

15th May



Corbettmaths

$$2a(3x + 7) + 4(ax - 2) \equiv 130x + b$$

Work out a and b

$$6ax + 14a + 4ax - 8 \equiv 130x + b$$

$$10ax + 14a - 8 \equiv 130x + b$$

$$10a = 130 \Rightarrow a = 13$$

$$14a - 8 = b \Rightarrow b = 174$$

$$f(x) = \frac{x}{3x+1} \text{ for positive values of } x.$$

Work out $f(x+2) - f(x)$

Give your answer as a simplified fraction.

$$f(x+2) = \frac{x+2}{3(x+2)+1} = \frac{x+2}{3x+7}$$

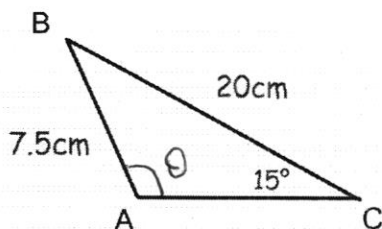
$$f(x+2) - f(x)$$

$$= \frac{x+2}{3x+7} - \frac{x}{3x+1}$$

$$= \frac{(x+2)(3x+1) - x(3x+7)}{(3x+1)(3x+7)}$$

$$= \frac{3x^2 + 7x + 2 - 3x^2 - 7x}{(3x+1)(3x+7)}$$

$$= \frac{2}{(3x+1)(3x+7)}$$



Angle BAC is obtuse.

Work out the size of angle BAC.

$$\frac{\sin \theta}{20} = \frac{\sin 15^\circ}{7.5}$$

$$\Rightarrow \sin \theta = 0.6902$$

$$\theta \text{ obtuse} \Rightarrow \theta = 136.4^\circ$$

$$y = x^5 - \frac{1}{x^4} = x^5 - x^{-4}$$

Work out $\frac{d^2y}{dx^2}$

$$\frac{dy}{dx} = 5x^4 + 4x^{-5}$$

$$\frac{d^2y}{dx^2} = 20x^3 - 20x^{-6}$$

$$= 20x^3 - \frac{20}{x^6}$$