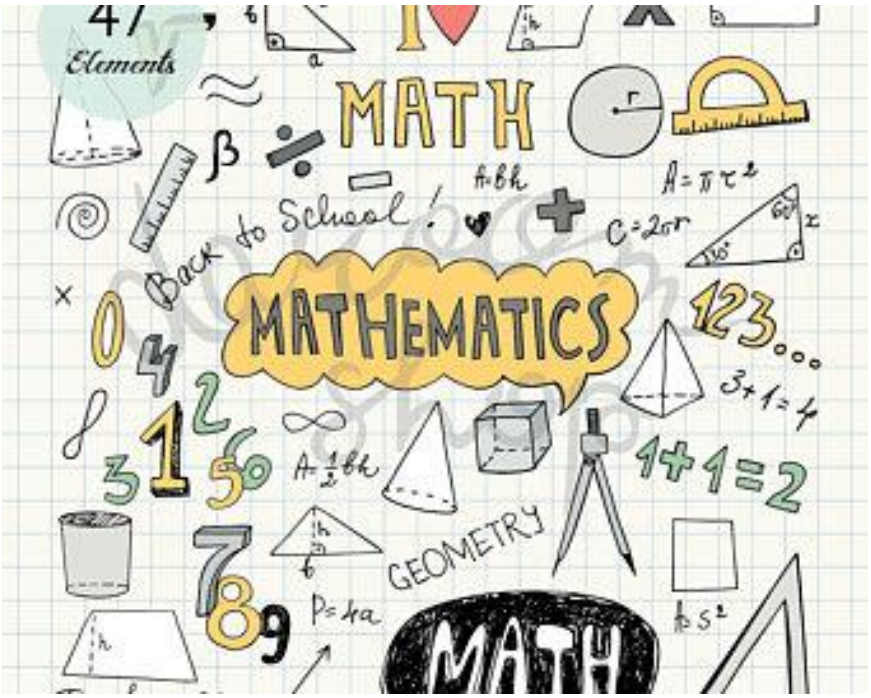
Form:

Each week covers topics you would complete in your 3 Maths lessons that week. Write out the title and LI and then complete the tasks.

All video links are online using the ClassCharts link.

The Knowledge Organiser on page 4 has further practice questions and page numbers linking to your pocket revision guides for all the key information and examples to help you with this unit.

Upload all work onto ClassCharts for feedback.



Contents

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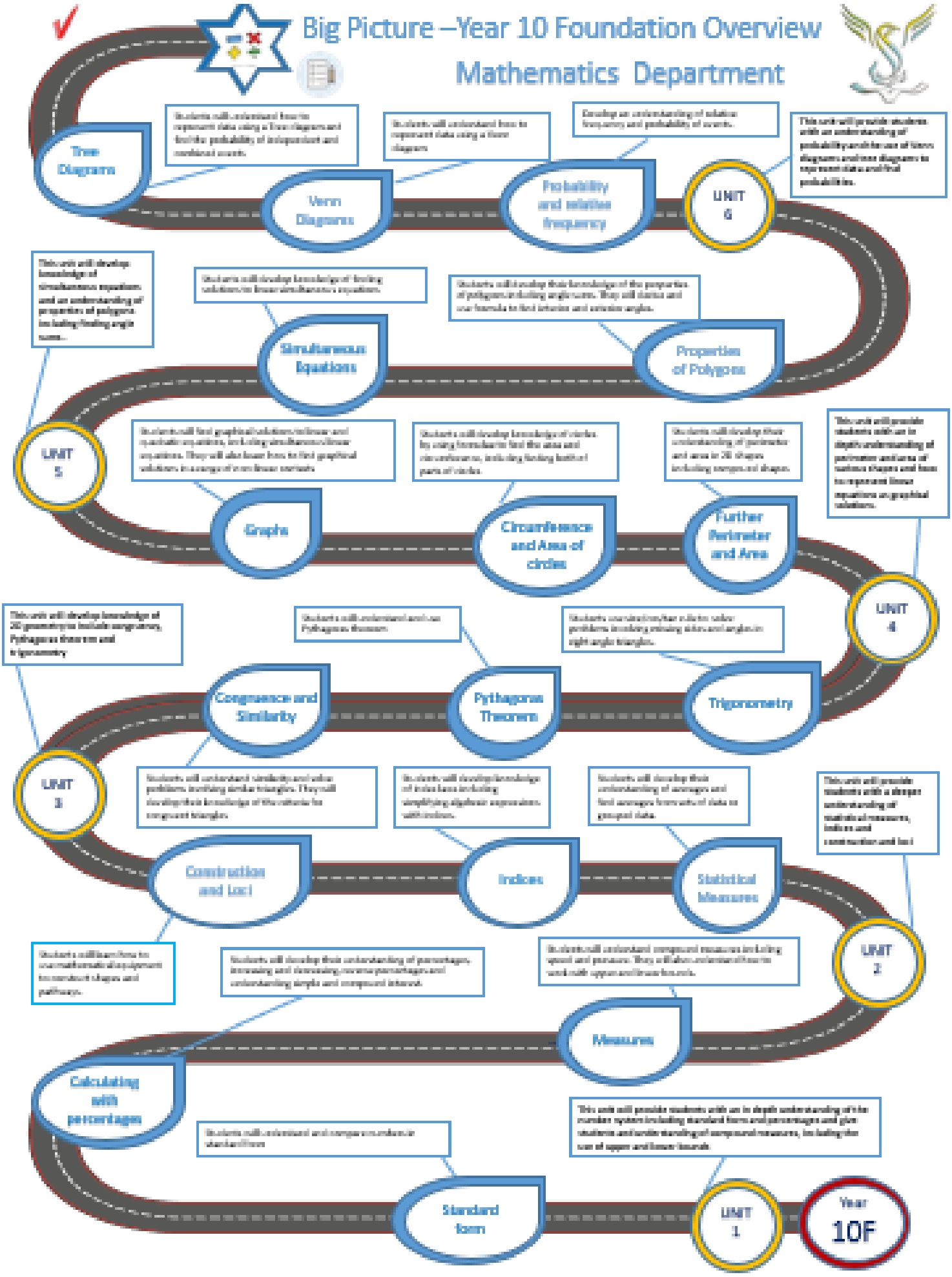


Year 10 - Foundation

Summer One

Simultaneous Equations, Properties of Polygons

Revision Guide pages:

Simultaneous equations– 46, 47

Properties of Polygons – 69

Task 1

Solve simultaneously

	★	★★
1)	$x + 2y = 8$ $3x + 2y = 12$	$x + 2y = 6$ $3x - 2y = 10$
2)	$3x + y = 7$ $3x + 2y = 11$	$3x - y = 10$ $2x + y = 5$
3)	$x + 3y = 5$ $2x + 3y = 4$	$-3x + y = 9$ $3x + 4y = 6$
4)	$4x - y = 10$ $3x - y = 8$	$4x - y = 11$ $x + y = -1$
5)	$2x - y = 7$ $2x + 3y = 3$	$-x - 2y = 6$ $x - 5y = 1$
6)	$x + 5y = 2$ $2x + 5y = -1$	$2x + 3y = 6$ $x - 3y = -17$

Task 2

Solve simultaneously

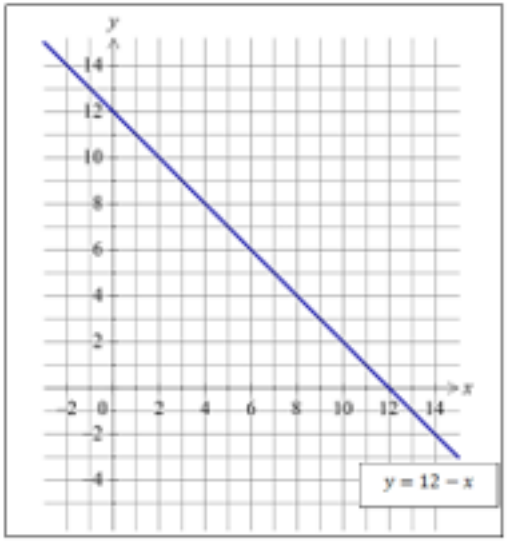
	★	★★
1)	$x - 2y = 2$ $3x + 2y = 14$	$3x + 2y = 11$ $x - y = 2$
2)	$x + 3y = 2$ $2x + 3y = 7$	$2x - 5y = 6$ $4x + y = 1$
3)	$x + 3y = 7$ $x - 2y = -8$	$x + 3y = 1$ $3x - y = -7$
4)	$4x + y = 5$ $3x - y = 9$	$x - 2y = 3$ $3x - 4y = 8$
5)	$2x - 7y = -1$ $2x - y = -7$	$5x + 2y = 8$ $x + y = 1$
6)	$x + 4y = 18$ $3x + 4y = 14$	$4x + y = 19$ $2x - 3y = 13$

Task 3

1) On the axes below, plot the graph of $y = 2x - 3$

2) The graph of $y = 12 - x$ is already plotted on the axes. Use the graphs to solve the pair of simultaneous equations:

$y = 2x - 3$ $\quad$ $y = 12 - x$



Task 4

The cost of buying a coffee and a tea in a café is £4.

The cost of buying a coffee and three teas is £7.

Work out the cost of buying a coffee and the cost of buying a tea.

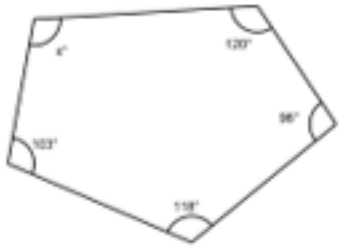
Task 5

Five adult tickets and three child tickets at a cinema costs £58.

Two adult tickets and eight child tickets costs £47.

Work out the cost of each type of ticket.

Task 6 – Find the value of the missing angle



Task 7

The diagram shows part of a regular polygon.

Work out the number of sides of this regular polygon.

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Week 1:

- **LI: I can manipulate algebraic expressions**

Demonstration Videos:

https://corbettmaths.com/2013/12/28/collecting-like-terms-video-9/
https://corbettmaths.com/2013/12/23/expanding-brackets-video-13/
https://corbettmaths.com/2013/02/06/factorisation/

Tasks: Collecting Like terms

Question 2: Simplify the following expressions

(a) $4u - 6u$ (b) $8w - 9w$ (c) $4a + 2a - 9a$ (d) $2y - 9y$

(e) $-3g - 2g$ (f) $-4f + 9f$ (g) $-m - 7m$ (h) $5y^2 - 7y^2$

Question 3: Simplify the following expressions

(a) $3a + 2b + 4a + b$ (b) $7y + 5y + 2h + 2h$ (c) $g + 8a + 2a + g$

(d) $7m + 7p + 8m + p + 2p$ (e) $9e + 2 + e + 2$ (f) $4 + 3a + 2a + 8$

Question 4: Simplify the following

(a) $3y^2 + 4ab + 7y^2 + ab$ (b) $9x^2 - 2x - 11x^2 + 5x$ (c) $7ac - 3ab + 9ab - 7ac$

TRUE or **FALSE**? Cut out all 16 cards. Sort them into two piles: **TRUE** & **FALSE**

A a, $2a$, $3a$, $4a$ Total = $10a$	**B** 5, $2e$, $-4e$, $3e$, -1, 3, e Total = $2e + 7$	**C** $-y$, $5x$, $-2x$, $-x$, $6y$ Total = $2x - 5y$	**D** 9, $4a$, $7c$, $-2c$, -2, $-6c$, $3a$, $-2c$ Total = $7a + c + 7$
E $2m - (-3m) = 5m$	**F** $2z + 4z + 3 - 8z - 7 = 4 - 2z$	**G** $5 - y + 3x + 4y - 7x + 4 + y = 4x - 4y + 9$	**H** $2a + 3b$, $a - b$, $2b - 4a$, $3a$ Total = $2a$
I $6g - 2h$, $k + 2h$, $-3h - 2g$, $-2k$, $5 - 2g$, $-2b + 3h$ Total = $2g + 5$	**J** $2s + 5t + 3t - 4s = 8t - 2s$	**K** $7x + 6y - 3y - 5x = 12x + 3y$	**L** $2a + 4b + (5 - 2c) - 6a - c = 4b - 4a - 3c + 5$
M $3x + 2y - (-4x) - 3y = -x - y$	**N** $3a + 2b - (5b - 4a) + 2a - b = 9a - 4b$	**O** $x^2 + x$, 5, $4 - 2x^2$, $3x$, $5x^2 - 2x$ Total = $4x^2 + 2x + 9$	**P** $6 + 3a^2 - 4a + 2a^2 - 2a - 11 = 5a^2 - 6a - 6$

Tasks – Expanding single Brackets.

