Math 8 Practice Exam I Answers, Winter 2004

1. Long Answer

Problem 1.1) The solution is $y = \frac{1}{2}(x^2 - x + \frac{1}{2} + \frac{1}{2}e^{-2x})$.

Problem 1.2) a.) $\frac{dx}{dt} = r - kx(t)$.
b.) $x(t) = \frac{r}{k} + \frac{C}{k}e^{-kt}$
c.) $x(t) = \frac{r}{k} + \frac{kc_0 - r}{k}e^{-kt}$

Problem 1.3) a.) $T_3(x) = (x-1) - \frac{1}{2}(x-1)^2 + \frac{1}{3}(x-1)^3$
b.) $\ln(\frac{3}{2}) \approx T_3(\frac{3}{2}) = \frac{5}{12}$
c.) $|R_3(x)| \leq E = \frac{1}{4} = 0.25$.

Problem 1.4) $\pi - e + \frac{e^2}{\pi^2} - \frac{e^3}{\pi^3} + \cdots = \frac{\pi^2}{\pi + e}$

2. True or False

Problem 2.1) False
Problem 2.2) False
Problem 2.3) True
Problem 2.4) False
Problem 2.5) False
Problem 2.6) True

3. Multiple Choice

Problem 3.1) B. $-1 < x < -\frac{1}{3}$

Problem 3.2) C. $y = \sqrt{2x^2 + C} + 1$

Problem 3.3) C. 5

Problem 3.4) A. 1

Problem 3.5) C. $y'' + 8y' + 16y = 0$

Problem 3.6) A. $\frac{2}{7}$

Problem 3.7) D. $y'' + 4y' + 25y = 0$

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