Name Motaz Sabor (9) ID 288786 Q4

1. Find equations of both lines through the point $(2,1)$ that are tangent to the curve $y = x^3 + 1$.

(1) equation of the tangent line :-

$y' = 3x^2$ (1)

$m = y'(2) = 3(2)^2 = 12$

$y - 1 = 12(x - 2)$

$y - 9 = 12x - 24$

$y = 12x - 24 + 9$

$y = 12x - 15$

2. Find an equation of the tangent line at x=**0**; $y = \dfrac{x^2 - 1}{\cos x}$

$y' = \dfrac{(\cos x)(2x) - (x^2 - 1)(-\sin x)}{\cos^2 x}$

$y' = \dfrac{2x\cos x - (-x^2 \sin x + \sin x)}{\cos^2 x}$

$y' = \dfrac{2x\cos x + x^2 \sin x - \sin x}{\cos^2 x}$

$y'(0) = \dfrac{0 + 0 + 0}{1} = 0 = m$

the equation of the tangent line :-

$y - f(0) = 0(x - 0)$

$y + 1 = 0$

$y = -1$

3. Given $u(0) = 5, u'(0) = -3, v(0) = -1, v'(0) = 2$ Find $\dfrac{d}{dx}\dfrac{u(x)}{v(x)}$ at $x = 0$.

$\dfrac{(-1)(-3) - (5)(2)}{(-1)^2}$

$= \dfrac{3 - 10}{1} = -7$

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