EXERCISE 71_123

Part (A)   **HSC 2013 Q11b**

Find the numbers A, B and C such that

$$\frac{2x^2 - 16x - 17}{\left(x^2 + 5\right)\left(x - 6\right)} = \frac{Ax + B}{\left(x^2 + 5\right)} + \frac{C}{\left(x - 6\right)}$$

Answer Part (A)

$$\frac{2x^2-16x-17}{\left(x^2+5\right)\left(x-6\right)}=\frac{Ax+B}{\left(x^2+5\right)}+\frac{C}{\left(x-6\right)}$$

$$N=\left(Ax+B\right)\left(x-6\right)+C\left(x^2+5\right)$$

$$N=\left(A+C\right)x^2+\left(-6A+B\right)x+\left(-6B+5C\right)$$

$$N=2x^2-16x-17$$

$$A+C=2 \quad -6A+B=-16 \quad -6B+5C=-17$$

$$C=2-A \quad B+6C=-4 \quad 6B+36C=-24$$

$$41C=-41$$

$$A=3 \quad B=2 \quad C=-1$$

$$\frac{2x^2-16x-17}{\left(x^2+5\right)\left(x-6\right)}=\frac{3x+2}{\left(x^2+5\right)}-\frac{1}{\left(x-6\right)}$$