THE GC SCHOOL OF CAREERS

DEPARTMENT OF MATHEMATICS

EXTRA PRACTICE

CORE MATHEMATICS 4

PARTIAL FRACTIONS

EXERCISES

1. Express $\dfrac{x-31}{(x+5)(x-4)}$ in partial fraction form.

2. Express $\dfrac{4x^2-28}{(x+2)^2(x-4)}$ in the form $\dfrac{A}{(x+2)^2}+\dfrac{B}{(x+2)}+\dfrac{C}{(x-4)}$.

3. Show that $\dfrac{x^3-4x^2+5x+2}{x^2-2x-3}$ can be put in the form $Ax+B+\dfrac{C}{(x-3)}+\dfrac{D}{(x+1)}$ where A, B, C and D are constants to be determined.

4. Given that $y=\dfrac{9x^2-2x-3}{x^3-x}$

(a) Show that $y \equiv \dfrac{A}{x}+\dfrac{B}{x+1}+\dfrac{C}{x-1}$ where A, B and C are constants to be determined.

(b) Hence or otherwise, find $\dfrac{dy}{dx}$ and show that the gradient of the curve at $x=3$ is equal to $-\frac{13}{12}$.

ANSWERS

1. $\dfrac{4}{x+5}-\dfrac{3}{x-4}$

2. $\dfrac{2}{(x+2)^2}+\dfrac{3}{(x+2)}+\dfrac{1}{(x-4)}$

3. $A=1, B=-2, C=2, D=2$

4. **(a)** $A=3,\ B=4,\ C=2$

(b) $\dfrac{dy}{dx}=\dfrac{-3}{x^2}-\dfrac{4}{(x+1)^2}-\dfrac{2}{(x-1)^2}$