USING THE STRATEGIES

1. **Driving** Rashad started the 780-km drive from Sault Ste. Marie to Ottawa at 09:00. His average speed was 80 km/h. Three hours later, Tyson left Ottawa for Sault Ste. Marie. He drove at 70 km/h on the same highway. How far from Ottawa, and at what time of day, did they meet?

2. **Geometry** The side lengths of a triangle are \(x + 2\), \(8 - x\), and \(4x - 1\). What value, or values, of \(x\) make the triangle isosceles?

3. **Rolling dice** You are given a standard die labelled from 1 to 6. How can you label a second die using only the numbers 0, 1, 2, 3, 4, and 5 so that, when you roll both dice, the totals from 1 to 12 are equally likely?

4. **Hop, step, and jump** Suppose that a hop, a step, and a jump each have a specific length. Suppose \(p\) hops equals \(q\) steps, \(r\) jumps equals \(s\) hops, and \(t\) jumps equals \(x\) metres. How many steps does one metre equal?

5. **Measurement** The height of a triangle is 12 cm. The side lengths are consecutive whole numbers of centimetres. The area of the triangle is a whole number of square centimetres. What are the side lengths?

6. **Rod lengths** You have 12 rods, each 13 units long. They are to be cut into pieces measuring 3, 4, and 5 units. The resulting pieces will be assembled into 13 triangles, each with sides of 3, 4, and 5 units. How should the rods be cut?

7. **Sequence** The ninth term of a geometric sequence is 40. The twelfth term of the sequence is 5. What is the first term of the sequence?

8. **Equations** The letters \(R\), \(S\), and \(T\) represent integers. Find the possible values of \(R\), \(S\), and \(T\).

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\begin{align*}
R + S - T &= 8 \\
R \times S \times T &= 48 \\
R - S - T &= 0
\end{align*}
\]

9. **Quotients**
   
a) What is the quotient when any three-digit number whose digits are the same is divided by the sum of its digits?
   
b) Explain why the quotient is always the same.
   
c) Is there a constant quotient for four-digit numbers whose digits are the same? For five-digit numbers? For numbers with any number of digits? Explain.

10. **Charity walk** Orly and her friends organized a fundraising walk for charity. Without stopping, they walked on a level road, then up a hill, back down the hill, and then back to the start along the level road. The walk took six hours. Their speed was 4 km/h on the level road, 3 km/h up the hill, and 6 km/h down the hill. How far did they walk?

11. **Intersecting circles** A circle with radius 3 cm intersects a circle with radius 4 cm. At the points of intersection, the radii are perpendicular. What is the difference in the areas of the non-overlapping parts of the circles?