Question 1: Expand the following brackets

(a) $5(y + 3)$ (b) $4(a + 2)$ (c) $8(w + 10)$ (d) $3(x - 7)$

(e) $9(s - 1)$ (f) $2(8 - t)$ (g) $7(4 + h)$ (h) $10(a + 2b + 3c)$

(i) $4(3y + 2)$ (j) $5(2p - 1)$ (k) $3(7a + 2)$ (l) $9(2x - 5)$

Question 2: Expand the following brackets

(a) $-2(w + 5)$ (b) $-3(c + 7)$ (c) $-8(c + 7)$ (d) $-10(y - 2)$

(e) $-7(g - 3)$ (f) $-4(2w + 3)$ (g) $-9(3w - 5)$ (h) $-9(5x - 1)$

Question 3: Expand the following brackets

(a) $a(c + 2)$ (b) $c(d - 3)$ (c) $a(b + c)$ (d) $w(8 - y)$

(e) $c(5 + a)$ (f) $w(a - 9)$ (g) $y(s + t)$ (h) $2a(c - 3)$

Question 4: Expand the following brackets

(a) $a(a + 2)$ (b) $y(y - 5)$ (c) $w(a + w)$ (d) $c(9 - c)$

(e) $p(2p + 5)$ (f) $2w(3w - 1)$ (g) $9y(2y + 3)$ (h) $4c(2a + 5c)$

Question 5: Expand and simplify the following

(a) $2(y + 3) + 3(y + 1)$ (b) $8(x + 2) + 3(x + 3)$ (c) $4(x - 1) + 2(x + 3)$

(d) $5x + 3 + 2(x + 9)$ (e) $3(2y + 1) + 4(2y + 5)$ (f) $5(2x + 3) + 2(3x + 1)$

Question 6: Expand and simplify

(a) $w(w + 5) + w(w + 7)$ (b) $2g(4g + 3) + g(g - 7)$ (c) $n(n - 4) - n(5 - n)$

(d) $2e(4e + 3) - 3e(e - 5)$ (e) $a(3 + c) + c(a + 2)$ (f) $m(a + 7) - a(4 - 3m)$

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Tasks: Factorising Single Brackets

Question 1: Factorise the following expressions

(a) $4x + 6$ (b) $15x + 20$ (c) $9y - 12$ (d) $5x + 15$

(e) $6x - 3$ (f) $4x + 8$ (g) $5y - 25$ (h) $8w + 24$

Question 2: Factorise the following expressions

(a) $x^2 + 7x$ (b) $x^2 - 3x$ (c) $y^2 + y$ (d) $w^2 + 9w$

(e) $x^2 - 7x$ (f) $4w^2 + 10w$ (g) $6x^2 - 8x$ (h) $9y^2 - 6y$

Task 3

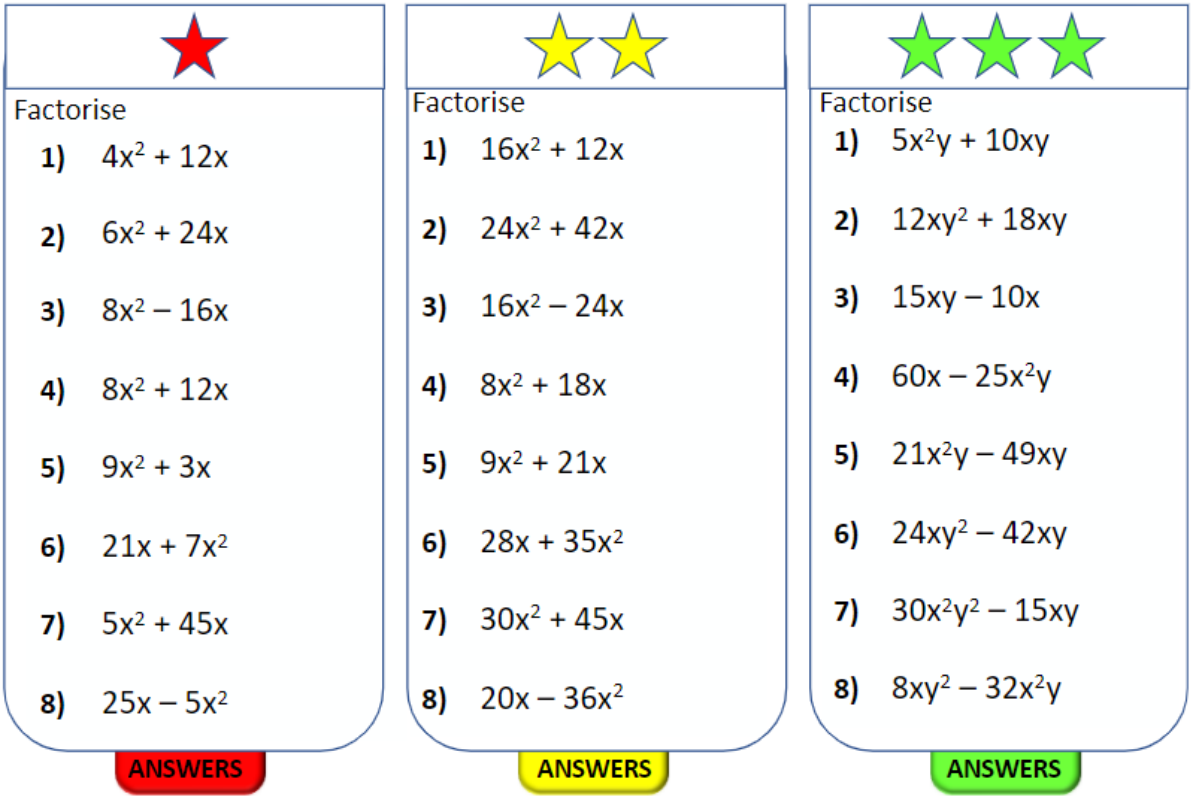
Factorising

4(4x - 5)	3(5x - 7)	4(4x - 5)	4(x + 5)	6(x + 7)
8(3x + 5)	2(x + 2)	6(2x + 5)	7(4x - 7)	6(2x - 5)
5(2x - 7)	4(2x + 5)	6(2x + 3)	4(x + 5)	7(2x + 5)
3(3x - 10)	3(x + 4)	5(x + 4)	5(2x + 7)	2(2x - 9)
3(2x + 3)	2(x + 3)	7(2x + 3)	5(3x + 4)	7(x + 8)

8x + 20	14x + 21	15x - 21	12x - 30
16x - 20	2x + 4	4x - 18	12x + 30
9x - 30	28x - 49	5x + 20	14x + 35
24x + 40	6x + 9	12x + 18	10x - 35
16x - 20	10x + 35	15x + 20	4x + 20

Missing expression

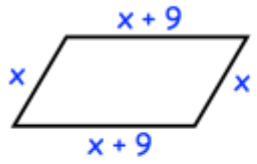
Task 4



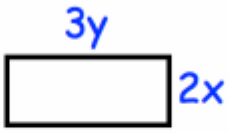
Challenges:

Task 1 Write down the perimeter of each shape below

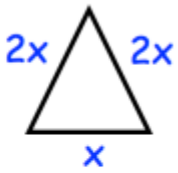
(a)



(b)



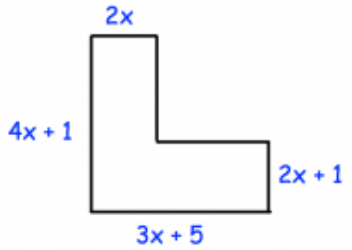
(c)



Task 2 : A square has a side length of 3x.
Find an expression for the perimeter of the square.

Task 3 $6x + 7y + x - 8y = 7x - y$
Write down three other expressions that are equal to $7x - y$

Task 4 Find an expression for the perimeter of this shape



Task 5 : Can you spot any mistakes in the questions below.

Expand 3(2y - 1)

6y - 1

Multiply out x(x + 3)

2x + 3x = 5x

Expand and simplify 6(w + 3) - 2(w - 5)

6w + 18 - 2w - 10
= 4w + 8

Task 6 : Explain why $8x + 3y$ cannot be factorised.

Task 7 : James has factorised an expression correctly.
His answer is $2(7y - 3)$.
What was the expression that he factorised?

Task 8 : Alexandra is trying to factorise fully $15y + 30$.
Rebecca says the answer is $3(5y + 10)$
Victoria says the answer is $5(3y + 6)$
Alexandra says both Rebecca and Victoria are incorrect, why?

Exam Practice:

1 (a) Expand $7(2x + 7)$ (1)

(b) Factorise $3y + 12$ (1)

(2 marks)

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11 (a) Expand $7(2h - 3)$ (1)

(b) Expand and Simplify $4(g + 5) + 3(g - 2)$ (2)

(3 marks)

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13 (a) Simplify $3a \times 4b$ (1)

(b) Simplify $3x + 2y + 6x - y$ (2)

(3 marks)

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1 *e* is 4 **more** than *d*
f is 6 **less** than *d*

1(a) Write an expression for *e* in terms of *d*. **[1 mark]**

Answer _____

1(b) Write an expression for *f* in terms of *d*. **[1 mark]**

Answer _____

1(c) Work out *e* – *f*
Simplify your answer. **[2 marks]**

_____

_____

Answer _____

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1 (a) Factorise $4 - 12n$

..... (1)

(a) Factorise fully $3g^2h + 6gh^2$

..... (2)

(Total for Question 1 is 3 marks)

2 (a) Factorise $6 - 24b$

..... (1)

(a) Factorise fully $4km^2 - 12k^2m$

..... (2)

(Total for Question 2 is 3 marks)

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Week 2:

- **LI: I can solve two-step equations**

Demonstration Videos:

https://corbettmaths.com/2012/08/24/solving-equations/

Tasks:

Answer GRID Cross off each answer, then total the remaining 5.

RED	$17 = 6x + 5$	$3x + 12 = 24$	$14 = 4x - 10$	$4x + 7 = 13$	$6 = 4x - 6$
	$4x - 5 = 5$	$36 = 6x - 24$	$8x + 6 = 10$	$19 = 2x + 3$	$6x + 11 = 44$
AMBER	$20 = 8x - 8$	$4x + 20 = 12$	$1 = 3x + 10$	$4x + 12 = 30$	$6.5 = 6x + 5$
GREEN	$7x - 10 = -17$	$10 = 24 - 2x$	$4x + 6 = 0$	$15 = 3 - 3x$	$3x - 5 = -20$

10	−1.5	0.5	3	−1
−5	2	0	0.25	6
−3	7	4.5	4	−2
−4	5.5	9	2.5	6.5
1.5	11	8	15	3.5

Total:

★

1) $x + 2 = 7$
2) $x - 3 = 9$
3) $4 + x = 10$
4) $15 - x = 10$
5) $3x = 15$
6) $\frac{x}{3} = 6$
7) $\frac{x}{6} = 3$
8) $x - 3 = -1$

★★

1) $2x + 3 = 13$
2) $5x - 1 = 14$
3) $10 + 2x = 30$
4) $20 - 3x = 11$
5) $\frac{x}{2} + 4 = 8$
6) $\frac{x}{5} - 2 = 3$
7) $15 = 4x - 1$
8) $4 = 2x + 8$

★★★

1) $2x + 3 = x + 9$
2) $4x - 3 = x + 9$
3) $3x - 7 = 2x + 1$
4) $5x - 2 = 3x - 4$
5) $x - 3 = 7 - x$
6) $x + 5 = 11 - 2x$
7) $10 - x = 13 - 2x$
8) $2 - x = 5x - 1$

Question 5: Solve the following equations

(a) $16 - y = 5$ (b) $5 + x = 13$ (c) $10 - 3x = 1$

(d) $38 - 4m = 14$ (e) $9 + 7x = 51$ (f) $11 - 5x = 21$

Challenges:

Question 2: Ronald is x years old.
His friend Colin is 3 years older than than Ronald.
Colin is 19 years old.
(a) Write down an equation for this information.
(b) Solve your equation to find how old Ronald is.

