MATH 113 – QUIZ 5 – 2 OCTOBER 2012

Answer all of the following questions in the space provided. Show all work as partial credit may be given. Answers without justification, even if they are correct, will earn no credit.

1. (5 pts.) Find the equation of the tangent line to the graph of $f(x) = \frac{10}{x^2} + 1$ at $x = 2$.

$f(x) = 10x^{-2} + 1$

$f'(x) = -20x^{-3}$

$f'(2) = \frac{-20}{8} = -\frac{5}{2}$ //

$f(2) = \frac{10}{4} + 1 = \frac{7}{2}$ //

Eqn of tang line:

$y - \frac{7}{2} = -\frac{5}{2}(x-2)$

$y = -\frac{5}{2}x + \frac{17}{2}$ //

2. (5 pts.) Find $f'(x)$ if $f(x) = \frac{x^2 + x}{e^x}$.

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

$= \frac{e^x(2x+1-x^2-x)}{e^{2x}} = \frac{x+1-x^2}{e^x}$ //

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Answer all of the following questions in the space provided. Show all work as partial credit may be given. Answers without justification, even if they are correct, will earn no credit.

1. (5 pts.) Find the equation of the tangent line to the graph of $f(t) = 6\sqrt{t} - 4$ at $t = 1$.

$f(t) = 6t^{1/2} - 4$

$f'(t) = 6 \cdot \frac{1}{2} t^{-1/2} = 3t^{-1/2}$

$f'(1) = 3$

$f(1) = 6 - 4 = 2.$

Eqn of tang line

$y - 2 = 3(x - 1)$

$y = 3x - 1$ //

2. (5 pts.) Find $g'(x)$ if $g(x) = 2e^x(x^2 + 1)$.

$g'(x) = (2e^x)(2x) + 2e^x(x^2+1)$

$= 2e^x(x^2 + 2x + 1)$

$= 2e^x(x+1)^2$ //

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Answer all of the following questions in the space provided. Show all work as partial credit may be given. Answers without justification, even if they are correct, will earn no credit.

1. (5 pts.) Find the equation of the tangent line to the graph of $f(x) = 3x^3 - 5x^2 + 3$ at $x = 2$.

$f'(x) = 9x^2 - 10x$

$f'(2) = 9 \cdot 4 - 20 = 16$

$f(2) = 3 \cdot 8 - 5 \cdot 4 + 3$

$= 7$

Eqn of tang line:

$y - 7 = 16(x - 2)$

$y = 16x - 25$ //

2. (5 pts.) Find $\frac{d}{dx}\left(\frac{2e^x}{x^2+1}\right)$.

$$\frac{d}{dx}\left(\frac{2e^x}{x^2+1}\right) = \frac{(x^2+1)(2e^x) - (2e^x)(2x)}{(x^2+1)^2}$$

$$= \frac{2e^x(x^2+1-2x)}{(x^2+1)^2} = \frac{2e^x(x-1)^2}{(x^2+1)^2}$$ //