Prob 1 If $f(x) = x^3 + x$, find the number c promised by MVT on the interval $[1,2]$.

Note: f is diff everywhere, so MVT applies.
f is a polynomial.

$$f'(c) = \frac{f(2) - f(1)}{2 - 1} = \frac{10 - 2}{2 - 1} = 8$$

$$f'(x) = 3x^2 + 1 \qquad f'(c) = 3c^2 + 1 = 8$$
$$3c^2 = 7$$
$$c^2 = 7/3$$

$$c = \sqrt{7/3}$$

Prob 2 Find the eqn of the tangent line to

$$x^3 + y^3 = x + y + 6 \qquad \text{at } (1, 2)$$

$$3x^2 + 3y^2 y' = 1 + y'$$

$$3 \cdot 1^2 + 3 \cdot 2^2 \cdot y' = 1 + y'$$

$$3 + 12y' = 1 + y'$$

$$11y' = -2$$

$$y' = -2/11$$

$$(y - 2) = -2/11 (x - 1)$$