Algebraic Fractions (Simplifying)

SCAN ME

REVISE THIS TOPIC

1 Simplify fully $\dfrac{3a + 9}{a^3 + 3a^2}$

$\dfrac{3(a+3)}{a^2(a+3)}$

$\dfrac{3}{a^2}$

(Total for Question 1 is 2 marks)

2 Simplify fully $\dfrac{2x^2 - 2xy}{xy^4 - y^5}$

$\dfrac{2x(x-y)}{y^4(x-y)}$

$\dfrac{2x}{y^4}$

(Total for Question 2 is 2 marks)

3 Simplify fully $\dfrac{3b + b^3}{4b^2 + 12}$

$\dfrac{b(3+b^2)}{4(b^2+3)}$

$\dfrac{b}{4}$

(Total for Question 3 is 2 marks)

4 Simplify fully $\frac{10n^2 - 90}{2n - 6}$

$\frac{10(n^2-9)}{2(n-3)} = \frac{10(n+3)(n-3)}{2(n-3)}$

[or $5n+15$]

$5(n+3)$

(Total for Question 4 is 2 marks)

5 Simplify fully $\frac{4k^2 - 1}{6k^3 - 3k^2}$

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

$\frac{2k+1}{3k^2}$

(Total for Question 5 is 2 marks)

6 Simplify fully $\frac{4c^3 - 100c}{4c + 20}$

$\frac{4c(c^2-25)}{4(c+5)} = \frac{4c(c+5)(c-5)}{4(c+5)}$

[or c^2-5c]

$c(c-5)$

(Total for Question 6 is 2 marks)

7 Simplify fully $\dfrac{2x^2 - 32}{x^2 + 9x + 20}$

$\dfrac{2(x^2-16)}{(x+4)(x+5)} = \dfrac{2(x+4)(x-4)}{(x+4)(x+5)}$

[or $\dfrac{2x-8}{x+5}$]

$\dfrac{2(x-4)}{x+5}$

(Total for Question 7 is 3 marks)

8 Simplify fully $\dfrac{a^2 - 11a + 30}{a^2 - 12a + 36}$

$\dfrac{(a-5)(a-6)}{(a-6)(a-6)}$

$\dfrac{a-5}{a-6}$

(Total for Question 8 is 3 marks)

9 Simplify fully $\dfrac{y^2 - 7y - 18}{y^2 - 81}$

$\dfrac{(y+2)(y-9)}{(y+9)(y-9)}$

$\dfrac{y+2}{y+9}$

(Total for Question 9 is 3 marks)

10 Simplify fully $\dfrac{9x^2 - 25}{3x^2 + 14x + 15}$

$\dfrac{(3x+5)(3x-5)}{(3x+5)(x+3)}$

$\dfrac{3x-5}{x+3}$

(Total for Question 10 is 3 marks)

11 Simplify fully $\dfrac{4y^2 - 9}{2y^2 - 11y + 12}$

$\dfrac{(2y+3)(2y-3)}{(2y-3)(y-4)}$

$\dfrac{2y+3}{y-4}$

(Total for Question 11 is 3 marks)

12 Simplify fully $\dfrac{n^2 + 11n + 24}{5n^2 + 22n + 21}$

$\dfrac{(n+8)(n+3)}{(5n+7)(n+3)}$

$\dfrac{n+8}{5n+7}$

(Total for Question 12 is 3 marks)

13 Simplify fully $\dfrac{45 - 20x^2}{2x^2 + 5x + 3}$

$\dfrac{5(9-4x^2)}{(2x+3)(x+1)} = \dfrac{5(3-2x)(3+2x)}{(2x+3)(x+1)}$

[or $\dfrac{15-10x}{x+1}$]

$\dfrac{5(3-2x)}{x+1}$

(Total for Question 13 is 3 marks)

14 Simplify fully $\dfrac{3x^2 + 19x + 6}{9x^2 + 6x + 1}$

$\dfrac{(3x+1)(x+6)}{(3x+1)(3x+1)}$

$\dfrac{x+6}{3x+1}$

(Total for Question 14 is 3 marks)

15 Simplify fully $\dfrac{3x^2 - 300}{6x^2 + 55x - 50}$

$\dfrac{3(x^2-100)}{(6x-5)(x+10)} = \dfrac{3(x+10)(x-10)}{(6x-5)(x+10)}$

[or $\dfrac{3x-30}{6x-5}$]

$\dfrac{3(x-10)}{6x-5}$

(Total for Question 15 is 3 marks)

16 Show that $\frac{12x - 36}{x^2 + 5x} \times \frac{x^2 + 9x + 20}{3x - 9}$ can be written in the form $a + \frac{b}{x}$

where a and b are integers.

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

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

$$= \frac{4(x+4)}{x}$$

$$= \frac{4x + 16}{x}$$

$$= 4 + \frac{16}{x}$$

(Total for Question 16 is 4 marks)

17 Show that $10x - 35 \div \frac{2x^2 - 15x + 28}{2x^2 - 32}$ can be written in the form $ax + b$

where a and b are integers.

$$5(2x-7) \times \frac{2(x+4)(x-4)}{(2x-7)(x-4)}$$

$$= \frac{10(2x-7)(x+4)(x-4)}{(2x-7)(x-4)}$$

$$= 10(x+4)$$

$$= 10x + 40$$

(Total for Question 17 is 4 marks)

18 Show that $9x^{-3} \times \frac{3x^5 + 10x^4}{9x^2 - 100} \div \frac{x^2}{6x - 20}$ can be written in the form $\frac{a}{x}$

where a is an integer.

$$\frac{9}{x^3} \times \frac{x^4(3x+10)}{(3x+10)(3x-10)} \times \frac{2(3x-10)}{x^2}$$

$$= \frac{18x^4(3x+10)(3x-10)}{x^5(3x+10)(3x-10)}$$

$$= \frac{18}{x}$$

(Total for Question 18 is 4 marks)

19 $2x - \frac{x^3 - x^2}{x^2 + 2x - 3} \times \frac{2x^2 - 1}{x^2}$ can be written in the form $\frac{ax + b}{x + 3}$

where a and b are integers. Work out the values of a and b.

$$2x - \frac{x^2(x-1)}{(x+3)(x-1)} \times \frac{2x^2-1}{x^2} = \frac{(2x^2+6x)-(2x^2-1)}{x+3}$$

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

$$= \frac{2x(x+3)}{x+3} - \frac{2x^2-1}{x+3} = \frac{6x+1}{x+3}$$

$a =$ 6

$b =$ 1

(Total for Question 19 is 4 marks)