Question 3: Hannah is n years old.
Her aunt Emily is three times older than Hannah.
Emily is 48 years old.
(a) Write down an equation for this information.
(b) Solve your equation to find how old Hannah is.

Question 4: Sam thinks of a number, n.
He multiplies his number by 7 and then adds 3 to the result.
His final answer is 45.
(a) Write down an equation for this information.
(b) Solve your equation to find the number, n.

Exam Practice:

8 Solve $5(x - 6) = 65$

(2 marks)

9 Solve $8(m - 5) = 48$

(2 marks)

11 (a) Solve $x + x + x = 42$ (1)

(b) Solve $\frac{y}{3} = 4$ (1)

(c) Solve $2a - 5 = 19$ (1)

(3 marks)

three identical small rectangles as shown.

Not drawn accurately

The perimeter of one small rectangle is 35 cm
Work out the perimeter of the large rectangle.

[4 marks]

- **LI: I can substitute an unknown value into an expression**

Demonstration Videos:

https://corbettmaths.com/2012/08/20/substitution-into-expressions/

Tasks:

Substitution On each row (**A** to **G**) the value of the variables change! ①

	a	b	c	$2a$	$a+b$	$b-a$	$2b+2c$	$3a-2c$
A	3	4	3					
B		5	3	8				
C	7		0		15			
D		9	3	12				
E	2		1			4		
F			8	14	14			
G	8		11				42	

Substitution On each row (**A** to **G**) the value of the variables change! ②

	a	b	c	$2a$	$a+b$	$b-a$	$2b+2c$	$3a-2c$
A	2	3	4					
B		4	5	−4				
C	5		3		2			
D	7		−6		11			
E	−3		8	−6				
F	6		−4			−11		
G			−7	−8	5			

Substitution On each row (**A** to **G**) the value of the variables change! ③

	x	y	z	$2x+y$	$2z-y$	$3x+3y$	$x+y-z$	$2y-x+3z$
A	1	4	−2					
B	5	−3	3					
C	0	6	−4					
D	4	−5	8					
E	−7	−2	3					
F	3	−8	−2					
G	10	−7	−4					

Question 4: If a = 1.5 b = 4 c = 6 d = 0.5 and e = −3
Find the value of each expression.

(a) $4(a+d)$ (b) $5(c+b)$ (c) $3(10-e)$ (d) abc

(e) e^3 (f) d^2 (g) $5b^2$ (h) $8e^2+3$

(i) $\frac{b+2}{3}$ (j) $\frac{2c-e}{4}$ (k) $\frac{10d+4b}{7}$

Challenges:

Question 4: This formula is used to calculate the weekly pay of a letting agent.

Weekly pay = basic pay + number of houses rented x bonus

The basic pay is £400 and a bonus of £75 is paid for each house rented.
Mrs Lewis rents out 5 houses in one week.
Calculate her pay.

Question 5: This formula can be used to convert between Celsius and Fahrenheit:

$F = 1.8C + 32$

(a) Work out the value of F when C = 10
(b) Work out the value of F when C = 20
(c) Work out the value of F when C = 4
(d) Work out the value of C when F = 35.6
(e) Work out the value of C when F = 41
(f) Work out the value of C when F = 112
(g) Find a temperature when F and C are the same value.

Exam Practice:

1 $f = 7$
$g = 5$
Work out the value of $3f + 2g$
(2 marks)

2 $c = 4d - 7$
Find the value of c when $d = 6$
(2 marks)

24 $y = mx + c$
$m = -2$, $x = 12$ and $c = -7$
Work out the value of y.
(2 marks)

26 $s = ut + \frac{1}{2}at^2$
$u = -5$, $a = 4$ and $t = 3$
Work out the value of s.
(2 marks)

27 $s = \frac{v^2 - u^2}{2a}$
$v = 7$, $u = 5$ and $a = 3$
Work out the value of s.
(2 marks)

Week 3

- **LI: I can plot a linear graph on a coordinate grid**

Demonstration Videos:

https://corbettmaths.com/2012/12/23/drawing-graphs-using-xy-tables/

Task 1

Question 1: For each equation, complete the table of values and draw its graph for values of x from −1 to 3.

(a) y = 2x + 1

x	-1	0	1	2	3
y	-1	1			7

(b) y = 3x − 1

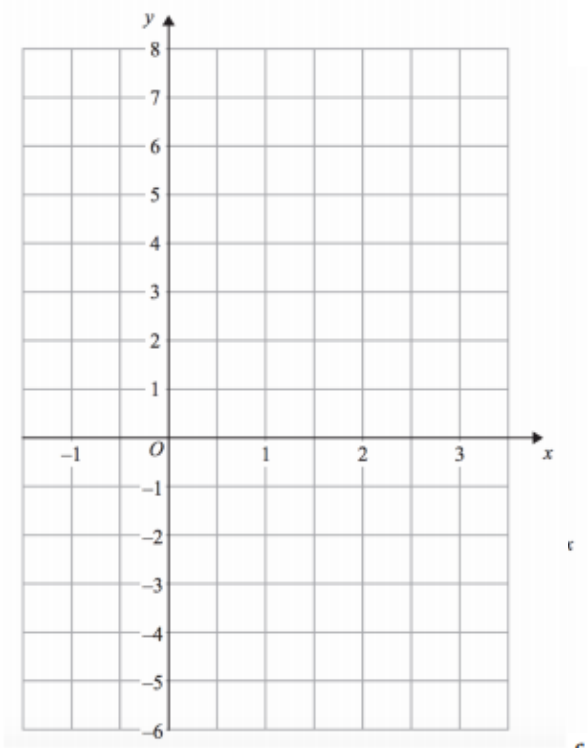
x	-1	0	1	2	3
y	-4			5	

(c) y = 2x − 3

x	-1	0	1	2	3
y		-3	-1		

(d) y = x + 4

x	-1	0	1	2	3
y					7



Question 4: For each equation, complete the table of values and draw its graph for values of x from −2 to 4.

(a) $y = \frac{1}{2}x + 1$

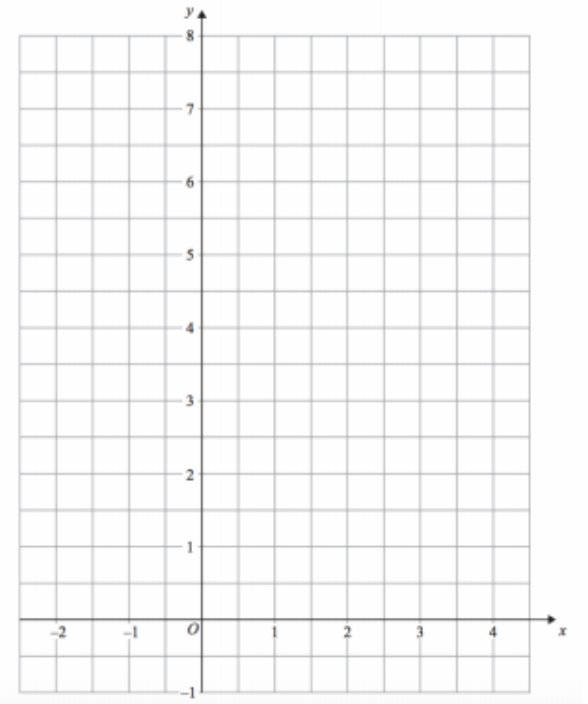
x	-2	-1	0	1	2	3	4
y							

(b) $y = \frac{1}{4}x + 5$

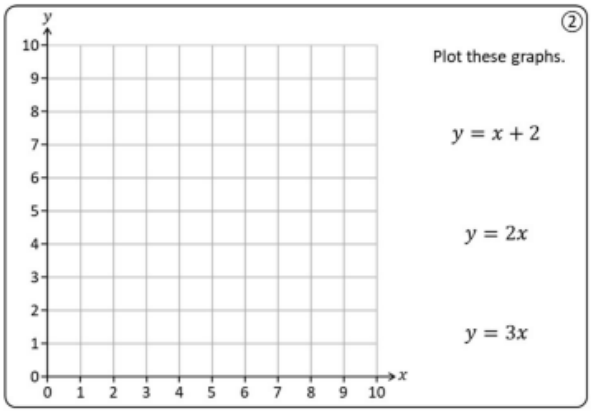
x	-2	-1	0	1	2	3	4
y							

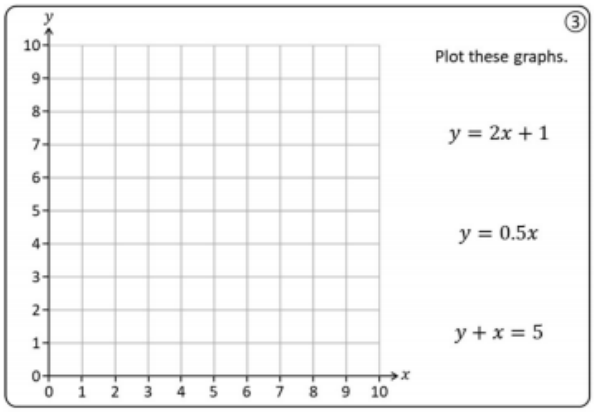
(c) $y = \frac{1}{3}x + 1$

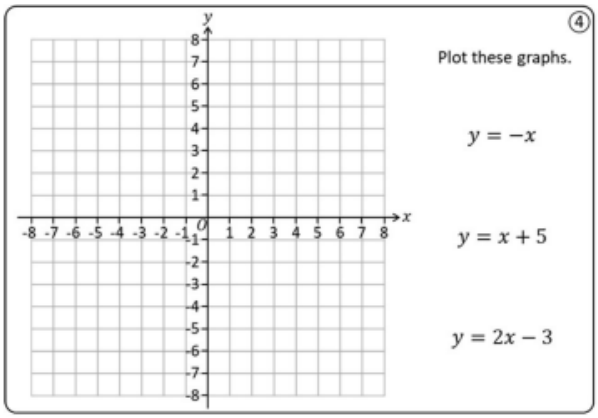
x	-2	-1	0	1	2	3	4
y							

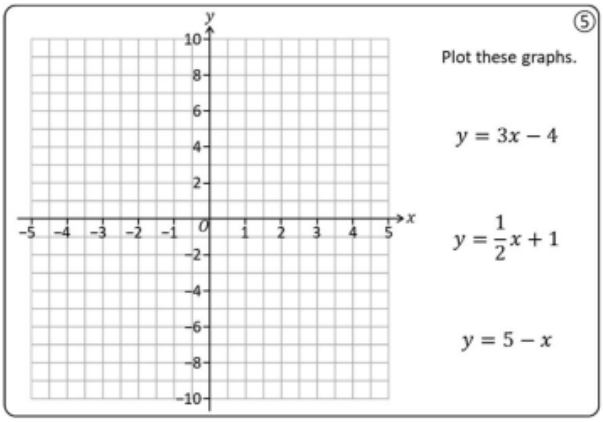


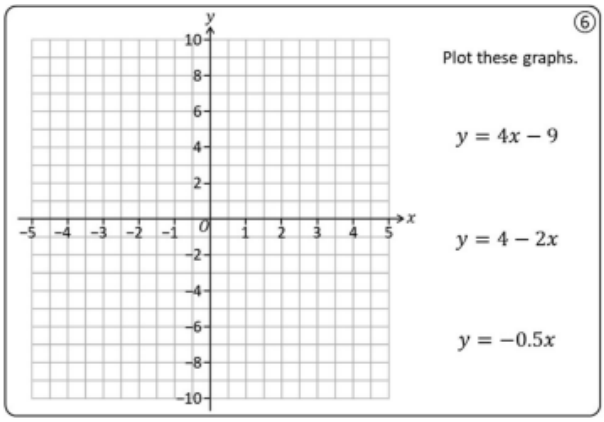
Task 2: Plot the following graphs using your own table of values

