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A LEVEL MATHS

(2) Algebraic Fractions (Simplifying)

WORKING AT D/E

(1) Find each of the following as a single, simplified fraction:

(a) $\dfrac{x^2}{(x+1)} \times \dfrac{2x+2}{x}$

(b) $\dfrac{x^2-1}{3y(x+1)} \times \dfrac{y^2}{(x-1)}$

(c) $\dfrac{x^2-36}{3y-3} \times \dfrac{y^2-1}{(x-6)}$

(d) $\dfrac{x^2-3x-10}{3(x+2)} \div \dfrac{(x-5)}{(x-4)}$

(e) $\dfrac{10x-1}{y} \div \dfrac{x^2-1}{y^2-y}$

(f) $\dfrac{(x+3)(x-2)}{x^2-3x} \times \dfrac{x^3}{(x\mp 2)}$

(2) Find each of the following as a single, simplified fraction:

(a) $\dfrac{2}{x} + \dfrac{1}{(x+1)}$

(b) $\dfrac{4}{(x-1)} + \dfrac{3}{(x+1)}$

(c) $\dfrac{10}{x^2} - \dfrac{2}{(x+3)}$

(d) $\dfrac{5}{x} + \dfrac{1}{x^2}$

(e) $\dfrac{9}{x^2-x-6} - \dfrac{1}{(x-3)}$

(f) $\dfrac{2}{(x-7)} + \dfrac{x}{(x+1)}$

(3) Cyril wants to simplify the fraction $\dfrac{x+7}{x+14}$.
Advise him on what he can do.

WORKING AT B/C

(1) Find each of the following as a single, simplified fraction:

(a) $\dfrac{x^2+x}{6x+6} \times \dfrac{25x^2-36}{5x+6}$

(b) $\dfrac{x^2-1}{x^2+x-2} \times \dfrac{y^2-10y}{y}$

(c) $\dfrac{x^3-x^2}{3y^2-2y-1} \times \dfrac{y^2-1}{14-14x}$

(d) $\dfrac{6x^2+5x-6}{9x-6} \div \dfrac{4x+6}{9}$

(e) $\dfrac{2-x}{14x+2} \times \dfrac{49x^2-1}{x^2-2x}$

(f) $\dfrac{2x^4-2x^3}{x^2-2x-8} \div \dfrac{4x^3}{(x\mp 2)}$

(2) Find each of the following as a single, simplified fraction:

(a) $\dfrac{1}{x^2-3x-1} + \dfrac{1}{x^2+x-30}$

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

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

(d) $\dfrac{3}{x^2} + \dfrac{4}{(x+1)} - \dfrac{1}{x}$

(3) Show that $2 + \dfrac{3}{x-1} - \dfrac{10}{x^2-1} \equiv \dfrac{(2x-3)(x+3)}{x^2-1}$

WORKING AT A*/A

(1) Simplify $\dfrac{2x^4-2}{x^2+1} \div \dfrac{x-1}{4x}$

(2) Simplify $\dfrac{3-x}{x^2-3x} \times \dfrac{5x^3-5x^2}{6x^2+4x-2}$

(3) (a) Write $-2 + \dfrac{a}{b} + \dfrac{b}{a}$ as a fully simplified single fraction.

(b) Doris is asked to solve the equation
$-2 + \dfrac{a}{b} + \dfrac{b}{a} = 0$ where a and b are real numbers.

What statement can Doris make about a and b? You must justify your answer.