eClassroom

GCSE Mathematics

Fractions

Worked Solutions

Pearson Edexcel GCSE & iGCSE Mathematics

Section A — Foundation — Worked Solutions

[Fluency] Question 1

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

$\therefore$

[Fluency] Question 2

$\frac{5}{6} - \frac{1}{4} = \frac{10}{12} - \frac{3}{12}$

$\therefore$

[Fluency] Question 3

$\frac{3}{4} \times \frac{8}{9} = \frac{24}{36}$

$\therefore$

[Fluency] Question 4

Dividing by a fraction: multiply by its reciprocal.

$\frac{5}{6} \div \frac{5}{3} = \frac{5}{6} \times \frac{3}{5} = \frac{15}{30}$

$\therefore$

[Fluency] Question 5

$2\frac{3}{5} = \frac{2 \times 5 + 3}{5}$

$\therefore$

[Fluency] Question 6

17 ÷ 4 = 4 remainder 1

$\therefore$

[Reasoning] Question 7

Convert to improper fractions: 3/2 and 11/4

$\frac{3}{2} + \frac{11}{4} = \frac{6}{4} + \frac{11}{4} = \frac{17}{4}$

$\therefore$

[Reasoning] Question 8

$\frac{3}{5} \times 240 = \frac{720}{5}$

$\therefore$ **144 students**

[Problem Solving] Question 9

Total eaten $= \frac{2}{5} + \frac{1}{3} = \frac{6}{15} + \frac{5}{15} = \frac{11}{15}$

Left $= 1 - \frac{11}{15} = \frac{4}{15}$

$\therefore$

[Problem Solving] Question 10

(a) Per person $= \frac{3}{4} \div 6 = \frac{3}{24} = \frac{1}{8}$ cup

(b) $\frac{1}{8} \times 10 = \frac{10}{8} = \frac{5}{4}$

$\therefore$

Section B — Higher — Worked Solutions

[Fluency] Question 1

Common denominator: (x+1)(x–1)

$$\frac{3(x-1)+2(x+1)}{(x+1)(x-1)} = \frac{3x-3+2x+2}{(x+1)(x-1)} = \frac{5x-1}{x^2-1}$$

∴

[Fluency] Question 2

Factorise numerator: $x^2-4 = (x+2)(x-2)$

$$\frac{(x+2)(x-2)}{x+2} = x-2 \quad (x \neq -2)$$

∴

[Fluency] Question 3

Factorise denominator: 4x+2 = 2(2x+1)

$$\frac{2x+1}{5} \times \frac{15}{2(2x+1)} = \frac{15}{10} = \frac{3}{2}$$

∴

[Reasoning] Question 4

Multiply every term by 12 (LCM of 3 and 4):

$$4x + 3x = 84 \Rightarrow 7x = 84$$

∴ **x = 12**

[Reasoning] Question 5

Multiply every term by 12 (LCM of 3 and 4):

$$4(2x+1) - 3(x-2) = 36$$

$$8x + 4 - 3x + 6 = 36 \Rightarrow 5x + 10 = 36 \Rightarrow 5x = 26$$

∴

[Reasoning] Question 6

Factorise numerator: $3x^2-12 = 3(x^2-4) = 3(x+2)(x-2)$

Factorise denominator: $x^2+x-6 = (x+3)(x-2)$

$$\frac{3(x+2)(x-2)}{(x+3)(x-2)} = \frac{3(x+2)}{x+3} \quad (x \neq 2)$$

$\therefore$

[Problem Solving] Question 7

Factorise: $x^2+5x+6=(x+2)(x+3)$, $x^2+2x=x(x+2)$

$$\frac{(x+2)(x+3)}{x+3} \div \frac{x(x+2)}{x+1} = (x+2) \times \frac{x+1}{x(x+2)}$$

$\therefore$

[Problem Solving] Question 8

$$\frac{1}{a} + \frac{1}{b} = \frac{a+b}{ab} = \frac{1}{c}$$

$\therefore$

[Problem Solving] Question 9

Multiply both sides by $(x-2)(x+1)$:

$$3(x+1) + 1(x-2) = (x-2)(x+1)$$

$$3x + 3 + x - 2 = x^2 - x - 2$$

$$x^2 - 5x - 3 = 0$$

$$x = \frac{5 \pm \sqrt{25+12}}{2} = \frac{5 \pm \sqrt{37}}{2}$$

$\therefore$

[Problem Solving] Question 10

(a) Right-hand side:

$$\frac{1}{n} - \frac{1}{n+1} = \frac{n+1-n}{n(n+1)} = \frac{1}{n(n+1)} \checkmark$$

(b) Telescoping sum:

$$\left(\frac{1}{1} - \frac{1}{2}\right) + \left(\frac{1}{2} - \frac{1}{3}\right) + \cdots + \left(\frac{1}{9} - \frac{1}{10}\right)$$

All intermediate terms cancel, leaving:

$\therefore$