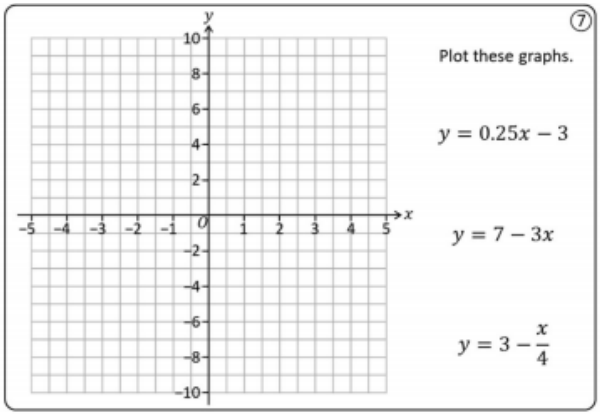




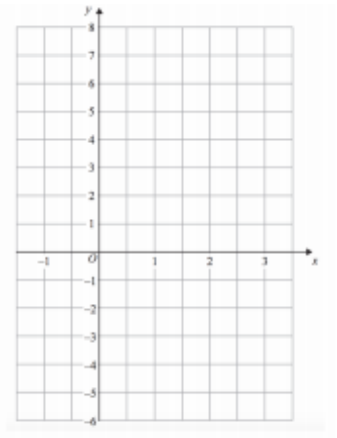








Challenges:

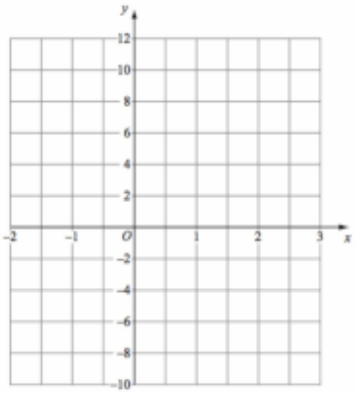


Question 1: (a) Draw y = x + 1 and y = 2x – 1 on the same set of axes.

(b) Where do the two graphs intersect?

Question 2: (a) Draw y = 3x – 4

(b) Draw x + y = 2



The graph y = 3x – 4 crosses the y-axis at the point A
The graph x + y = 2 crosses the x-axis at the point B
O is the origin.

(c) Write down the coordinates of the point A

(d) Write down the coordinates of the point B

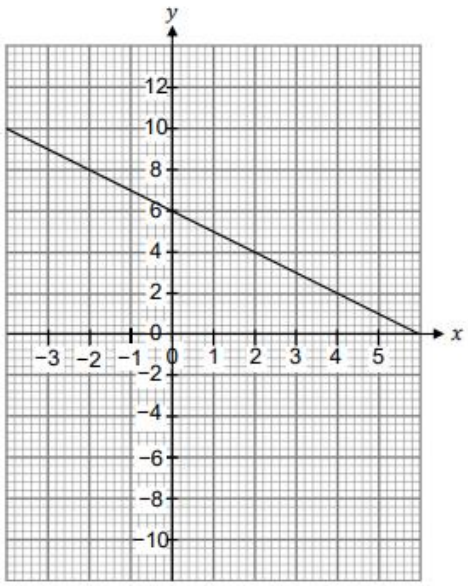
(e) Find the area of triangle OAB.

Exam Practice:

1 The graph of $y = 6 - x$ for values of x from –3 to 5 is shown on the grid.

1 (a) On the grid, draw the graph of $y = 3x - 2$ for values of x from –3 to 5

[3 marks]



1 (b) Use your graph to solve $3x - 2 = 6 - x$

[1 marks]

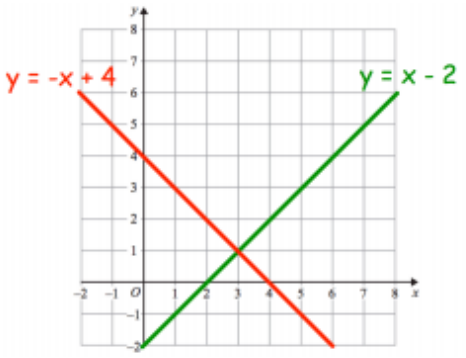
- **LI: I understand the intersection of two graphs is the solution to the equations simultaneously**

Demonstration Videos:

https://corbettmaths.com/2019/03/27/solving-simultaneous-equations-graphically/

Tasks:

Question 1: Shown below are the graphs of $y = -x + 4$ and $y = x - 2$

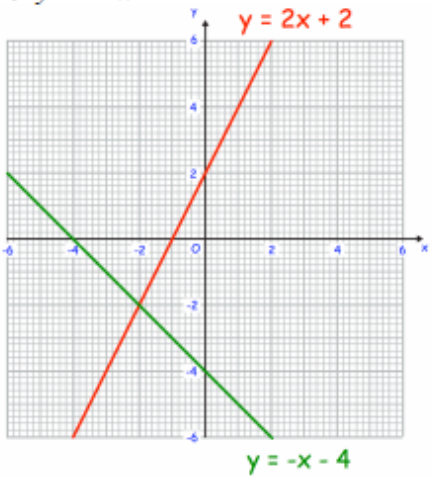


(a) Write down the coordinates of the point where the graphs of $y = -x + 4$ and $y = x - 2$ intersect.

(b) Use your answer to (a) to solve the simultaneous equations.

$y = -x + 4$
$y = x - 2$

Question 2: Shown below are the graphs of $y = 2x + 2$ and $y = -x - 4$

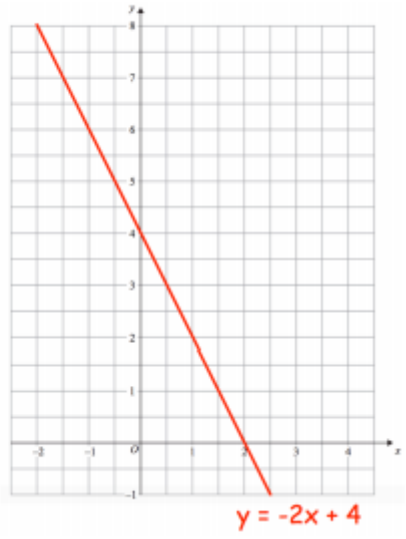


(a) Write down the coordinates of the point where the graphs of $y = 2x + 2$ and $y = -x - 4$ intersect.

(b) Use your answer to (a) to solve the simultaneous equations.

$y = -x - 4$
$y = x - 2$

Question 5: The straight line $y + 2x = 4$ has been drawn on the grid.



(a) On the same grid, draw the graph of $y = x + 1$

(b) Use the graphs to solve the simultaneous equations

$y + 2x = 4$
$y = x + 1$.

Solving Simultaneous Equations Graphically

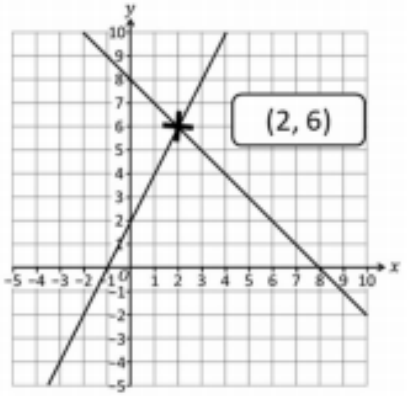
Plot each equation on the same grid.

You may want to rearrange the equations first.

The intersection shows the values (x, y) that satisfy both equations.

Check the solution by substituting values back into the equations.

$y = 2x + 2$ $\quad$ $y + x = 8$



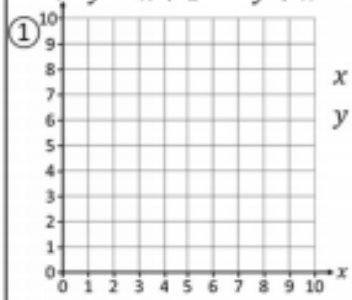
Solution: $x = 2$ $\quad$ $y = 6$

Substitute to check:

$y = 2x + 2$ $\quad$ $6 = 2(2) + 2$ ✓

$y + x = 8$ $\quad$ $6 + 2 = 8$ ✓

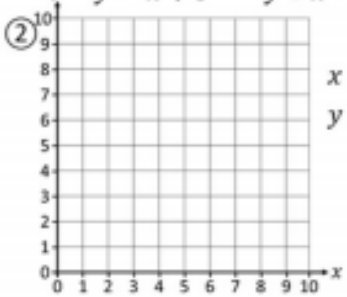
① $y = x + 1$ $\quad$ $y + x = 9$



$x =$

$y =$

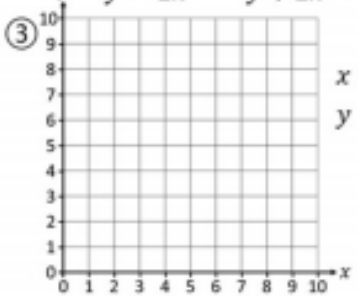
② $y = x + 3$ $\quad$ $y - x = 7$



$x =$

$y =$

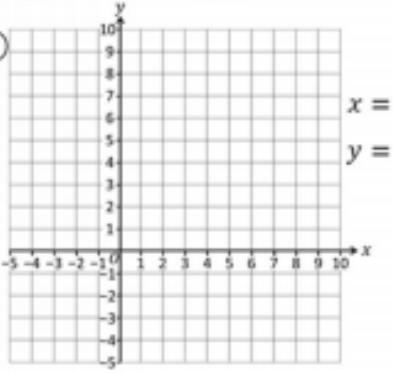
③ $y = 2x$ $\quad$ $y + 2x = 8$



$x =$

$y =$

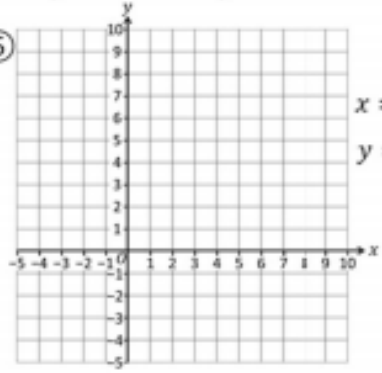
④ $y = 3x - 3$ $\quad$ $2y + 3x = 12$



$x =$

$y =$

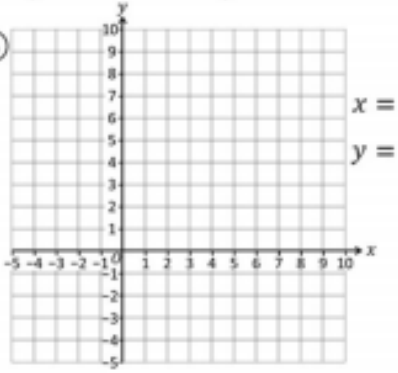
⑤ $y = 5 - 2x$ $\quad$ $y = 0.5x - 5$



$x =$

$y =$

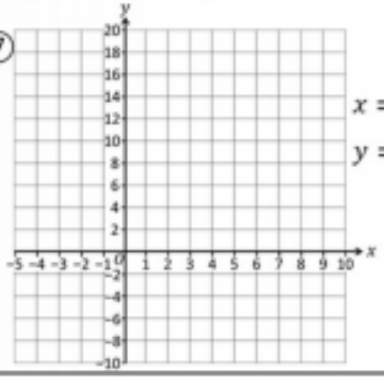
⑥ $y - x = -3$ $\quad$ $2y - 3x = -9$



$x =$

$y =$

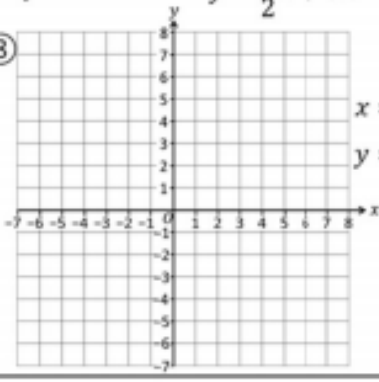
⑦ $2y + 5x = 30$ $\quad$ $y = 6x - 2$



$x =$

$y =$

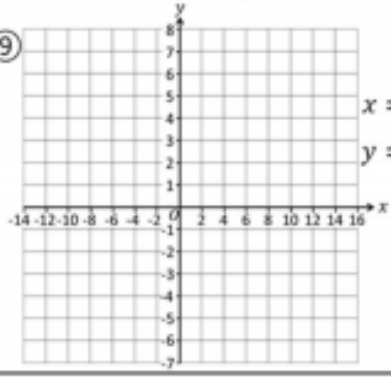
⑧ $4y + 5x = -20$ $\quad$ $y = \frac{1}{2}x + 5.5$



