

Christmas Maths Competition 2020 - Solutions

1)	Partridge	1×12	12
	Turtle doves	2×11	22
	French hens	3×10	30
	Calling birds	4×9	36
	Geese-a-laying	6×7	42
	Swans-a-swimming	7×6	42

184

2) Circumference = $42 - 1 = 41$ cm
 Diameter = $\frac{41}{\pi} = 13.0507... \text{ cm}$

Each pupil: $8 \times 13.0507... = 104.405... \text{ cm}$

Whole school: $829 \times 104.405... = 86552.277... \text{ cm} = 865.52... \text{ m}$

Quad perimeter = $4 \times 30 = 120 \text{ m}$

$865.52... \div 120 = 7.21$ times \Rightarrow 7 times

3) Each lane: $\frac{188000}{4.5+1} = 34181.8... = 34181$

6 lanes: $34181 \times 6 =$ 205086 cars allow answers from other approaches to rounding

4)

	Hundreds	Tens	Units	
1-99		10	10	
100-199		10	10	
200-272	73	10	8	
	73	30	28	= 131 2 digits

5) Google maps Tehvan \rightarrow Jerusalem: 1932 km (allow other routes)
 $\frac{1932}{5 \times 12} = 32.2$ days round up to 33 days (overnight stay)

Jerusalem \rightarrow Bethlehem: 9.4 km < 1 day

so \approx 34 days (for this route)

6) In the bleak midwinter (shift 5 letters)

7) Presents: 1 2 3 4

Labels: 1 2 3 4

1	2	4	3	
1	3	2	4	
1	3	4	2	
1	4	2	3	
1	4	3	2	
2	1	3	4	
2	1	4	3	✓
2	3	1	4	
2	3	4	1	✓
2	4	1	3	✓
2	4	3	1	
3	1	2	4	
3	1	4	2	✓
3	2	1	4	
3	2	4	1	
3	4	1	2	✓
3	4	2	1	✓
4	1	2	3	✓
4	1	3	2	
4	2	1	3	
4	2	3	1	
4	3	1	2	✓
4	3	2	1	✓

$$P(\text{no matches}) = \boxed{\frac{9}{24} = \frac{3}{8} = 0.375}$$