Co-op Round, Page 1: Team answers must be on the *coloured* page.
Answers on a white page will not be graded.

1. In Vancouver taxis, the meter starts at $2.44. For that you get to ride a distance of at most 71 metres. Each additional 71 metres or fraction thereof costs 10 cents. You are also charged 10 cents for every 14 seconds or fraction thereof that the taxi is not moving.

   Alan took a taxi ride in Vancouver. The distance covered was 7 kilometres, and the taxi was not moving for a total of 6 minutes and 59 seconds. How many dollars did the taxi ride cost?
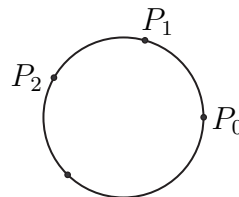
   1. _____ dollars

2. At the beginning, the red bowl contains 1 litre of water, and the blue bowl is empty. Then one-half of the water in the red bowl is poured into the blue bowl. Then one-third of the water in the blue bowl is poured into the red bowl. Then one-quarter of the water in the red bowl is poured into the blue bowl. Finally, one-fifth of the water in the blue bowl is poured into the red bowl.

   At the end, how many litres of water are in the red bowl?

   2. _____ litres

3. For any number x, $\lfloor x \rfloor$ is the greatest integer which is less than or equal to x. For example, $\lfloor 2.45 \rfloor = 2$.

   Find the positive number x such that the product of x and $\lfloor x \rfloor$ is equal to $\dfrac{64}{7}$.
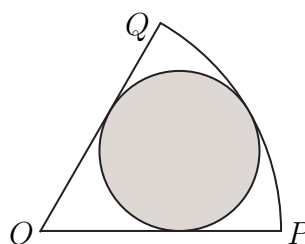
   3. _____

4. Starting at a point P_0 on a circle, we mark off successive arcs of 75 degrees counterclockwise around the circle. Let P_1, P_2, ... be the points that we reach in turn. What is the smallest positive integer n such that P_n coincides with P_0?

   4. _____

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5. Let x be the repeating decimal $1.\overline{6}$, that is, $1.6666\ldots$. Express x^2 as a repeating decimal.

    5. _____

6. In the figure below, the shaded circle is inscribed in the circular sector OPQ. Given that $\angle QOP$ has measure 60 degrees, and that the shaded circle has area 1, what is the area of the circular sector?

    6. _____ units^2

7. How many ways are there to express 15 as the sum of three positive integers? Note that for example $3 + 9 + 3$ is to be viewed as 'the same' as $9 + 3 + 3$.

    7. _____ ways

8. How many right-angled triangles can be formed whose vertices are 3 of the 9 points below? The 9 points have coordinates (a, b), where a and b range over the integers from 0 to 2.
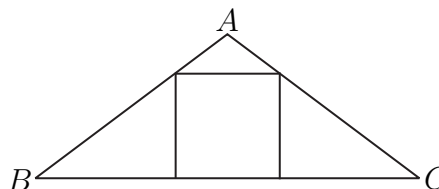
8. _____ triangles

$$\bullet \quad \bullet \quad \bullet$$
$$\bullet \quad \bullet \quad \bullet$$
$$\bullet \quad \bullet \quad \bullet$$

9. Express the following sum as a common fraction:

9. _____

$$\frac{1}{1 \cdot 3} + \frac{1}{3 \cdot 5} + \frac{1}{5 \cdot 7} + \cdots + \frac{1}{17 \cdot 19} + \frac{1}{19 \cdot 21}.$$

10. In $\triangle ABC$ below, $AB = AC = 10$ and $BC = 16$. A square is inscribed in $\triangle ABC$, with one side along the line BC. What is the number of units in a side of the square? Express your answer as a common fraction.

10. _____ units

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