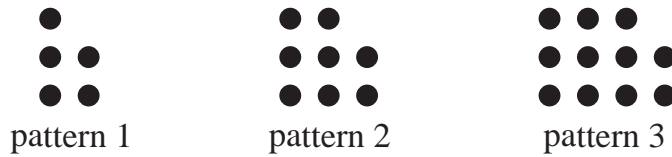


Sample Questions and Mark Schemes

1 The diagram shows the first three patterns in a series of dots.



(a) Complete the table below.

pattern number	1	2	3	4	5
number of dots	5	8	11		

[2]

(b) How many dots will be needed for pattern number 8? _____ [1]

(c) Which pattern needs 62 dots? _____ [1]

(d) Write down a rule connecting the number of dots and the pattern number.

[1]

Mark Scheme for Question 1

Question No. 1				
<ul style="list-style-type: none"> Recognise, continue and generalise number patterns including finding expressions for the nth term Use and interpret positive, negative and zero indices 				
Part	CF ¹	Mark	Answer	Further Information
(a)	Ag5	2	14 and 17	Accept other letters
(b)	Ag5	1	26	
(c)	Ag5	1	20	
(d)	Ag5	1	$S = 3n + 2$ or Number of dots = 3 times pattern number then add 2	
	Total	5		

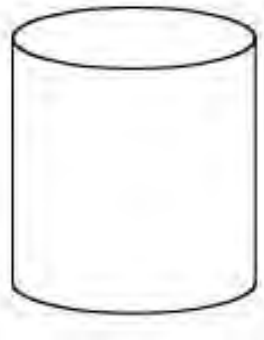
1 CF stands for Curriculum Framework. This column shows which part of the Curriculum Framework is being assessed in the question. The first letter, N, A or S, shows the main area of Mathematics: Number, Algebra or Space. The next letter shows the subtopic – e.g. Number is divided into Properties (p), Problem Solving (s) and Data Handling (d). The number shows which bullet point from that section of the Curriculum Framework is being assessed.

- 2 (a) In 1998 an Australian bought a coin collection for \$17550.
Before taking the collection home he had to pay a tax of 22%.
Calculate how much tax he paid.
- \$ _____ [1]
- (b) The collection was originally owned by an American.
He made a profit of 30% when he sold it to the Australian.
Calculate the amount paid by the American.
- \$ _____ [1]
- (c) The American was charged \$877.50 for selling the collection.
Give the percentage of the sale price of \$17550.
- _____ % [1]
- (d) The collection was a mixture of bronze and silver coins in the ratio 5 : 2.
The total number of coins in the collection was 4557.
Calculate how many coins were silver.
- _____ silver coins [2]

Mark Scheme for Question 2

Question No. 2				
<ul style="list-style-type: none"> Calculate the percentage of a quantity; express one quantity as a percentage of another; recognise the notation of ratio, use ratio and direct proportion in context 				
Part	CF	Mark	Answer	Further Information
(a)	Ns1	1	3861	
(b)	Ns1	1	5	
(c)	Ns3	1	$\frac{2}{7} \times 4557$	1 mark for $\frac{2}{5} \times 4557$ seen
		1	1302	
	Total	4		

- 3 The diagram shows a cylindrical can closed at both ends. The height of the can is 15 cm and its radius is 3.5 cm. The volume of the can is 500 ml.



Circumference of a circle = $2\pi r$

Area of a circle = πr^2

Volume of a cylinder = $\pi r^2 h$

- (a) (i) Calculate the circumference of the circular end of the can.
Give your answer to the nearest whole cm.

_____ cm [1]

- (ii) Calculate the area of the circular end of the can.
Give your answer to 1 decimal place.

_____ cm² [2]

- (b) The height of another can is 12 cm.
The area of its circular end is 24.6 cm².
Calculate the volume of this can.

_____ cm³ [1]

Mark Scheme for Question 3

Question No. 3				
<ul style="list-style-type: none"> Calculate the perimeter and area of triangles, quadrilaterals and circles, and the volumes derived from these shapes Understand approximation to specified numbers of significant figures and decimal places; give appropriate upper and lower bounds for data given to specified accuracy 				
Part	CF	Mark	Answer	Further Information
(a)(i)	Sm5	1	22	
(ii)	Sm5	1	38.4851	
	Ns4	1	38.5	
(b)	Sm5	1	295.2	
	Total	4		

