

Cambridge International AS & A Level

Mathematics

9709/32

Paper 3 Pure Mathematics 3

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Question No (2)

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Question No (2)

Express $\frac{6x^2-9x-16}{2x^2-5x-12}$ in partial fractions.

Solution:

$$\frac{6x^2-9x-16}{2x^2-5x-12}$$

As this is improper fraction, we shall make this proper fraction first.

$$\begin{array}{r} 3 \\ 2x^2-5x-12 \overline{) 6x^2-9x-16} \\ \underline{6x^2-5x-36} \\ 6x+20 \end{array}$$

$$\frac{6x^2-9x-16}{2x^2-5x-12} = 3 + \frac{6x+20}{2x^2-5x-12} \longrightarrow \textcircled{1}$$

now we shall convert $\frac{6x+20}{2x^2-5x-12}$ into partial fraction.

$$\begin{aligned} \frac{6x+20}{2x^2-5x-12} &= \frac{6x+20}{2x^2-8x+3x-12} \\ &= \frac{6x+20}{2x(x-4)+3(x-4)} \end{aligned}$$

By factorization

DATE:-

(3)

$$\frac{6x+20}{(x-4)(2x+3)} = \frac{A}{x-4} + \frac{B}{2x+3} \rightarrow (2)$$

Multiply with $(x-4)(2x+3)$ on both sides

$$6x+20 = A(2x+3) + B(x-4) \rightarrow (3)$$

From equation (2) put $x-4=0 \Rightarrow x=4$
in equation (3)

$$6(4)+20 = A(2(4)+3) + B(0)$$

$$44 = 11A$$

$$A = 4$$

Now from equation (2) put $2x+3=0$

$$\Rightarrow x = -3/2 \text{ in equation (3)}$$

$$6(-3/2)+20 = A(2(-3/2)+3) + B(-3/2-4)$$

$$-9+20 = -11/2 B$$

$$11 = -11/2 B$$

$$B = -2$$

put value of $A = 4, B = -2$ in (2)

$$\frac{6x+20}{(x-4)(2x+3)} = \frac{4}{x-4} - \frac{2}{2x+3} \rightarrow (4)$$

putting the value of (4) in (1)

$$\frac{6x^2 - 9x - 16}{2x^2 - 5x + 12} = 3 + \frac{4}{x-4} - \frac{2}{2x+3}$$