

72. Given that both rational expressions are defined, what is the value of  $k$ ?

$$\frac{2x^2 - x + k}{3x^2 - x - 2} = \frac{2x + 1}{3x + 2}$$

- \* A. -2  
 B. -1  
 C. 1  
 D. 2

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

should be equal

$$\cancel{6x^3} + \cancel{4x^2} - \cancel{3x^2} - 2x + 3kx + 2k = \cancel{6x^3} + \cancel{3x^2} - \cancel{2x^2} - x - 4x - 2$$

Solution

$$-2x + 3kx = -4x - x \quad \text{or} \quad 2k = -2$$

$$-2 + 3k = -5$$

$$3k = -3$$

$$\underline{k = -1}$$

← Same answer

<p>C PATTERNS AND RELATIONS (Variables and Equations)</p>	<p>C11 find and verify the solutions of rational equations that reduce to linear form</p>
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Knowledge

Prescribed Learning Outcomes – C11

86. Solve:  $\frac{8}{x-2} = 4$ ;  $x \neq 2$

A. 0

B.  $\frac{1}{4}$

C.  $\frac{1}{2}$

\*  D. 4

$$8 = 4x - 8$$

$$16 = 4x$$

$$4 = x$$

Understanding

Prescribed Learning Outcomes – C11

87. Solve:  $\frac{3x+4}{2x+7} = \frac{3x-4}{2x-3}$ ;  $x \neq \frac{3}{2}, -\frac{7}{2}$

A.  $-\frac{8}{7}$

\*  B.  $\frac{8}{7}$

C.  $\frac{4}{3}$

D.  $\frac{10}{3}$

$$\cancel{6x^2 - 9x + 8x - 12} = \cancel{6x^2 - 8x + 21x - 28}$$

$$-x - 12 = 13x - 28$$

$$16 = 14x$$

$$\frac{16}{14} = x$$

$$\frac{8}{7} = x$$

88. Solve:  $\frac{5}{3m-1} - \frac{1}{4} = \frac{m}{3m-1}; m \neq \frac{1}{3}$

A. 1

B. 1.5

C.  $\frac{19}{7}$

\* **D. 3**

$$\frac{4(3m-1)}{(3m-1)} \frac{5}{4} - \frac{1(3m-1)}{4} = \frac{4(3m-1)}{(3m-1)} \frac{m}{(3m-1)}$$

$$20 - 3m + 1 = 4m$$

$$21 = 7m$$

$$3 = m$$

Higher Mental Processes

Prescribed Learning Outcomes – C11; A4, A3

89. Sophie and Hypatia are sisters who both attend the same high school. Sophie walks to school, and Hypatia cycles to school at an average speed five times as fast as Sophie's average speed. If they leave home together and travel the 3 km distance to school, Hypatia arrives 30 min ahead of Sophie. What is the average speed for each girl?

A. Sophie's speed is  $\frac{3}{8}$  km/h; Hypatia's speed is  $\frac{15}{8}$  km/h.

B. Sophie's speed is 0.8 km/h; Hypatia's speed is 4 km/h.

C. Sophie's speed is  $5\frac{5}{8}$  km/h; Hypatia's speed is  $22\frac{1}{2}$  km/h.

\* **D. Sophie's speed is 4.8 km/h; Hypatia's speed is 24 km/h.**

	D	r	t
Sophie	3	$x$ <sup>4.8</sup>	$\ominus$
Hypatia	3	$5x$ <sup>24</sup>	$\frac{30 \text{ min}}{\text{or}} 0.5 \text{ h}$

$$\text{Time (slow)} - \text{Time (fast)} = 0.5 \text{ hrs}$$

$$5x \left( \frac{3}{x} - \frac{3}{5x} = 0.5 \right)$$

$$15 - 3 = 2.5x$$

$$12 = 2.5x$$

$$\frac{12}{2.5} = x$$

$$\underline{\underline{4.8 = x}} \text{ (Sophie)}$$