4 Remove the brackets and simplify.

(a) $2(x + 3) + 3x$

_____ [2]

(b) $3(x + 2) - 2(x + 1)$

_____ [2]

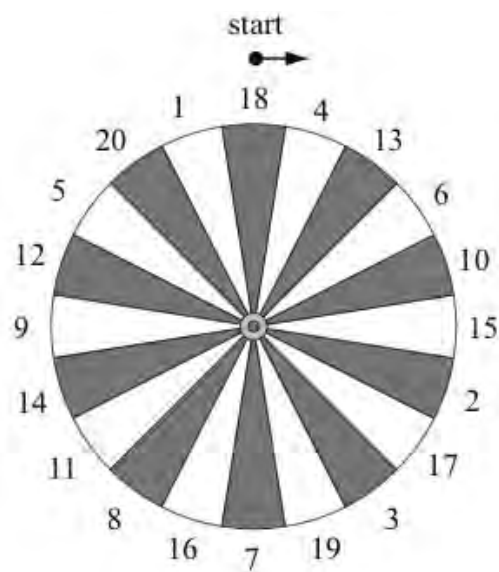
(c) $(x + 2)(x - 3)$

_____ [2]

Mark Scheme for Question 4

Question No. 4				
<ul style="list-style-type: none"> Manipulate directed numbers; use brackets and extract common factors 				
Part	CF	Mark	Answer	Further Information
(a)	An4	1	$2x + 6$	Mark is for correct removal of brackets
	An4	1	$5x + 6$	Mark is for correct collection of terms Award both marks for correct answer even if working is not shown
(b)	An4	1	$3x + 6$ or $-2x - 2$	Mark is for correct removal of either brackets
	An4	1	$x + 4$	Mark is for correct collection of terms Award both marks for correct answer even if working is not shown Note: award 1 mark for $x + 8$
(c)	An4	1	$x^2 - 3x + 2x - 6$	Mark is for correct removal of brackets items in any order, e.g. $-3x + 2x + x^2 - x - 6$)
	An4	1	$x^2 - x - 6$	Mark is for correct collection of terms Award both marks for correct answer even if working is not shown
	Total	6		

5



Each section on a circular board has a number between 1 and 20, as shown on the diagram. Starting each time at 18, and working **clockwise**, give the **first number** that satisfies the following conditions:

(a) is a prime number _____ [1]

(b) is a multiple of 2, 3, 4 and 6 _____ [1]

(c) is a an odd square number _____ [1]

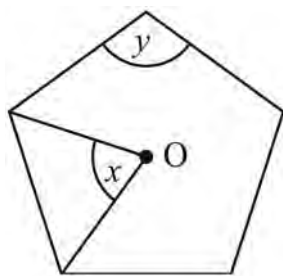
(d) is the **square root** of an even number on the board _____ [1]

Mark Scheme for Question 5

Question No. 5				
<ul style="list-style-type: none"> Use prime numbers, common factors and common multiples, squares, square roots and cubes of numbers 				
Part	CF	Mark	Answer	Further Information
(a)	Np4	1	13	
(b)	Np4	1	12	
(c)	Np4	1	9	
(d)	Np4	1	4	Accept 2
	Total	4		

6

NOT TO SCALE



A spinner, made in the shape of a **regular** pentagon, is shown. O is the centre of the pentagon.

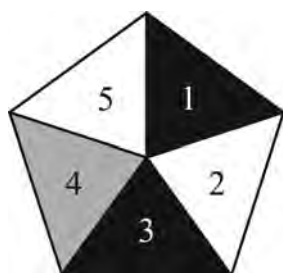
(a) Calculate the size of:

(i) angle x

$x = \underline{\hspace{2cm}}^\circ$ [1]

(ii) angle y

$y = \underline{\hspace{2cm}}^\circ$ [1]



The spinner is shaded and numbered as shown in this picture.

(b) Calculate the probability that the spinner will:

(i) land on a black odd number. Give your answer as a fraction.

$\underline{\hspace{2cm}}$ [1]

(ii) land on a white even number. Give your answer as a decimal.

$\underline{\hspace{2cm}}$ [1]

(iii) not land on a grey number. Give your answer as a percentage.

$\underline{\hspace{2cm}}\%$ [1]

Mark Scheme for Question 6

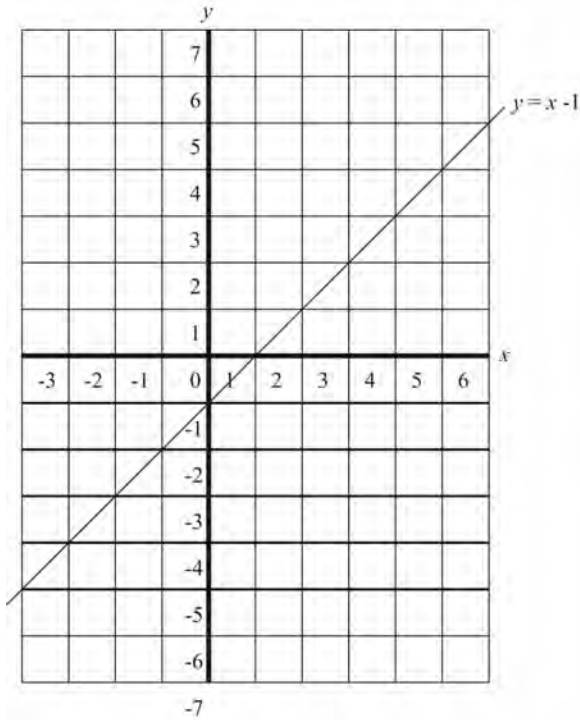
Question No. 6				
<ul style="list-style-type: none"> Calculate unknown angles using the properties of: angles at a point, angles formed within parallel lines and angle properties of triangles and quadrilaterals Calculate the probability of a single event 				
Part	CF	Mark	Answer	Further Information
(a) (i)	Sg2	1	72	If probability is given in wrong format, penalise only once in this question
(ii)	Sg2	1	108	
(b) (i)	Nd3	1	$\frac{2}{5}$	
(ii)	Nd3	1	0.2 or .2	
(iii)	Nd3	1	80	
	Total	5		

