Name Aleta Olivia Mascarenhas, ID 00105738

Quiz 5

Ayman Badawi

$Score = \frac{20}{20}$ (11 ✓)

QUESTION 1. (6 points)

(i) $Lim_{x\to -1} \frac{x^2+x}{x+1} =$

$\lim_{x\to -1} \frac{x^2+x}{x+1} \to \lim_{x\to -1} \frac{x(x+1)}{(x+1)} \to \lim_{x\to -1} x = -1$ ✓

(ii) $Lim_{x\to 4} \frac{x-4}{\sqrt{x}-2} =$

$\lim_{x\to 4} \frac{x-4}{\sqrt{x}-2}$

$\lim_{x\to 4.1} \frac{(4.1)-4}{\sqrt{4.1}-2} = 4.024\ldots$

$\lim_{x\to 4.01} \frac{(4.01)-4}{\sqrt{4.01}-2} = 4.0024\ldots$

$\lim_{x\to 4} \frac{x-4}{\sqrt{x}-2} = 4$ ✓

QUESTION 2. (9 points)

Find $f'(x)$ and do not simplify

(i) $f(x) = 3x^4 + 12x^2 - 15x + 3$

$f'(x) = 12x^3 + 24x - 15$ ✓

(ii) $f(x) = \frac{x^2+1}{x^7} + 3x + 12$

$f(x) = (x^2+1)(x^{-7}) + 3x + 12$

$f'(x) = (x^{-5} + x^{-7}) + 3x + 12$ $\quad f'(x) = -5x^{-6} - 7x^{-8} + 3 \to f'(x) = -\frac{5}{x^6} - \frac{7}{x^8} + 3$ ✓

(iii) $f(x) = \sqrt[5]{(3x^2+2x+1)^2} + 7x^2 - 13$

$f(x) = (3x^2+2x+1)^{\frac{2}{5}} + 7x^2 - 13$

$f'(x) = \frac{2}{5}(3x^2+2x+1)^{-\frac{3}{5}}(6x+2) + 14x$ ✓

QUESTION 3. Find the equation of the tangent line to the curve $f(x) = 4\sqrt{x} + x + 1$ when x = 4.

$f(x) = 4x^{\frac{1}{2}} + x + 1 \qquad x = 4.$

$f(4) = 4(4)^{\frac{1}{2}} + (4) + 1 = 13 \qquad$ point = (4, 13)

$y = mx + c$

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

$f'(4) = 2(4)^{-\frac{1}{2}} + 1 = 2 \qquad m = 2$

$13 = 2(4) + c \to c = 5$

equation → $y = 2x + 5$ ✓