1. Simplify fully

$\frac{x^2 - 3x}{x^2 - 8x + 15}$ $\frac{x(x-3)}{(x-3)(x-5)}$

$\frac{x}{x-5}$

.....

(3)

(Total 3 marks)

2. (a) Simplify $\frac{5a^3}{4ab^2}$

$\frac{5a}{b^2}$

.....

(2)

(b) Simplify $\frac{x-3}{x^2-9}$ $\frac{1(x-3)}{(x+3)(x-3)}$

$\frac{1}{x+3}$

.....

(2)

(Total 4 marks)

3. Simplify fully $\frac{4a - 20}{a^2 - 25}$ $\frac{4(a-5)}{(a+5)(a-5)}$

$\frac{4}{a+5}$

.....

(Total 3 marks)

4. Simplify $\frac{x^2 + 5x + 6}{x + 2}$

$$\frac{(x+2)(x+3)}{(x+2)}$$

$x + 3$

.....

(Total 2 marks)

5. Simplify $\frac{4x^2 - 9}{2x^2 - 5x + 3}$

$$\frac{(2x+3)(2x-3)}{(2x-3)(x-1)}$$

$\frac{2x+3}{x-1}$

.....

(Total 3marks)

6. Write as a single fraction $\frac{4}{x(x+3)} + \frac{5}{(x+3)}$

$$\frac{4}{x(x+3)} + \frac{5x}{x(x+3)}$$

$$\frac{4+5x}{x(x+3)}$$

$\frac{5x+4}{x(x+3)}$

.....

(Total 2 marks)

7. Write as a single fraction in its simplest form

$$\frac{4}{x+5} + \frac{1}{x-3}$$

$$\frac{4(x-3)}{(x+5)(x-3)} + \frac{1(x+5)}{(x+5)(x-3)}$$

$$\frac{4(x-3)+1(x+5)}{(x+5)(x-3)}$$

$$\frac{4x-12+x+5}{(x+5)(x-3)}$$

$$\frac{5x-7}{(x+5)(x-3)}$$

$\frac{5x-7}{(x+5)(x-3)}$

(Total 4 marks)

8. Simplify fully $\frac{3(2x+1)}{4x^2-1}$

$$\frac{3(2x+1)}{(2x+1)(2x-1)}$$

$\frac{3}{2x-1}$

(Total 2 marks)

9. Solve the equation

$$\frac{x}{2x-3} + \frac{4}{x+1} = 1$$

$$\frac{x(x+1)}{(2x-3)(x+1)} + \frac{4(2x-3)}{(2x-3)(x+1)} = 1$$

$$\frac{x(x+1)+4(2x-3)}{(2x-3)(x+1)} = 1$$

$$x(x+1)+4(2x-3) = (2x-3)(x+1)$$

$$x^2+x+8x-12 = 2x^2+2x-3x-3$$

$$0 = x^2-10x+9$$

$$0 = (x-9)(x-1)$$

$$x = 9 \text{ and } x = 1$$

$x =$ 9 and $x = 1$

(Total 5 marks)

10. Simplify fully $\frac{3x+6}{x^2-4}$

$$\frac{3(x+2)}{(x+2)(x-2)}$$

$$\frac{3}{x-2}$$

(Total 3 marks)

11. Solve the equation

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

$$\frac{3(x-3)}{(x+3)(x-3)} - \frac{4(x+3)}{(x+3)(x-3)} = \frac{5x}{x^2-9}$$

$$\frac{3(x-3) - 4(x+3)}{x^2-9} = \frac{5x}{x^2-9}$$

$$3x - 9 - 4x - 12 = 5x$$

$$-x - 21 = 5x$$

$$-21 = 6x$$

$$x = \frac{-21}{6} = \frac{-7}{2}$$

$x =$ ..... -3.5 .....

(Total 4 marks)

12. Solve $\frac{5(2x+1)}{3} = 4x + 7$

$$5(2x+1) = 3(4x+7)$$

$$10x + 5 = 12x + 21$$

$$5 = 2x + 21$$

$$-16 = 2x$$

$$x = -8$$

$x =$ ..... -8 .....

(Total 3 marks)

13. Simplify

$$\frac{6x^2 + 7x - 3}{9x^2 - 6x + 1}$$

$$\frac{(3x-1)(2x+3)}{(3x-1)(3x-1)}$$

$$\frac{2x+3}{3x-1}$$

(3)

(Total 5 marks)

14. (a) Solve $\frac{40-x}{3} = 4 + x$

$$40 - x = 3(4 + x)$$

$$40 - x = 12 + 3x$$

$$40 = 12 + 4x$$

$$28 = 4x$$

$$x = 7$$

$x = 7$

(3)

(b) Simplify fully $\frac{4x^2 - 6x}{4x^2 - 9}$

$$\frac{2x(2x-3)}{(2x+3)(2x-3)}$$

$$\frac{2x}{2x+3}$$

(3)

(Total 6 marks)

15. (a) Solve $\frac{3}{x} + \frac{3}{2x} = 2$

$\frac{6}{2x} + \frac{3}{2x} = 2$

$\frac{9}{2x} = 2$

$9 = 4x$

$x = \frac{9}{4}$

$x =$ $\frac{9}{4}$

(2)

(b) Using your answer to part (a), or otherwise,

solve $\frac{3}{(y-1)^2} + \frac{3}{2(y-1)^2} = 2$

$x = (y-1)^2$

$\frac{9}{4} = (y-1)^2$

$\pm\sqrt{\frac{9}{4}} = y - 1$

$\pm\frac{3}{2} = y - 1$

$y = 1 \pm \frac{3}{2}$

$y =$ $\frac{5}{2}$

or $y =$ $-\frac{1}{2}$

(3)

(Total 5 marks)