Unit 4 · Rational Number

HARDER PRACTICE QUESTIONS

Full marks 34

Write your answers on separate paper. Show your working, and give every fraction in its lowest terms.

1 Spot the errors [4]

Bibek wrote these four lines. Each has one mistake. Write each line correctly, and say what was wrong.

i. $-\frac{3}{4}$ and $\frac{3}{-4}$ are additive inverses of each other.

ii. The multiplicative inverse of $-\frac{2}{5}$ is $\frac{5}{2}$.

iii. $0.\overline{36} = \frac{36}{100} = \frac{9}{25}$

iv. $\frac{1}{6}$ is a terminating decimal, because 6 is even.

2 Terminating or recurring? [4]

Without dividing, say whether each fraction gives a terminating or a non-terminating recurring decimal. Write it in its lowest terms first, and give the reason.

a. $\frac{7}{40}$

b. $\frac{9}{75}$

c. $\frac{21}{56}$

d. $\frac{11}{48}$

3 In order [4]

Write these numbers in ascending order. Two of them are equal: say which.

$-0.7, -\frac{2}{3}, -0.\overline{6}, -\frac{5}{8}, -\frac{3}{4}$

4 Recurring into fractions [4]

Write each as a fraction in its lowest terms.

a. $3.\overline{18}$

b. $0.\overline{405}$

c. $0.1\overline{6}$. The block doesn't start straight after the point. Let $x = 0.1666\ldots$, so $10x = 1.666\ldots$. Use what you know about $0.\overline{6}$ to find x.

5 Between two negatives [3]

Find three rational numbers between $-\frac{1}{3}$ and $-\frac{1}{4}$, and write all five numbers in ascending order.

6 Name the property [4]

Rojina worked this out in four steps. Name the property of rational numbers she used at each step.

$\frac{2}{5} \times \left(-\frac{3}{7}\right) \times \frac{5}{2}$

i. $= \frac{2}{5} \times \frac{5}{2} \times \left(-\frac{3}{7}\right)$

ii. $= \left(\frac{2}{5} \times \frac{5}{2}\right) \times \left(-\frac{3}{7}\right)$

iii. $= 1 \times \left(-\frac{3}{7}\right)$

iv. $= -\frac{3}{7}$

7 A meter of ribbon [4]

A tailor cuts 1 m of ribbon into n equal pieces. Each piece is $\frac{1}{n}$ m long.

i. Write the length of one piece as a decimal of a meter when $n = 8$ and when $n = 12$.

ii. For which values of n from 2 to 12 is the length a terminating decimal?

iii. For each of those, is a piece a whole number of millimeters? (1 m = 1,000 mm)

iv. Find a number of pieces, more than 12, for which the length is a terminating decimal of a meter but not a whole number of millimeters.

8 Make your own [3]

i. Write a fraction with denominator 12 that gives a terminating decimal, and one with denominator 12 that gives a recurring decimal.

ii. Write a negative rational number whose reciprocal is **greater** than the number itself. Check it.

9 Think: add the tops, add the bottoms [4]

Prarthana has a shortcut for finding a number between two fractions: add the tops and add the bottoms. For $\frac{1}{3}$ and $\frac{1}{2}$ she gets $\frac{1+1}{3+2} = \frac{2}{5}$.

i. Is $\frac{2}{5}$ between $\frac{1}{3}$ and $\frac{1}{2}$? Check with decimals.

ii. Try her shortcut on $\frac{2}{3}$ and $\frac{3}{4}$. Is the answer between them?

iii. She says this shows that $\frac{1}{3} + \frac{1}{2} = \frac{2}{5}$. Is she right? Explain.

iv. Is $\frac{2}{5}$ the number exactly halfway between $\frac{1}{3}$ and $\frac{1}{2}$? If not, find it.