$x =$

$y =$

⑨ $2x = -24 - 6y$ $\quad$ $y - 10 = 2x$



$x =$

$y =$

Challenges:

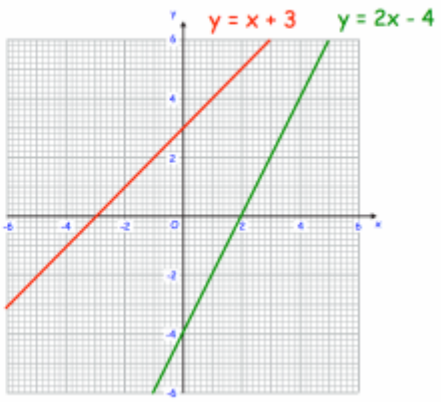
Question 1: Jesse has been asked to graphically solve the simultaneous equations

$y = x + 3$
$y = 2x - 4$

He has drawn the graph shown.

Jesse says that there is no answer to the simultaneous equations.

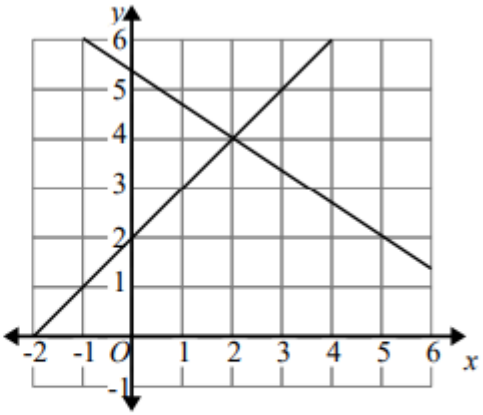
Explain why Jesse is incorrect.



Exam Practice:

1

The graphs of the straight lines with equations $y = x + 2$ and $2x + 3y = 16$ have been drawn on the grid.



Use the graphs to solve the simultaneous equations $y = x + 2$
$2x + 3y = 16$

(2 marks)

3 (a) On the same grid, draw the graphs of of $4y - 6x = 7$ and $y = -2x$

(2)

(b) Use the graphs to solve the simultaneous equations $4y - 6x = 7$
$y = -2x$

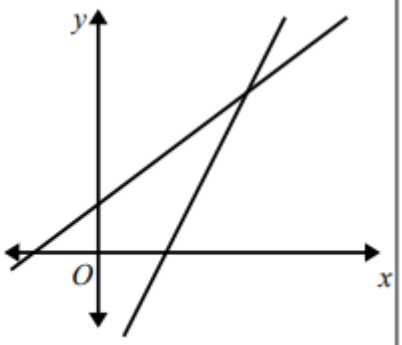
(2)

(4 marks)

4

The diagram shows two straight lines.
The equation of the lines are $y = 4x - 5$ and $y = 2x + 1$

Work out the coordinates of the point where the line intersect.



(3 marks)

Week 4:

- **LI: I understand that a simultaneous equation involved two equations and two unknowns**

Demonstration Videos:

https://corbettmaths.com/2013/03/05/simultaneous-equations-elimination-method/

Tasks:

Question 1: Solve the following simultaneous equations by using elimination.

(a)	$6x + y = 18$ $4x + y = 14$	(b)	$4x + 2y = 10$ $x + 2y = 7$	(c)	$9x - 4y = 19$ $4x + 4y = 20$
(d)	$2x + y = 36$ $x - y = 9$	(e)	$6x - 3y = 12$ $4x - 3y = 2$	(f)	$3x - 6y = 6$ $2x - 6y = 3$
(g)	$8x + 7y = 39$ $8x + 2y = 34$	(h)	$x + 3y = 38$ $x + 6y = 53$	(i)	$6x + 3y = 48$ $6x + y = 26$

Question 2: Solve the following simultaneous equations by using elimination.

(a)	$3x + 2y = 23$ $2x - y = 6$	(b)	$3x - 3y = 9$ $2x + y = 12$	(c)	$4x + 2y = 34$ $3x + y = 21$
(d)	$9x - 4y = 59$ $2x - y = 12$	(e)	$2x + 8y = 43$ $x + 3y = 18$	(f)	$6x + 3y = 45$ $2x - 2y = 12$
(g)	$5x + 4y = 130$ $x + 6y = 130$	(h)	$10x - 15y = 25$ $x - 2y = 1$	(i)	$3x + 8y = 97$ $2x + 4y = 58$

Question 3: Solve the following simultaneous equations by using elimination.

(a)	$2x + 2y = 14$ $5x - 3y = 19$	(b)	$2x + 3y = 1$ $7x + 2y = -22$	(c)	$5x + 3y = 22$ $2x + 4y = 20$
(d)	$5x - 6y = 28$ $4x - 4y = 24$	(e)	$3x + 2y = 7$ $2x + 9y = 43$	(f)	$3x + 3y = -6$ $4x - 4y = -24$
(g)	$3x + 8y = 31$ $5x + 3y = 31$	(h)	$7x - 15y = 2.5$ $3x - 2y = 5.5$	(i)	$3x + 2y = 53$ $2x + 5y = 72$

Challenges:

Question 4: Solve the following simultaneous equations by rearranging and then using elimination.

(a) $x = 10 - y$
$2x + y = 17$

(b) $x - 4 = y$
$x + 3y = 12$

(c) $2x + 6y = 4$
$x = 12 + 2y$

(d) $3x = 10 + 5y$
$3y = 52 - 4x$

(e) $2x + y - 18 = 0$
$3y = 7x + 80$

(f) $6x + 2y + 6 = 0$
$7x - 5y - 93 = 10$

Question 8: Can you spot any mistakes in the question below?

Solve the simultaneous equations

$3x + 5y = 1$ x2
$2x - 3y = 7$ x3

Do not use trial and improvement

$6x + 10y = 2$
$6x - 9y = 21$
$19y = 23$
$y = 1.21$

$3x + (5 \times 1.21) = 1$
$3x + 6.05 = 1$
$3x = -5.05$
$x = -1.68$

x = -1.68 y = 1.21

(4)

Exam Practice:

1 Solve the simultaneous equations

$4x + 3y = 18$
$x - 3y = 7$

(3 marks)

2 Solve the simultaneous equations

$x - 3y = -23$
$5x + 2y = 4$

(3 marks)

3 Solve the simultaneous equations

$2x + 5y = -10$
$2x - y = 8$

(3 marks)

4 Solve the simultaneous equations

$4x + 2y = 10$
$5x + 3y = 12$

(3 marks)

5 Solve the simultaneous equations

$2x + 5y = 4$
$7x - 5y = -1$

(3 marks)

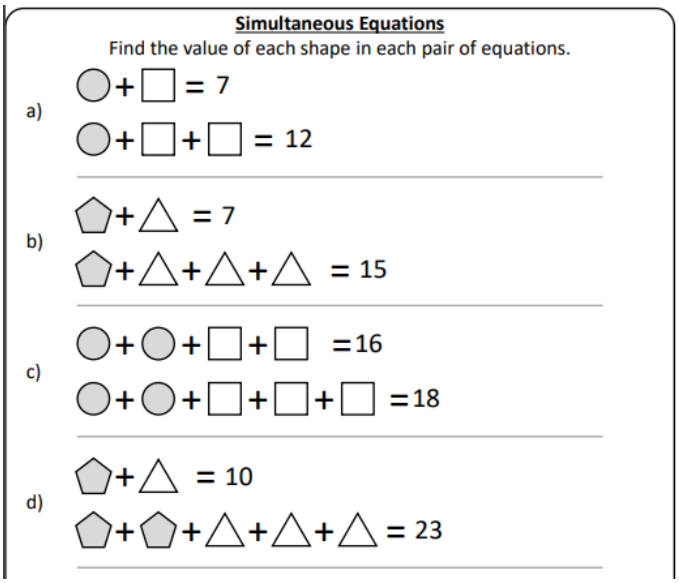
Stewards Academy

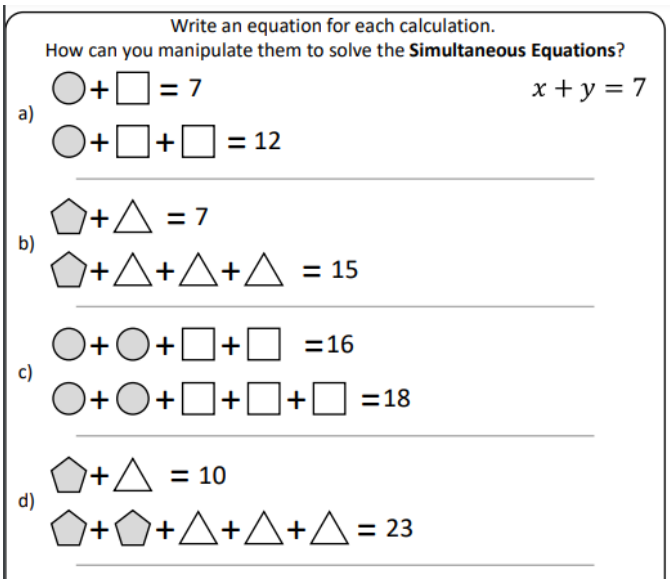
- **LI: I can identify a simultaneous equation from a worded problem**
- **LI: I can derive two simultaneous equations**

Demonstration Videos:

https://corbettmaths.com/2013/03/05/simultaneous-equations-elimination-method/
(re-watch the video on solving simultaneous equations to help you with this work)

Tasks:





Match the equations to the questions then solve to find the value of x and y

Sally & Sue bought a banana and an apple each but Sally bought one extra banana. Sally spent £5 and Sue spent £3.	$2x + y = 6$ $2x + 2y = 8$
Jim spent £2 more than John. Jim bought 2 packets of sweets and 2 chocolate bars. John bought 2 chocolate bars and 1 packet of sweets.	$3x + y = 4$ $4x + y = 5$
Mary bought 3 tins of soups and a loaf of bread. Mike bought 2 loaves of bread and 3 tins of soup. Mike spent £8 and Mary spent £7.	$3x + y = 13$ $x + y = 7$
Todd spent £3 more than Toby. Todd bought 2 carrots and 3 potatoes. Toby bought 2 potatoes and 2 carrots.	$4x + 3y = 19$ $3x + 3y = 15$
Dan spent £5 on 4 toys and a packet of crisps. Diana bought a packet of crisps and one less toy and spent £1 less.	$2x + y = 7$ $3x + y = 9$
Anna spent £9 on a packet of biscuits and 3 packets of crisps. Hannah spent £7 on 2 packets of crisps and a packet of biscuits.	$x + y = 3$ $x + 2y = 5$
Fran spent £15 on 3 t-shirts and 3 pairs of jeans. Fred spent £4 more on 3 t-shirts and 4 pairs of jeans.	$x + y = 6$ $x + 3y = 14$
Tim bought a pair of shorts and a shirt for £6. Tom spent £8 more to get a pair of shorts and three shirts.	$x + 2y = 9$ $5x + 2y = 21$
Sam spent £6 less than Pam. Pam bought 3 litres of petrol and a magazine. Toby bought a magazine and a litre of petrol.	$3x + y = 7$ $3x + 2y = 8$
Josh and Joan bought a shirt and 2 ties each but Josh bought four extra shirts. Joan spent £9 and Josh spent £21.	$2x + 2y = 10$ $3x + 2y = 13$

Challenges:

Question 4: Four chairs and two tables cost £218.
Six chairs and seven tables cost £587.
Find the total cost of buying twenty chairs and five tables.

