**7D Algebraic Proof**

1. Prove that:

$$\left(3x+2\right)\left(x-5\right)\left(x+7\right)≡3x^{3}+8x^{2}-101x-70$$

1. Prove that if $(x-p)$ is a factor of $f(x)$ then $f\left(p\right)=0$
2. Prove that $A(1,1)$, $B\left(3,3\right)$ and $C(4,2)$ are the vertices of a right-angled triangle.
3. The equation $kx^{2}+3kx+2=0$, where k is a constant, has no real roots. Prove that k satisfies the inequality $0\leq k<\frac{8}{9}$.

**7E Proof by Exhaustion, Counter-Example & Jottings**

1. Prove that all square numbers are either a multiple of 4, or 1 more than a multiple of 4
2. Prove that the following statement is not true:

“The sum of two consecutive prime numbers is always even”

1. Prove that for all positive values of x and y:

$$\frac{x}{y}+\frac{y}{x}\geq 2$$