1	0:	414
1.	Given	Inat

$$\frac{2x^4 - 3x^2 + x + 1}{(x^2 - 1)} \equiv (ax^2 + bx + c) + \frac{dx + e}{(x^2 - 1)},$$

VORKSHIRE MATHS TUTOR

find the values of the constants a, b, c, d and e.

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

(a) Express f(x) as a single fraction in its simplest form.

(4)

(b) Hence show that $f'(x) = \frac{2}{(x-3)^2}$

(3)

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1. Express

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

as a single fraction in its simplest form.

(4)







2. (a) Express

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

as a single fraction in its simplest form.

(4)

Given that

$$f(x) = \frac{4x-1}{2(x-1)} - \frac{3}{2(x-1)(2x-1)} - 2, \quad x > 1,$$

(b) show that

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

(2)

(c) Hence differentiate f(x) and find f'(2).

(3)

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$$f(x) = \frac{2x+3}{x+2} - \frac{9+2x}{2x^2+3x-2}, \quad x > \frac{1}{2}.$$

(a) Show that $f(x) = \frac{4x-6}{2x-1}$.

(7)

(b) Hence, or otherwise, find f'(x) in its simplest form.

(3)

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8. (a) Simplify fully

$$\frac{2x^2 + 9x - 5}{x^2 + 2x - 15}$$

(3)

Given that

$$ln(2x^2 + 9x - 5) = 1 + ln(x^2 + 2x - 15), \quad x \neq -5,$$

(b) find x in terms of e.

(4)



7.

$$f(x) = \frac{4x - 5}{(2x + 1)(x - 3)} - \frac{2x}{x^2 - 9}, \qquad x \neq \pm 3, \ x \neq -\frac{1}{2}$$

(a) Show that

$$f(x) = \frac{5}{(2x+1)(x+3)}$$

(5)

The curve C has equation y = f(x). The point $P\left(-1, -\frac{5}{2}\right)$ lies on C.

(b) Find an equation of the normal to C at P.

(8)

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1.	Express
2. 0	Aut the Late of the Late

$$\frac{2(3x+2)}{9x^2-4} - \frac{2}{3x+1}$$

as a single fraction in its simplest form.

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7.

$$h(x) = \frac{2}{x+2} + \frac{4}{x^2+5} - \frac{18}{(x^2+5)(x+2)}, \qquad x \geqslant 0$$

(a) Show that $h(x) = \frac{2x}{x^2 + 5}$

(4)

(b) Hence, or otherwise, find h'(x) in its simplest form.

(3)

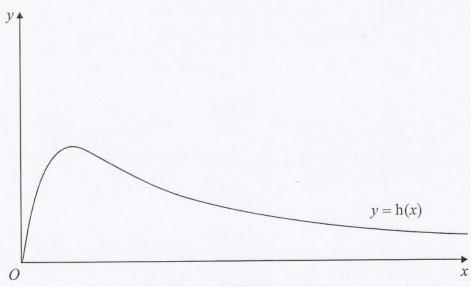


Figure 2

Figure 2 shows a graph of the curve with equation y = h(x).

(c) Calculate the range of h(x).

(5)

1. Given that

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