multiply through

$$\frac{x^4 - 2x^3 + 2x^3 - 4x^2 + x^2 - 2x - \frac{1}{2}}{\frac{2x^5 - x^4}{3} \times (x-3)}$$

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

using elimination method

$$\frac{x^4 - 4x^2 + x^2 - 2x - \frac{1}{2}}{\frac{(2x^5 - x^4) \times (x-3)}{3}}$$

collect like terms

$$\frac{x^4 - 3x^2 - 2x - \frac{1}{2}}{\frac{(2x^5 - x^4) \times (x-3)}{3}}$$

$$\frac{x^4 - 3x^2 - 2x - \frac{1}{2}}{\frac{2x^6 - 6x^5 - x^5 + 3x^4}{3}}$$

rewriting

$$\frac{\frac{2x^4 - 6x^2 - 4x - 1}{2}}{\frac{2x^6 - 6x^5 - x^5 + 3x^4}{3}}$$

collect like term

$$\frac{\frac{2x^4 - 6x^2 - 4x - 1}{2}}{\frac{2x^6 - 7x^5 + 3x^4}{3}}$$

Simplify

$$\frac{(2x^4 - 6x^2 - 4x - 1) \times 3}{2(2x^6 - 7x^5 + 3x^4)}$$

multiply through by 3

$$\frac{6x^4 - 18x^2 - 12x - 3}{2(2x^6 - 7x^5 + 3x^4)}$$ 1

multiby by 2

$$\frac{6x^4 - 18x^2 - 12x - 3}{4x^6 - 14x^5 + 6x^4}$$

$$y = \frac{6x^4 - 18x^2 - 12x - 3}{4x^6 - 14x^5 + 6x^4}$$ 2

2 $$y = \frac{[3e^k \sin 2k]}{k^{5/2}}$$ 3

finding the dirivative of the function

$$y = \frac{d}{dx}\left(\frac{3e^k \sin 2k}{k^{5/2}}\right)$$

Since $$\frac{d}{dx}\left(\frac{f}{g}\right) = \frac{\frac{d}{dx}(f) \times g - f \times \frac{d}{dx}(g)}{g^2}$$

$$\therefore y = \frac{\frac{d}{dx}(3e^k \sin(2k)) \times k^{5/2} - 3e^k \sin(2k) \times \frac{d}{dx}(5/2)}{(k^{5/2})^2}$$

derivative of the product

$$y = \frac{(3e^k \sin(2k)) \times 3e^k \times \cos(2k)\, k2)\, k^{5/2} - 3e^k \sin k \frac{d}{dx}(k^{5/2})}{(k^{5/2})}$$

$$\therefore y = \frac{(6k^2 \sqrt{x} e^k \sin(2k)) + 12k^2 \sqrt{x} e^k \times \cos(2k) - 15\sqrt{x} e^k \times \sin(2k) \times k}{2k^5}$$

Integration

1 $4 \sec^2 (3m+1)$

in exponential form

$2^2 \times \sec (3m+1)^2$

multiply through by bases

$= (2 \sec (3m+1))^2$

2 $2t (3t-1)^{1/2}$

using $a^{\frac{m}{n}} = \sqrt[n]{a^m}$

$= 2t \sqrt{3t^2-1}$

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

since any number raised to the power of 1 = the number

$\therefore \dfrac{2x}{\dfrac{4x^2-1}{2}}$

$= \dfrac{x}{4x^2-1}$