

If a question asks to
 "Show a curve has no
 turning points"

this requires you to show
 that $\frac{dy}{dx} \neq 0$

i.e. 1st derivative can never = 0.

12. Given that $f(x) = \frac{x+1}{x-3}$, $x \in R$ and $x \neq 3$.

Show that the graph of $y = f(x)$ has no turning points.

$$u = x+1$$

$$\frac{du}{dx} = 1$$

$$v = x-3$$

$$\frac{dv}{dx} = 1$$

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

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

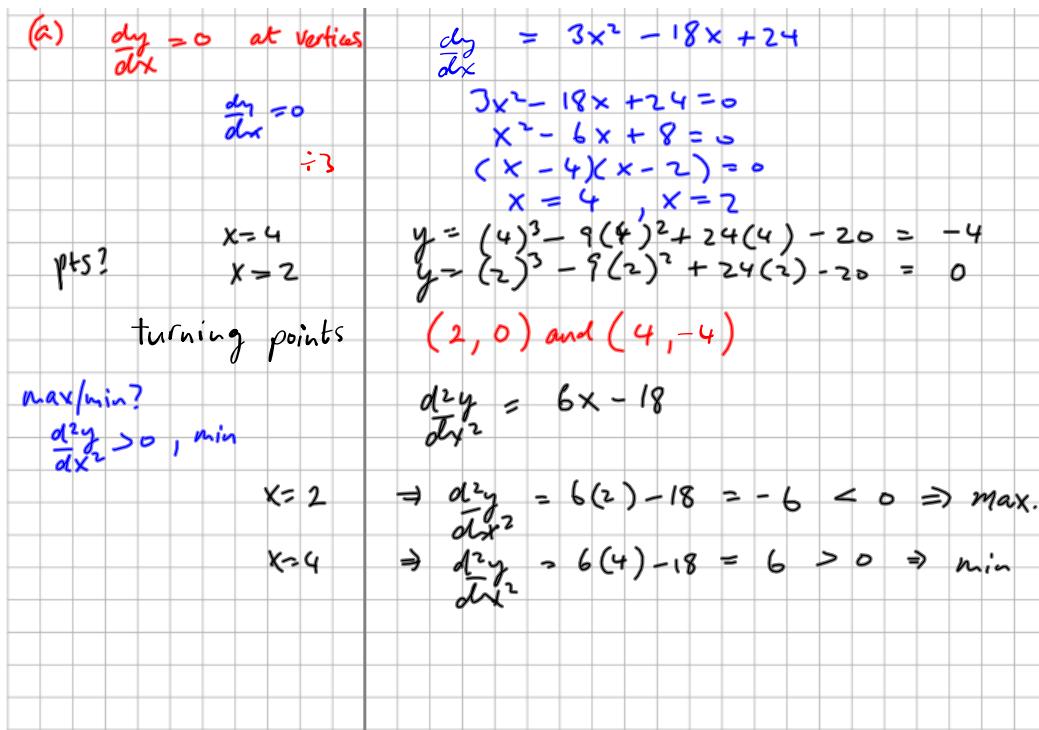
Quotient rule

$$y = \frac{u}{v} \Rightarrow \frac{dy}{dx} = \frac{v \frac{du}{dx} - u \frac{dv}{dx}}{v^2}$$

$$\frac{dy}{dx} = \frac{-4}{(x-3)^2} \neq 0$$

\Rightarrow no turning pts.

15. (a) Find the stationary points on the curve with equation $y = x^3 - 9x^2 + 24x - 20$ and justify their nature.
 (b) (i) Show that $(x-2)^2(x-5) = x^3 - 9x^2 + 24x - 20$.
 (ii) Hence, sketch the graph of $y = x^3 - 9x^2 + 24x - 20$.



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 (ii) Hence, sketch the graph of $y = x^3 - 9x^2 + 24x - 20$.

