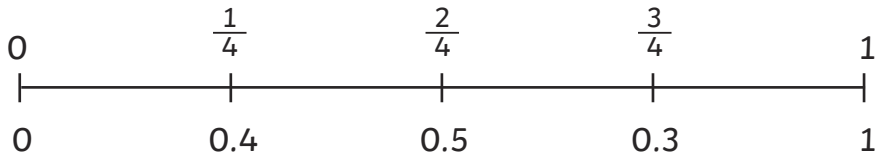
Year 6

Decimal Equivalents Mastery

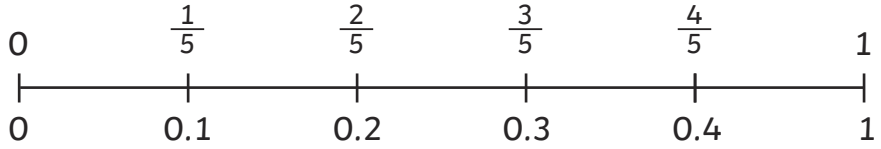
Challenge Cards

1. Pavel draws this number line to show the decimal equivalents for quarters:



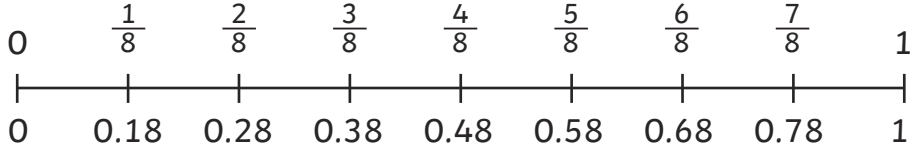
Find the decimal equivalents that are incorrect, write the correct answers and explain how Pavel may have come up with the answers he did.

2. Nikita draws this number line to show the decimal equivalents for fifths:



Find the decimal equivalents that are incorrect, write the correct answers and explain how Nikita may have come up with the answers she did.

3. George draws this number line to show the decimal equivalents for eighths:



Find the decimal equivalents that are incorrect, write the correct answers and explain how George may have come up with the answers he did.

4. Pavel needs to explain how to find the decimal equivalents to the eighths. He starts by showing the simpler fraction equivalents to $\frac{2}{8}$, $\frac{4}{8}$ and $\frac{6}{8}$, then using his knowledge of the decimal equivalents to these fractions, he finds the decimal equivalents of $\frac{1}{8}$, $\frac{3}{8}$, $\frac{5}{8}$ and $\frac{7}{8}$.

   Work alone or with a partner to help Pavel.

$$\frac{1}{8} \quad \frac{2}{8} \quad \frac{3}{8} \quad \frac{4}{8} \quad \frac{5}{8} \quad \frac{6}{8} \quad \frac{7}{8}$$

5. Nikita is looking for a pattern to help her remember the decimal equivalents for the sevenths.

   She starts by using a formal division calculation to find the decimal equivalent of $\frac{1}{7}$ and finds a recurring pattern.

$$7\overline{)1.00000000}$$

   She repeats this for $\frac{2}{7}$ and $\frac{3}{7}$ and writes the recurring decimals vertically. Work alone or with a partner to help Nikita spot the pattern.

6. George is exploring the patterns made by the decimal equivalents of the ninths.

   He uses a formal division calculation to find the decimal equivalents to $\frac{1}{9}$ and $\frac{2}{9}$.

$$9\overline{)1.000} \quad \text{and} \quad 9\overline{)2.000}$$

   Work alone or with a partner to calculate the decimal equivalents to $\frac{1}{9}$ and $\frac{2}{9}$, propose a pattern and check some of the other decimal equivalents of the ninths. Finally, relate your answers to $\frac{1}{3}$ and $\frac{2}{3}$.

7. Pavel wants to use coins to help some of his friends understand the decimal equivalents of fractions.

   He starts with 2 50p coins make £1, so 50p = $\frac{1}{2}$ of £1.

   $\frac{1}{2}$ of £1 = £0.50, so $\frac{1}{2}$ = 0.5

   Work alone or with a partner to use other coins to show decimal equivalents.

8. Nikita explores the decimal equivalents of twelfths. She starts by recognising the simpler fraction equivalents of $\frac{3}{12}$, $\frac{4}{12}$, $\frac{6}{12}$, $\frac{8}{12}$, $\frac{9}{12}$. She then uses these to find other decimal equivalents.

Work alone or with a partner to explore the decimal equivalents of twelfths using Nikita's method.

9. George has a set of fraction and decimal fraction cards. Match the cards. (Sometimes there will be more than 2 cards that are equivalent.)

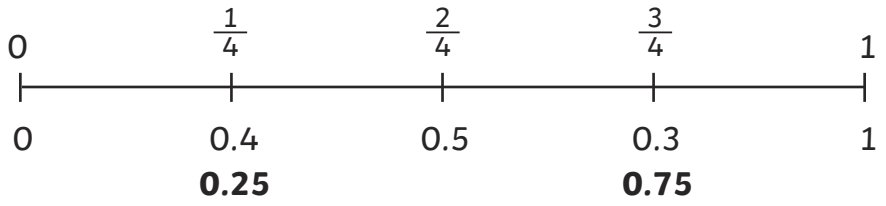
$\frac{3}{9}$ 0.25 $\frac{3}{6}$ $\frac{3}{12}$ 0.5 $\frac{2}{8}$ $\frac{1}{3}$ $\frac{1}{5}$ $\frac{2}{10}$ $\frac{1}{2}$ 0.2 0.333 $\frac{1}{4}$

10. Nikita has a set of fraction and decimal fraction cards. Match the cards. (Sometimes there will be more than 2 cards that are equivalent.)

