

## Topic 23 Algebraic fractions (Post-TT) [36]

1.

Show that  $\frac{a}{b+1} - \frac{a}{(b+1)^2}$  can be written as  $\frac{ab}{(b+1)^2}$  (2)

2.

Prove algebraically that

$$(2n+1)^2 - (2n+1) \text{ is an even number}$$

for all positive integer values of  $n$ .

(3)

3.

(a) Simplify  $\frac{6(x+5)^2}{2(x+5)}$  (2)

(b) Simplify  $\frac{x^2-9}{x^2+3x}$  (3)

(Total 5 marks)

4.

(a) Give **one** reason why 0 is an even number.

(b) The lengths of the sides of a **right-angled** triangle are all integers.

Prove that if the lengths of the two shortest sides are even, then the length of the third side must also be even.

(4)

5.

The product of two consecutive positive integers is added to the larger of the two integers.

Prove that the result is always a square number.

(3)

6.

Solve the equation  $\frac{3x+1}{2} - \frac{2x+5}{3} = 1$

(Total 4 marks)

7.

Simplify  $\frac{5x^2+14x-3}{x^2-9}$

(Total 4 marks)

8. **Non-calculator**

Show that  $\frac{3x+6}{x^2-3x-10} + \frac{x+5}{x^3-25x}$  simplifies to  $ax$  where  $a$  is an integer.

(40)

9.

Solve this equation  $\frac{3}{x+5} - \frac{1}{x+4} = \frac{1}{2}$

(Total 7 marks)