Question 5: A plumber charges a price for each hour, £h, and a fixed charge, £c.
A 5 hour job costs £155 in total.
A 8 hour job costs £230 in total.
How much would a job that lasts 2 hours cost?

Question 6: Barry buys 200 pieces of stationery for £76.
Of the 200 pieces of stationery, x of them are rulers that cost 50p each and y of them are pens that cost 20p each.
Find how many rulers Barry buys and how many pens he buys.

Question 7: In a greengrocers, 4kg of bananas and 3kg of apples costs £7.50
In the same greengrocers, 3kg of bananas and 5kg of apples costs £8.10
How much would 2kg of bananas and 2kg of apples cost?

Exam Practice:

1 2 cakes and 3 rolls have a total cost of £7.20
5 cakes and 6 rolls have a total cost of £15.60

Work out the cost on one cake and the cost of one roll.

13 In a shop 2 coffees and 3 cakes cost £9.95
In the same shop 1 coffee and 4 cakes cost £10.35.

Work out the price for one coffee and the price for one cake.

(3 marks)

14 Sweets are sold in small packs and in big packs.
There is a total of 175 sweets in 4 small packs and 3 big packs.
There is a total of 154 sweets in 5 small packs and 2 big packs.
Work out the number of sweets in each small pack and in each big pack.

(3 marks)

Further Exam Style Questions

*1. The Singh family and the Peterson family go to the cinema.
The Singh family buy 2 adult tickets and 3 child tickets.
They pay £28.20 for the tickets.
The Peterson family buy 3 adult tickets and 5 child tickets.
They pay £44.75 for the tickets.
Find the cost of each adult ticket and each child ticket.

(Total for question = 5 marks)

*8. Paper clips are sold in small boxes and in large boxes.
There is a total of 1115 paper clips in 4 small boxes and 5 large boxes.
There is a total of 530 paper clips in 3 small boxes and 2 large boxes.
Work out the number of paper clips in each small box and in each large box.

(Total for Question is 5 marks)

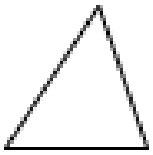
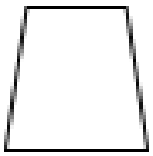
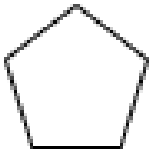
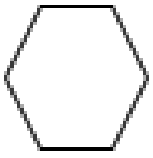
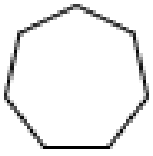
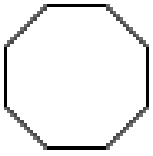
Week 5:

- **LI: I understand that the sum of angles in any polygon is the number of sides minus 2 times by 180**
- **LI: I understand how to calculate the sum of all the angles in a polygon**

Demonstration Videos:
https://corbettmaths.com/2012/08/10/angles-in-polygons/

Tasks 1:

We already know the sum of the interior angles of triangles and quadrilaterals, but what happens as polygons increase in their number of sides? Try and fill in the following table to help you discover the sum of interior angles of different polygons.

Picture of Polygon	Name of Polygon	Number of sides	Number of triangles	Sum of interior angles	Size of each angle (regular)
	Triangle	3	1	180°	60°
					
					
					
					
					

What do you think the sum of interior angles would be for a:
a) Nonagon? b) Decagon?

What happens to the sum of the interior angles as you add a side? (What does it go up in?)

Can you find a formula to relate the number of sides to the total sum of the interior angles? Use the table below to help you:

n (number of sides)										
T (total sum of interior angles										

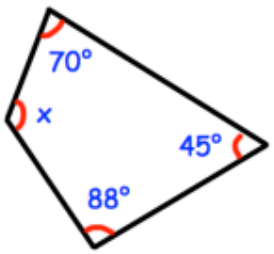
Formula:

What would the total sum of the interior angles be for a polygon with:
a) 20 sides? b) 100 sides?

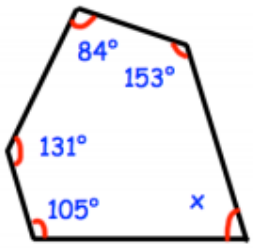
Tasks 2:

Question 1: Find the missing angle in each irregular polygon

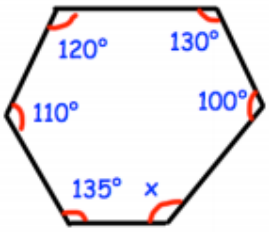
(a)



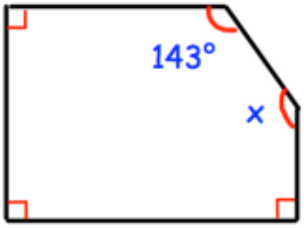
(b)



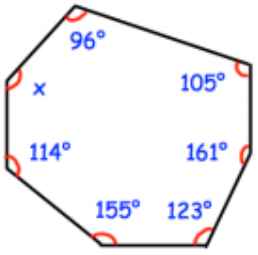
(c)



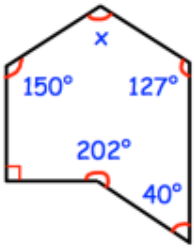
(d)



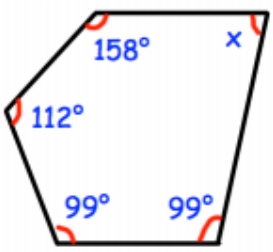
(e)



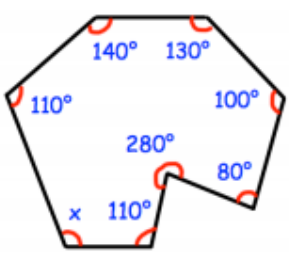
(f)



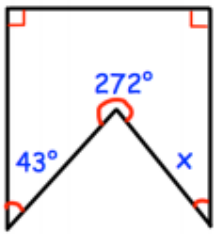
(g)



(h)



(i)



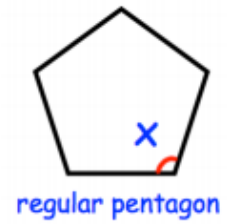
Question 3: Work out the number of sides of polygons with these sum of interior angles

(a) 1260° (b) 2880° (c) 3960° (d) 5040°

(e) 12240° (f) 15840° (g) 2340° (h) 89640°

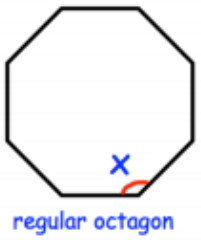
Question 4: Each of the polygons below are regular.
Calculate the size of each interior angle, x.

(a)

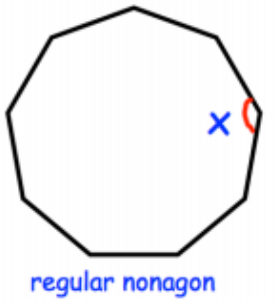


(b)

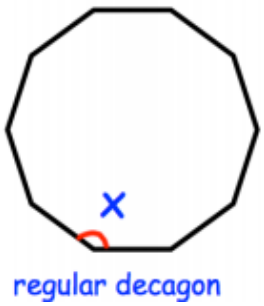
(c)



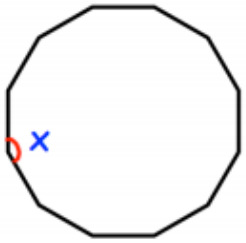
(d)



(e)



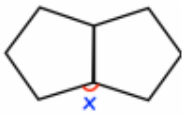
(f)



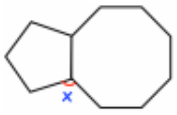
Challenges:

Question 1: In each diagram below, two regular polygons are shown.
Calculate x.

(a)

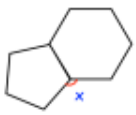


(b)

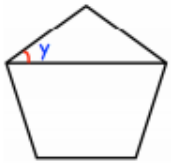


(c)

(d)



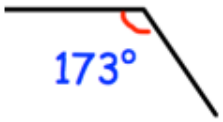
Question 2: Shown is a regular pentagon.
Find y.



Question 3: A regular polygon has 18 sides.
Calculate the size of each interior angle.

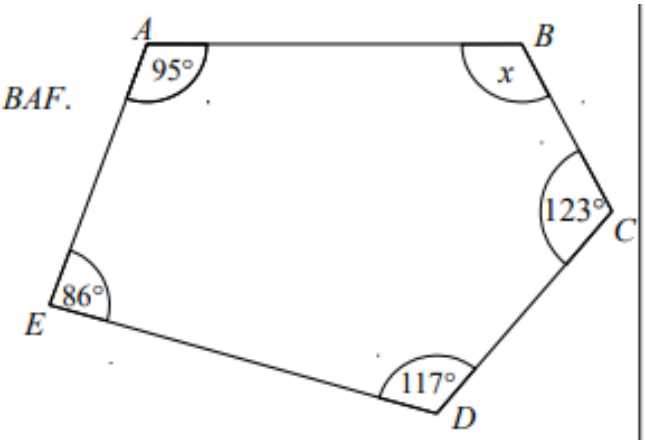
Question 4: A regular polygon has 30 sides.
Calculate the size of each interior angle.

Question 5: Explain why this cannot be an interior angle from regular polygons.



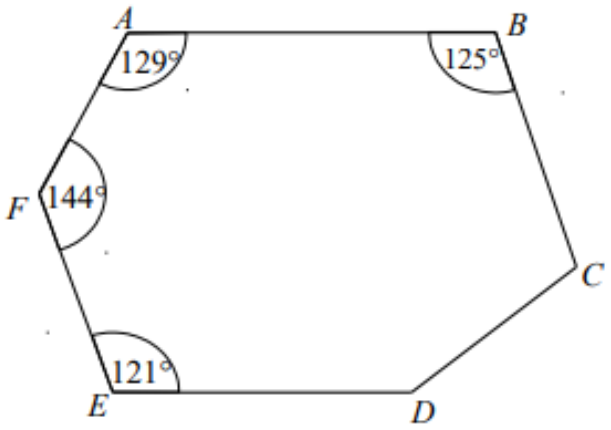
Exam Practice:

7 *ABCDE* is a pentagon.
Work out the size of angle *BAF*.



(2 marks)

8



ABCDEF is a hexagon.
Angle *CDE* = 2 × Angle *BCD*

Work out the size of angle *CDE*.

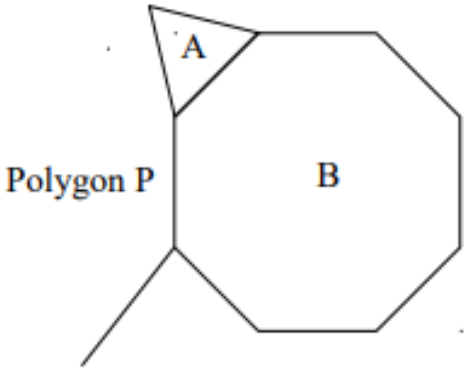
(3 marks)

10 Shape A is a regular triangle.
Shape B is a regular octagon.

Another regular polygon,
P, is shown on the diagram.

How many sides does polygon P have?

You must show your working.



