

Maths - Year 6

Calculating 13: Solving non-routine problems using all four operations

Key Vocabulary		Mathematical Skills
Redistribute/ regroup	Rearranging numbers by place value to make it easier to carry out operations.	<ul style="list-style-type: none"> - Approach problem solving confidently and identify alternative ways of solving a problem. - Choose calculating strategies and methods which are appropriate to the problem. - Work systematically to solve problems involving more than one step. - Interpret answers or results to calculations and express solutions in appropriate units of measure, according to the problem context. - Round numbers to an appropriate degree of accuracy when calculating, according to the problem context.
Rounding	Increasing or decreasing a number or amount to make it closer to (usually) a multiple of ten, or a whole measuring unit, e.g. rounding 353 to 350 or 89 cm to 1 metre. Often done to make calculating easier, but less accurate.	
Percentage	Used to show a fraction 'out of 100' with the symbol %, e.g. 50%.	
Inverse	The opposite or the reverse.	
Measurement related words	E.g. speed, pace, rate, distance, time.	
Rotation	Rotating/turning about an axis or centre point.	
Radius	A straight line from the centre to the edge of a circle.	
circumference	The distance around a circle.	
Diameter	The measurement across a circle.	
Pi π	the ratio of the circumference of any circle, always equal to 3.14....	

Mathematical Methods

- Solving non-routine problems involving decimals—dividing, multiplying and subtracting e.g. which child cycles the fastest?

Name	Time (min, to nearest min)	Distance (km)
Ashya	10	1.85
Matias	8	1.7
Jen	16	2.68
Sam	18	2.25
Mark	13	2.6

$$\begin{array}{r} 0.21625 \\ 8 \overline{) 1.73000} \\ \underline{8} \\ 9 \\ \underline{72} \\ 18 \\ \underline{16} \\ 20 \\ \underline{16} \\ 40 \end{array}$$

$$\begin{array}{r} 0.21375 \\ 16 \overline{) 2.68000} \\ \underline{16} \\ 10 \\ \underline{96} \\ 40 \\ \underline{32} \\ 80 \\ \underline{80} \\ 0 \end{array}$$

$$\begin{array}{r} 0.2125 \\ 8 \overline{) 1.3400} \\ \underline{8} \\ 54 \\ \underline{56} \\ 20 \\ \underline{16} \\ 40 \end{array}$$

Name	Distance cycled per minute
Matias	0.213 km
Mark	0.2 km
Ashya	0.185 km
Jen	0.168 km
Sam	0.125 km

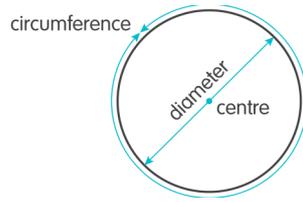
- Solving non-routine problems involving fractions and percentages—dividing, adding and subtracting e.g. which bike offer results in the lowest price?



each bike the amount of the discount can be calculated by dividing (e.g. 25% of £329.52 can be calculated by dividing £329.52 by 4, since 25% is equivalent to one-quarter) and then the discounted price found by subtracting the discount from the original price.

- Solving non-routine problems—multiplying and dividing e.g. how far would Jen’s bike travel if its wheels went through 8 complete rotations?

Name	Diameter of bike wheels (inches)
Ashya	16
Matias	24
Jen	14
Sam	20
Mark	26

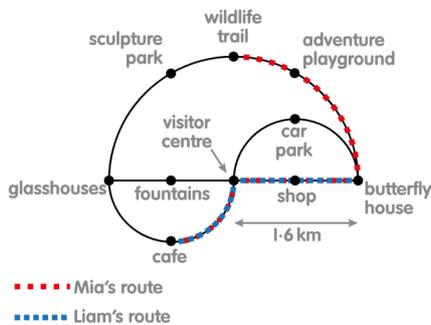


Jen’s bike wheels $d = 14$ so $C = 3.14 \times 14$,

	3	1	4			4	3	9	6
×		1	4			×			8
	1	2	5	6		3	5	1	6
	3	1	4	0			3	7	4
	4	3	9	6					

Name	Diameter of bike wheels (inches)	Distance in 1 rotation (inches)	Distance in 1 rotation (m)	Distance in 8 rotations (inches)	Distance in 8 rotations (m)	Number of rotations in 500 m
Ashya	16	50.24	1.28	401.92	10.21	391
Matias	24	75.36	1.91	602.88	15.31	262
Jen	14	43.96	1.12	351.68	8.93	446
Sam	20	62.8	1.60	502.4	12.76	313
Mark	26	81.64	2.07	653.12	16.59	242

- Solving more non-routine problems - adding, multiplying and dividing e.g. Mia is at the wildlife trail, while Liam is at the butterfly house. Work out the length of the shortest route for each of them to get to the café, if they both go via the shop.



Liam:

	3	1	4			1	2	5	6
×		1	6		4	5	0	2	2
	1	8	8	4					
	3	1	4	0		1	6	0	0
	5	0	2	4		+	1	2	5
	1	1					2	8	5

Mia:

		3	1	4			2	5	1	2
×			3	2		4	1	0	0	4
			6	2	8					
			9	4	2	0		2	5	1
		1	0	0	4	8		+	2	8
									5	3

Can you..?

- Elsie wants to tile the bathroom floor. The floor measures 7.2m x 5.4m. Can you work out the price for the different tiles?

60 cm × 60 cm £7.90 per tile 10% off each 100 tiles purchased	20 cm × 20 cm £9.99 per pack of 10 tiles	30 cm × 60 cm £3.94 per tile