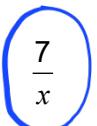


1 Simplify  $\frac{3}{x} + \frac{4}{x}$

Circle your answer.

[1 mark]

$$\frac{7}{2x}$$

$$\frac{12}{x}$$

$$\frac{12}{x^2}$$

**2**

$$d = 2f$$

$$\frac{e-f}{d-e} = \frac{1}{4}$$

Work out the ratio  $e:f$ **[3 marks]**

$$\frac{e-f}{2f-e} = \frac{1}{4}$$

$$4e - 4f = 2f - e \quad (1)$$

$$5e = 6f \quad (1)$$

$$\frac{e}{f} = \frac{6}{5}$$

Answer 6 : 5 (1)

3

The flight of a plane was in two stages.

The table shows information about the flight.

	Distance (miles)	Speed (mph)	Time (hours)
1st stage	731	$x$	$\frac{731}{x}$
2nd stage	287	$x - 24$	$\frac{287}{x - 24}$

In total, the flight lasted 2 hours.

Work out the value of  $x$ .

$$\frac{731}{x} + \frac{287}{x-24} = 2 \quad (1)$$

[5 marks]

$$731(x-24) + 287x = 2(x)(x-24) \quad (1)$$

$$731x - 17544 + 287x = 2x^2 - 48x$$

$$2x^2 - 1066x + 17544 = 0$$

$$x^2 - 533x + 8772 = 0 \quad (1)$$

$$x = \frac{533 \pm \sqrt{(533)^2 - 4(1)(8772)}}{2} \quad (1)$$

$$= \frac{533 \pm \sqrt{284089 - 35088}}{2}$$

$$= \frac{533 \pm 499}{2} \quad \text{time cannot be negative}$$

$$= \frac{34}{2} \text{ or } \frac{1032}{2} = 17 \text{ or } 516$$

Answer 516 (1)

4 (a) Simplify fully  $\frac{6x^4}{a} - \frac{11}{4a}$

[2 marks]

$$\frac{6}{a} = \frac{24}{4a} \quad (1)$$

$$\frac{24}{4a} - \frac{11}{4a} = \frac{13}{4a}$$

Answer  $\frac{13}{4a} \quad (1)$

4 (b) Simplify fully  $(y^2 - 3y) \times \frac{y^2 + 10y + 21}{y^2 - 9}$

[4 marks]

$$y^2 - 3y = y(y-3) \quad (1)$$

$$y^2 + 10y + 21 = (y+7)(y+3) \quad (1)$$

$$y^2 - 9 = (y+3)(y-3) \quad (1)$$

$$\frac{y(y-3) \times (y+7)(y+3)}{(y+3)(y-3)}$$

$$(y+7)$$

$$\approx y(y+7) \quad (1)$$

Answer  $y(y+7)$

5 Show that  $\frac{x-5}{x-2} + \frac{x+5}{x+2}$

simplifies to  $\frac{ax^2-b}{x^2-4}$  where  $a$  and  $b$  are integers.

[3 marks]

$$\frac{(x-5)(x+2)}{(x-2)(x+2)} + \frac{(x+5)(x-2)}{(x+2)(x-2)} \quad (1)$$

$$= \frac{x^2 - 3x - 10}{x^2 - 4} + \frac{x^2 + 3x - 10}{x^2 - 4}$$

$$= \frac{x^2 + x^2 - 3x + 3x - 10 - 10}{x^2 - 4} \quad (1)$$

$$= \frac{2x^2 - 20}{x^2 - 4} \quad (1)$$

6

Simplify fully  $\frac{2}{x+1} + \frac{7-5x}{3} + 4x$

Give your answer as a single fraction.

① Solving numerator part

[4 marks]

$$2(3) + (7-5x)(x+1) + 4x(x+1)(3) \quad (1)$$

$$= 6 + 7x + 7 - 5x^2 - 5x + 12x^2 + 12x \quad (1)$$

$$= -5x^2 + 12x^2 + 7x - 5x + 12x + 6 + 7$$

$$= 7x^2 + 14x + 13$$

② Add solved numerator to the denominator

$$\frac{7x^2 + 14x + 13}{3(x+1)} \quad (1)$$

Answer

$$\frac{7x^2 + 14x + 13}{3(x+1)}$$