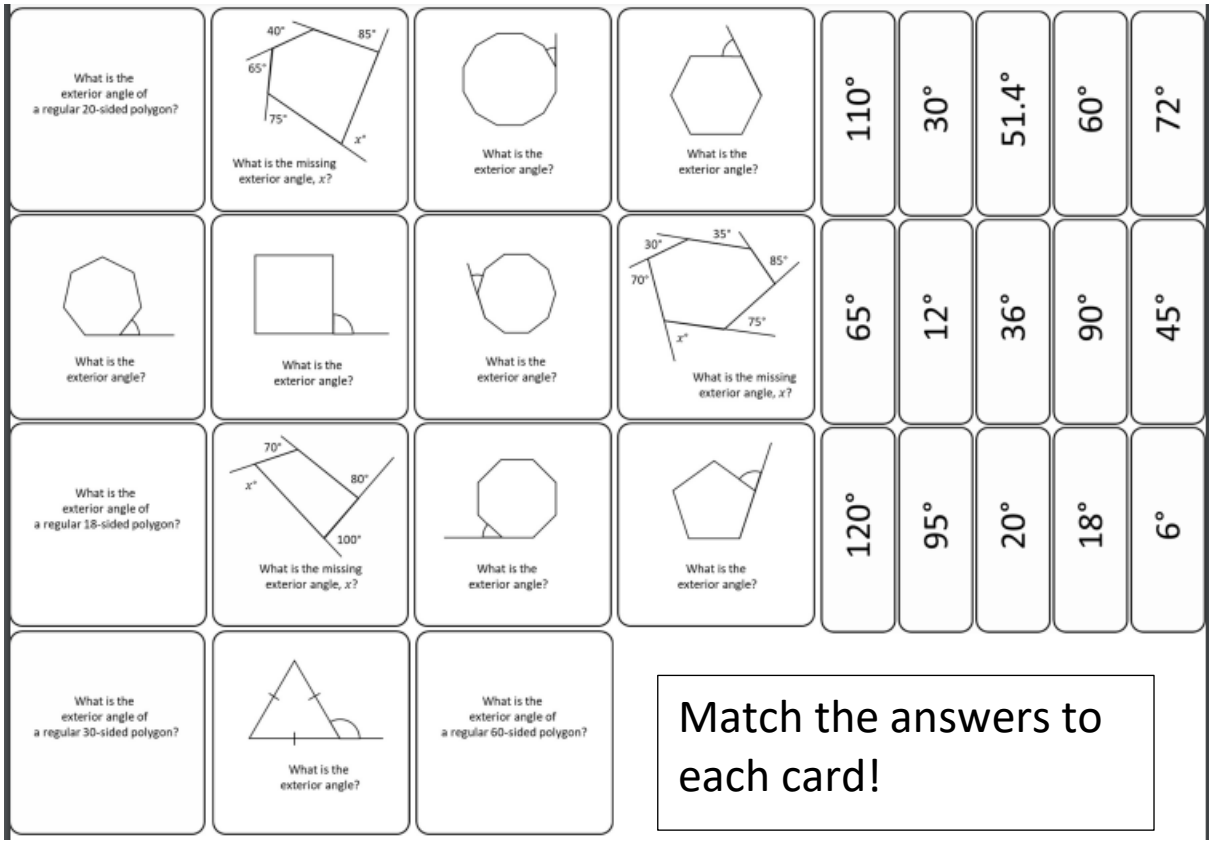
(4 marks)

Stewards Academy

- **LI: I understand how to find exterior angles in regular polygons**

Demonstration Videos:
https://www.khanacademy.org/math/geometry-home/geometry-shapes/angles-with-polygons/v/sum-of-the-exterior-angles-of-convex-polygon

Tasks:



Question 7: Calculate the size of each exterior angle in regular polygons with

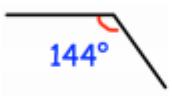
(a) 15 sides (b) 18 sides (c) 20 sides (d) 24 sides

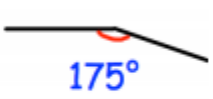
(e) 30 sides (f) 36 sides (g) 40 sides (h) 45 sides

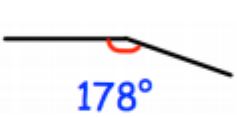
(i) 60 sides (j) 72 sides (k) 90 sides (l) 200 sides

Challenges:

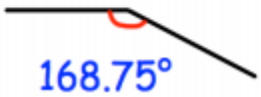
Question 8: Shown below is one interior angle from regular polygons.
Calculate how many sides the polygons have.

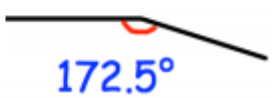
(a) 

(b) 

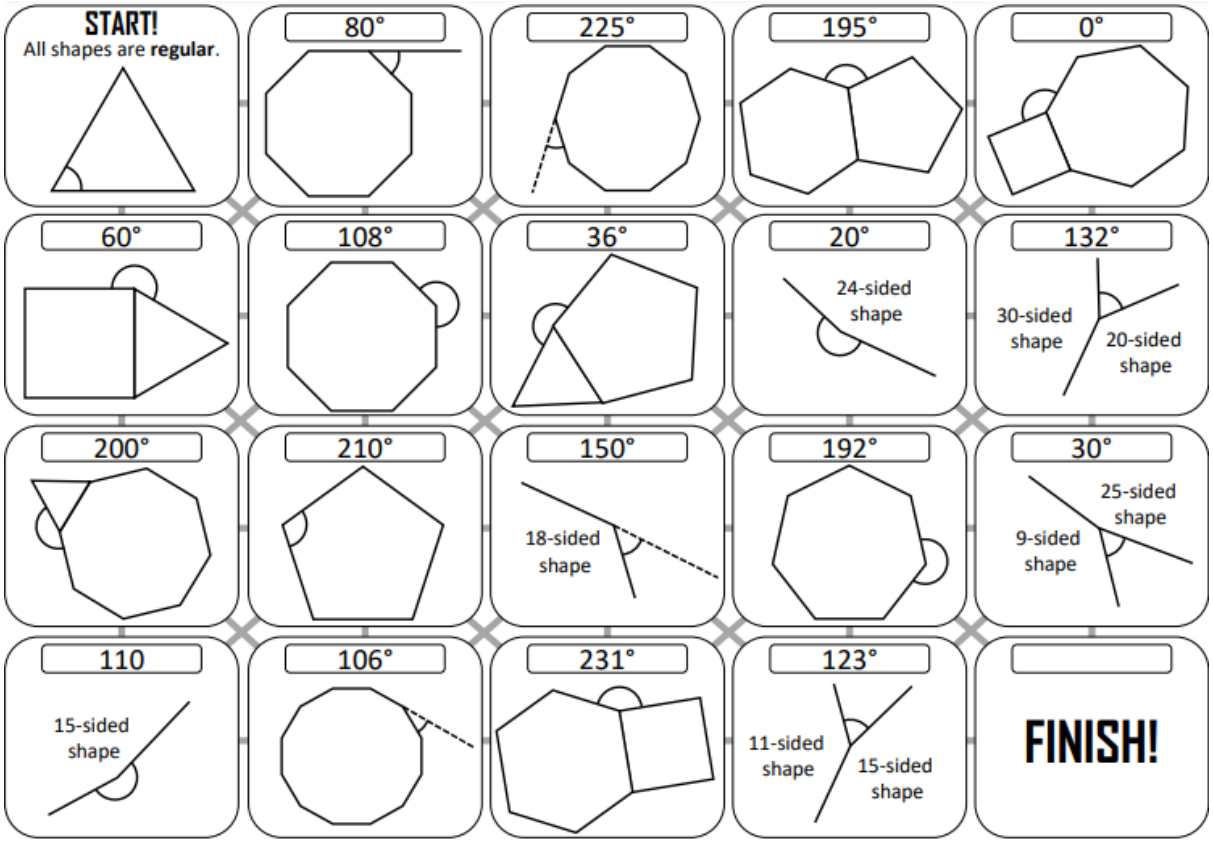
(c) 

(d) 

(e) 

(f) 

Find a path through the maze through boxes leading to correct answers



Exam Practice:

1 Work out the size of an exterior angle of a regular hexagon.

(2

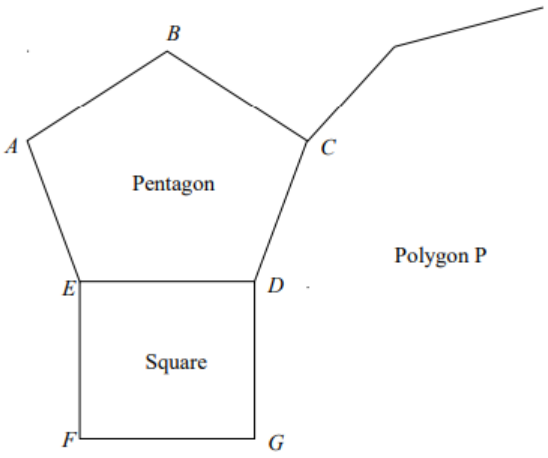
4 The size of each exterior angle in a regular polygon is 20°.
Work out how many sides the polygon has.

(2

6 The size of each interior angle in a regular polygon is 165°.
Work out how many sides the polygon has.

(2

12



Polygon P

The diagram shows a regular pentagon, ABCDE, and a square, EDFG.

The lines CD and DG are both sides of another regular polgon, P.

How many sides does polygon P have?

You must show how you got your answer.

(4 marks)

Week 6:

- **LI: I can identify properties of special types of quadrilaterals**

Demonstration Video:

https://corbettmaths.com/2013/12/21/names-of-quadrilaterals-video-2/

Tasks:

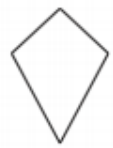
Question 1: Draw the following quadrilaterals

(a) A kite (b) A rectangle (c) A square (d) A parallelogram

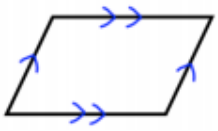
(e) A trapezium (f) A rhombus (g) An arrowhead/A delta

Question 2: Name each of the shapes below

(a)



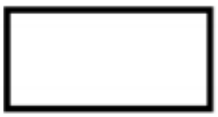
(b)



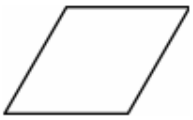
(c)

(d)

(e)



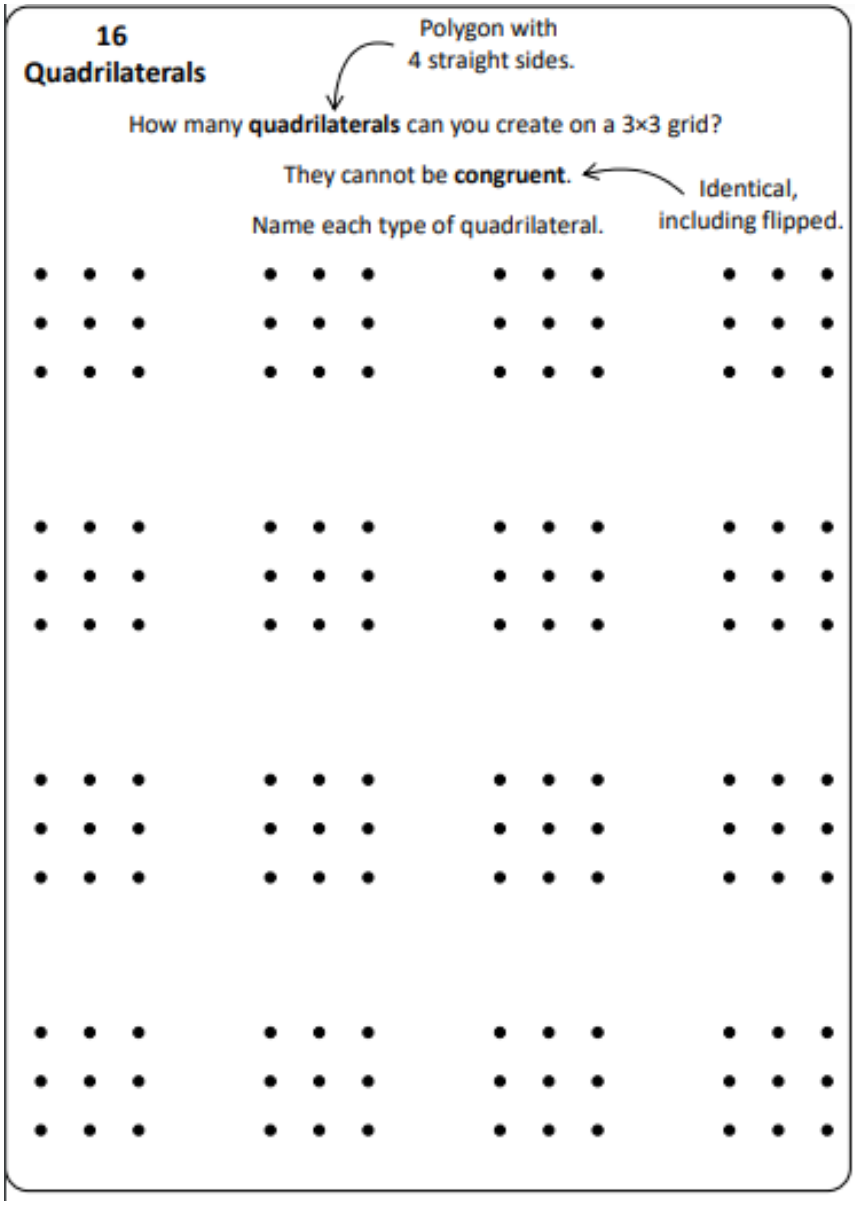
(f)



Question 5: Which quadrilaterals have only one pair of equal length sides?