$\frac{8}{9}$ 0.6 0.75 0.625 0.888 $\frac{6}{8}$ $\frac{5}{8}$ $\frac{3}{5}$ $\frac{6}{10}$ $\frac{2}{3}$ 0.666 $\frac{3}{4}$

Year 6 Decimal Equivalents Mastery **Answers**

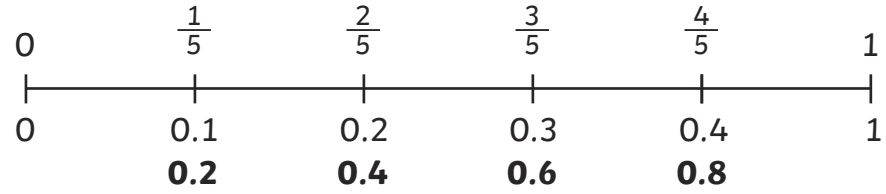
1.



$\frac{1}{4}$ is sometimes written 0.4 due to the denominator 4.

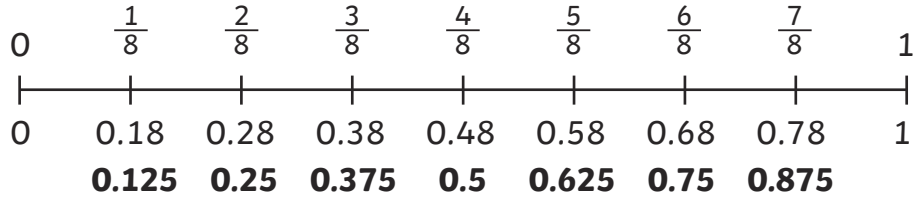
$\frac{3}{4}$ may have been written as 0.3 due to the numerator 3.

2.



Nikita has simply transferred the numerator to the tenths place in the decimal, which misunderstands that a tenth is one part in ten, and $\frac{1}{5}$ is one part in five.

3.



George has simply transferred the numerator to the tenths place and the denominator to the hundredths place, which misunderstands the nature of a fraction as part of a whole.

4. **$\frac{2}{8} = \frac{1}{4}$, $\frac{4}{8} = \frac{1}{2}$ and $\frac{6}{8} = \frac{3}{4}$**

$\frac{1}{4}$ = 0.25, $\frac{1}{2}$ = 0.5 and $\frac{3}{4}$ = 0.75

$\frac{1}{8}$ is half of $\frac{1}{4}$ = half of 0.250 = 0.125

$\frac{3}{8} = \frac{1}{4} + \frac{1}{8}$ = 0.25 + 0.125 = 0.375

$\frac{5}{8} = \frac{1}{2} + \frac{1}{8}$ = 0.5 + 0.125 = 0.625

$\frac{7}{8} = \frac{1}{2} + \frac{3}{8}$ = 0.5 + 0.375 = 0.875

5. **0.142857**

0.285714

0.428571

0.571428

0.714285

0.857142

The 6 digits are always in the same order but start with a different digit each time, with the starting digit increasing each time.

6. **0.1111**

0.2222

Check any other so $\frac{4}{9}$ = 0.4444 or $\frac{6}{9}$ = 0.6666

$\frac{3}{9}$ = 0.3333 = $\frac{1}{3}$ and $\frac{6}{9}$ = 0.6666 = $\frac{2}{3}$

Year 6 Decimal Equivalents Mastery **Answers**

7. **5 20p coins make £1, so $\frac{1}{5}$ of £1 = 20p, $\frac{1}{5}$ = 0.2**

10 10p coins make £1, so $\frac{1}{10}$ of £1 = 10p, $\frac{1}{10}$ = 0.1

20 5p coins make £1 so $\frac{1}{20}$ of £1 = 5p, $\frac{1}{20}$ = 0.05

50 2p coins make £1, so $\frac{1}{50}$ of £1 = 2p, so $\frac{1}{50}$ = 0.02

100 1p coins make £1 so $\frac{1}{100}$ of £1 = 1p, so $\frac{1}{100}$ = 0.01

7. **$\frac{3}{12} = \frac{1}{4}$ = 0.25**

$\frac{4}{12} = \frac{1}{3}$ = 0.333

$\frac{6}{12} = \frac{1}{2}$ = 0.5

$\frac{8}{12} = \frac{2}{3}$ = 0.666

$\frac{9}{12} = \frac{3}{4}$ = 0.75

$\frac{2}{12} = \frac{1}{6}$ = half of $\frac{1}{3}$ = 0.1666

$\frac{1}{12}$ = half of $\frac{1}{6}$ = 0.08333

$\frac{5}{12} = \frac{3}{12} + \frac{2}{12}$ = 0.25 + 0.1666 = 0.41666

$\frac{7}{12} = \frac{1}{2} + \frac{1}{12}$ = 0.5 + 0.08333 = 0.58333

$\frac{10}{12} = \frac{6}{12} + \frac{4}{12}$ = 0.5 + 0.333 = 0.8333

$\frac{11}{12} = \frac{1}{2} + \frac{5}{12}$ = 0.5 + 0.41666 = 0.91666

8. $\frac{1}{2} = \frac{3}{6} = 0.5$

$\frac{1}{3} = \frac{3}{9} = 0.333$

$\frac{1}{4} = \frac{2}{8} = \frac{3}{12} = 0.25$

$\frac{1}{5} = \frac{2}{10} = 0.2$

9. $\frac{3}{4} = \frac{6}{8} = 0.75$

$\frac{8}{9} = 0.888$

$\frac{3}{5} = \frac{6}{10} = 0.6$

$\frac{5}{8} = 0.625$

$\frac{2}{3} = 0.666$