MATH 113 – QUIZ 11 – 27 NOVEMBER 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.) Use LHopital's Rule to evaluate the limit $\lim_{x\to 0} \frac{1-\cos(\pi x)}{8x^2}$. What is the indeterminate form of the original limit?

$$\lim_{x\to 0} \frac{1-\cos(\pi x)}{8x^2} = \lim_{x\to 0} \frac{\pi \sin \pi x}{16x}$$

$$= \lim_{x\to 0} \frac{\pi^2 \cos \pi x}{16} = \frac{\pi^2}{16}$$

Indeterminate form: $\frac{0}{0}$

2. (5 pts.) Find $\int \left(\frac{5}{t^2} + 4t^2\right) dt$. (Hint: Don't forget the "$+C$")

$$= \int (5t^{-2} + 4t^2)\, dt = -5t^{-1} + \frac{4}{3}t^3 + C$$

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1. (5 pts.) Use LHópital's Rule to evaluate the limit $\lim_{x\to 0} x^{1/2}\ln(x)$. What is the indeterminate form of the original limit?

$$\lim_{x\to 0^+} x^{1/2}\ln(x) = \lim_{x\to 0^+} \frac{\ln x}{x^{-1/2}} = \lim_{x\to 0^+} \frac{\frac{1}{x}}{-\frac{1}{2}x^{-3/2}}$$

$$= \lim_{x\to 0^+} \frac{-2x^{3/2}}{x} = \lim_{x\to 0^+} -2x^{1/2} = 0$$

Indeterminate form: $0\cdot\infty$

2. (5 pts.) Find $\int (x^4 + \sin(2x))\,dx$. (Hint: Don't forget the "$+C$")

$$\int (x^4 + \sin 2x)\,dx = \frac{1}{5}x^5 - \frac{1}{2}\cos(2x) + C$$

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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.) Use L'Hopital's Rule to evaluate the limit $\lim_{x\to 0} \frac{2x^3+4x^2-\sin(\pi x)}{2x^2+3x}$. What is the indeterminate form of the original limit?

$$\lim_{x\to 0} \frac{2x^3+4x^2-\sin(\pi x)}{2x^2+3x} = \lim_{x\to 0} \frac{6x^2+8x-\pi\cos(\pi x)}{4x+3}$$

$$= -\frac{\pi}{3} //$$

Indeterminate form: $\frac{0}{0}$

2. (5 pts.) Find $\int (x^{4/3} - 2x^{1/3})\,dx$. (Hint: Don't forget the "$+C$")

$$\int (x^{4/3} - 2x^{1/3})\,dx = \frac{3}{7}x^{7/3} - 2\cdot\frac{3}{4}x^{4/3} + C$$

$$= \frac{3}{7}x^{7/3} + \frac{3}{2}x^{4/3} + C //$$