Question 6: Which quadrilaterals have two pairs of equal length sides?

Challenges:



Exam Practice:

1 Tick all the statements that are true for any rhombus.

[1 mark]

- ☐ The diagonals are lines of symmetry
- ☐ The diagonals bisect each other
- ☐ The diagonals are perpendicular
- ☐ The diagonals are equal in length

1 Which of these shapes has the most sides? **[1 mark]**

Circle your answer.

Pentagon Parallelogram Kite Hexagon

2 Which of these shapes has the least sides? **[1 mark]**

Circle your answer.

Rectangle Pentagon Rhombus Equilateral Triangle

3 Which of these shapes has the most sides? **[1 mark]**

Circle your answer.

Trapezium Square Octagon Pentagon

- **LI: I can identify equal angles in quadrilaterals**

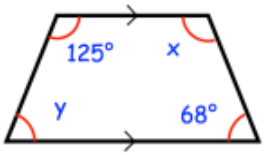
Demonstration Videos:

https://corbettmaths.com/2013/03/17/angles-in-quadrilaterals/

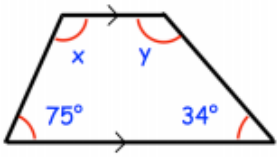
Tasks:

Question 2: Shown below are three trapezia.
Find the size of each missing angle.

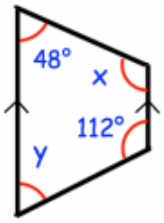
(a)



(b)

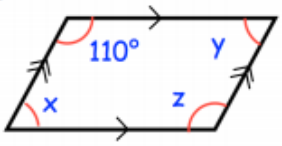


(c)

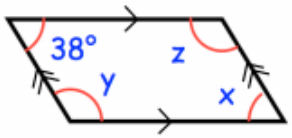


Question 3: Shown below are three parallelograms.
Find the size of each missing angle.

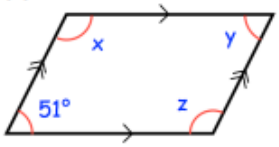
(a)



(b)

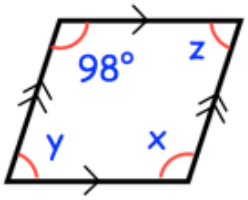


(c)

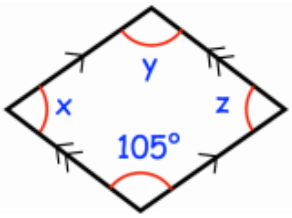


Question 4: Shown below are three rhombuses.
Find the size of each missing angle.

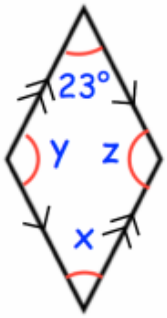
(a)



(b)

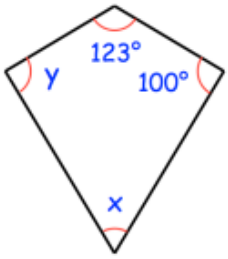


(c)

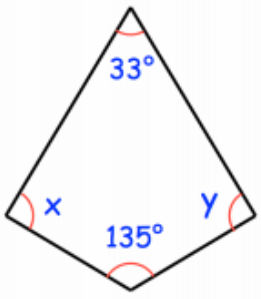


Question 5: Shown below are three kites.
Find the size of each missing angle.

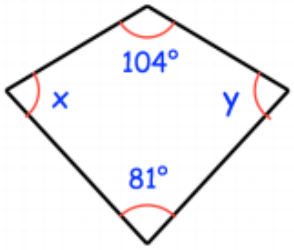
(a)



(b)

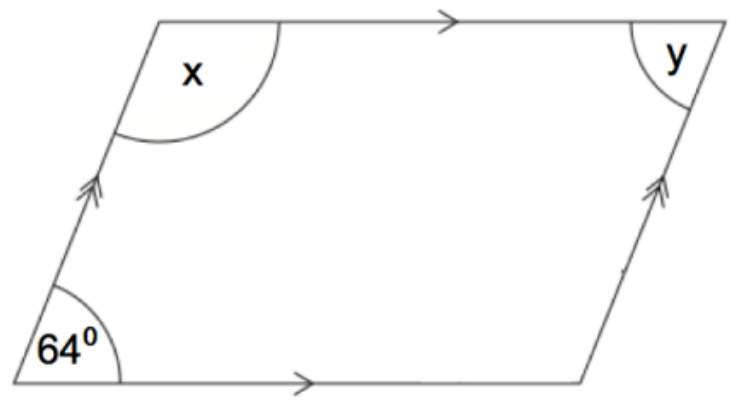


(c)



Challenges & Exam Practice:

9.



The diagram above shows a parallelogram.

(a) Work out the size of the angle marked x.

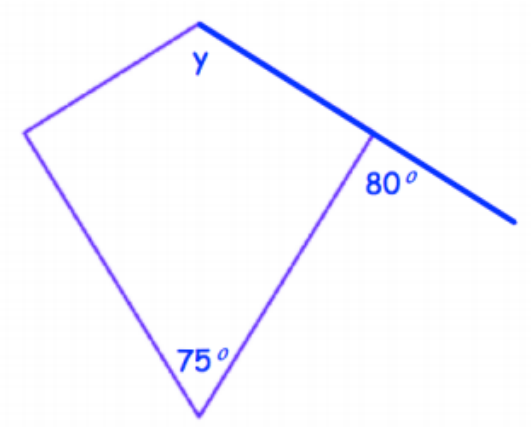
.....⁰

(b) Work out the size of the angle marked y.

.....⁰

(2)

19. Below is a kite.



Calculate the size of angle y.

.....

(3)

- **LI: I can identify parallel sides, lines of symmetry and rotational symmetry**

Demonstration Videos:

https://corbettmaths.com/2013/04/04/parallel-lines-definition/
https://corbettmaths.com/2013/05/15/line-symmetry/
https://corbettmaths.com/2012/08/10/rotational-symmetry/

Tasks:

Question 1: Draw the following quadrilaterals

(a) A kite (b) A rectangle (c) A square (d) A parallelogram

(e) A trapezium (f) A rhombus (g) An arrowhead/A delta

Question 3: Draw all lines of symmetry on the quadrilaterals you have drawn in Question 1.

Question 4: Write down the order of rotational symmetry that each quadrilateral below has:

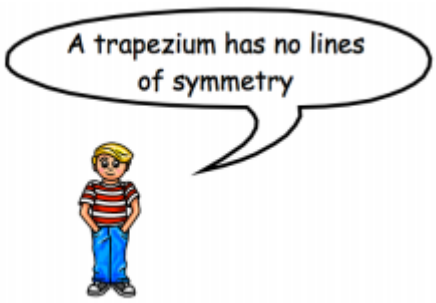
(a) A square (b) A rectangle (c) A kite (d) A parallelogram

(e) A trapezium (f) A rhombus

Question 8: Which quadrilaterals have two pairs of parallel sides?

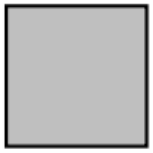
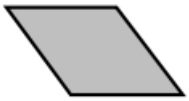
Question 9: Which quadrilaterals have one pair of parallel sides?

Question 10 Explain why Martin is incorrect.



Challenges:

Match shapes with its name and properties

					
Rectangle	Kite	Rhombus	Isosceles Trapezium	Parallelogram	Square
2 pairs of parallel sides	2 pairs of parallel sides	No parallel sides	1 pair of parallel sides	2 pairs of parallel sides	2 pairs of parallel sides
2 pairs of equal sides	2 pairs of equal sides	All sides equal	2 pairs of equal sides	All sides equal	1 pair of equal sides
1 pair of equal angles	All angles equal	2 pairs of equal angles	2 pairs of equal angles	2 pairs of equal angles	All angles equal
2 lines of symmetry	2 lines of symmetry	1 line of symmetry	No lines of symmetry	4 lines of symmetry	1 line of symmetry

Question 2: Can you spot any mistakes?

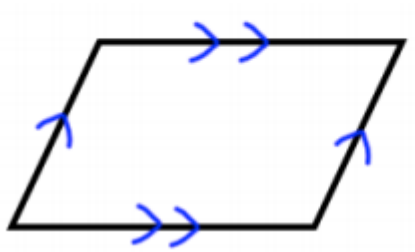
Below is a rectangle.

Tick the correct boxes for the four statements.

	True	False
A rectangle has four right angles	☑	☐
A rectangle has one pair of parallel lines	☑	☐
A rectangle has four lines of symmetry	☑	☐
A rectangle has rotational symmetry of order 2	☑	☐

Exam Practice:

3. A quadrilateral is drawn below.
It has two pairs of parallel sides.



(a) Write down the name of this quadrilateral.

.....

(1)

(b) How many lines of symmetry does the shape have?

.....

(1)

(c) Draw a quadrilateral with two lines of symmetry

7. The names of three quadrilaterals are below.

square kite parallelogram

Write each name in the correct position in the table below.

	Line Symmetry	No Line Symmetry
Two pairs of parallel lines		
No parallel lines		

(3)

6. Here is a list of quadrilaterals.

kite rectangle rhombus square parallelogram

For each of the following descriptions, choose the correct name from the list.

(a) All four sides are the same length.
All four angles are equal.

.....

(1)

(b) Two pairs parallel sides.
Opposite angles are equal.
No lines of symmetry.

.....

(1)

(c) All four sides are the same length.
There are no right angles.

Questions	Question Title
1	Converting units of time
2	Square numbers
3	Decimal place value
4	Writing formulae
5a	Indices in algebra
5b	Collecting like terms
6	Drawing bar charts
7	Problem solving with coins
8	Special offer money problems
9	Writing and solving equations
10	Types of triangles, triangle properties
11	Factors, prime numbers
12	Complex calculations using a calculator
13a	Complex calculations using a calculator
13b	Estimating complex calculations
14a/b	Reading two-way tables
15	Percentages of amounts
16	Circumference of a circle
17a/b	Substituting into formulae
18	Mean problem solving
19a	Sharing in a ratio
19b	Writing ratios in the form n : 1
20	Income and rates of pay
21a	Calculating relative frequencies
21b	Calculating expected outcomes from relative frequencies
22	Compound measure
23	Understanding discrete data
24	Describing enlargements
25a	Inverse proportion graphs, prism volume
25b	Volume of a prism
26a	Fractions of amounts
26b	Comparing fractions
27	Solving linear equations: brackets, x on both sides
28	Finding the next term of a quadratic sequence
29	Right-angled trigonometry, finding angles