7 (a) Complete the table below for the graph $y = 2x - 3$

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

_____ [2]

(b) On the grid below draw the graphy of $y = 2x - 3$



(c) Write down the gradient of the graph $y = 2x - 3$

Gradient = _____ [1]

(d) The graph of $y = x - 1$ is also drawn on the grid above.

Use your graph to solve the simultaneous equations: $y = 2x - 3$ and $y = x - 1$

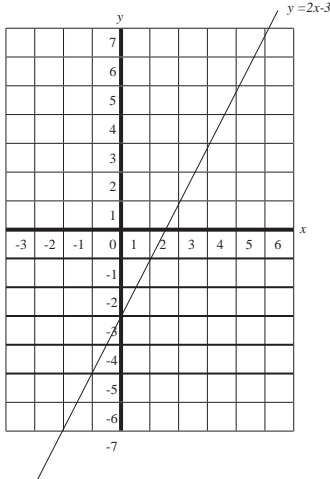
$x =$ _____

$y =$ _____ [2]

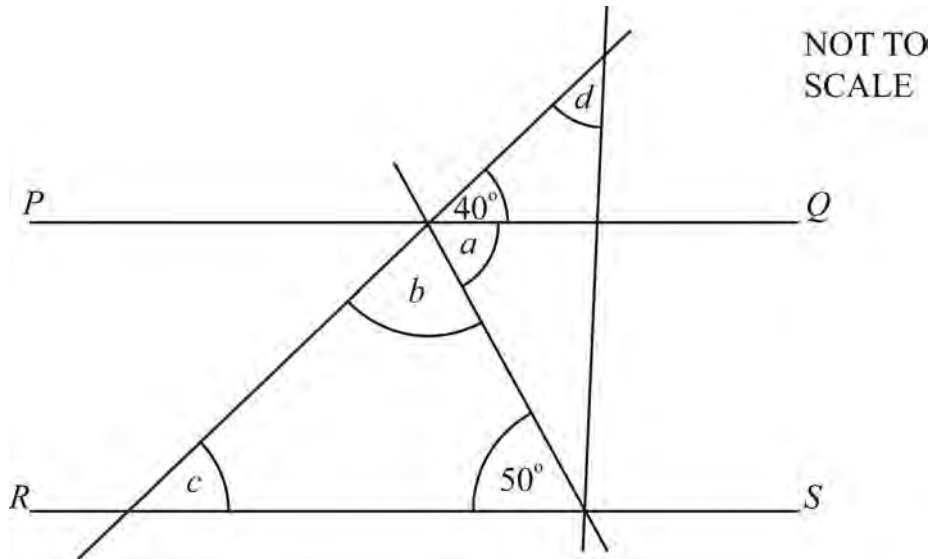
Mark Scheme for Question 7

Question No. 7

- Draw and interpret the graphs of simple functions, use tables of values and find the gradient of straight line graphs
- Find the solution of linear and simple simultaneous equations using graphs

Part	CF	Mark	Answer	Further Information
(a)	Ag1	2	-5, -3, 1 (missing values in this order)	Award 1 mark for one or two correct entries
(b)	Ag1	1		
(c)	Ag1	1	2	
(d)	Ag4	1	$x = 2$	
	Ag4	1	$y = 1$	
	Total	6		

8



In the diagram PQ is parallel to RS .

Find angles a , b , c and d .

$a = \text{—————}^\circ$ [1]

$b = \text{—————}^\circ$ [1]

$c = \text{—————}^\circ$ [1]

$d = \text{—————}^\circ$ [1]

Mark Scheme for Question 8

Question No. 8				
<ul style="list-style-type: none"> Calculate unknown angles using the properties of: angles at a point, angles formed within parallel lines and angle properties of triangles and quadrilaterals 				
Part	CF	Mark	Answer	Further Information
(a)	Sg2	1	50	
(b)	Sg2	1	90	
(c)	Sg2	1	40	
(d)	Sg2	1	40	
Total		4		

