MATH 1320 EXAM 3 REVIEW

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1. Solve for x.

a. $e^{2x-1}=6$

b. $\ln(4x)-\ln(3x+1)=0$

c. $e^{\ln(x^2)}-9=0$

2. Find dy/dx for the following.

a. $y=e^{x^2}\ln(1-x^3)$

b. $y=\ln\left[\dfrac{5x^2(x-1)^3}{\sqrt{2x+3}}\right]$

c. $y=\left(\sqrt{3}\right)^{2x^4-3}$

d. $y=\left(x^4-x^2\right)^{x^3+2x}$

3. Find the equation of the tangent line of the following at the given point.

$y=\ln(2x)$ **at (0.5,0)**

4. You deposit P dollars in a bank at a continuously compounded interest rate r (in decimal form). After 2 years you have $100, and after 4 years you have $120. How much will you have after 7 years?

5. Carbon 14 (^{14}C **) has a half life of 5,730 years. A sample has 20% of its** ^{14}C **left. How old is the sample?**

6. Find the indefinite integrals of the following:

a. $\int\left(\sqrt[3]{x^2}+4x-3\right)dx$

b. $\int\dfrac{x^4+2x^2+1}{x^2}\,dx$

c. $\int\dfrac{(3x+2)\,dx}{(3x^2+4x-1)^3}$

d. $\int 6x^2e^{2x^3-1}\,dx$

e. $\int\dfrac{x^2+2x+3}{x^3+3x^2+9x+1}\,dx$

7. Solve the differential equation $F'(x)=4x-5$ **with the initial**

condition $F(2)=3.$

8. Your company has a marginal cost function of $C'(x)=\dfrac{43}{\sqrt[3]{43x+1}}$**. Your cost of producing 5 items is $100. Find C(x).**

9. Evaluate the following definite integrals:

a. $\displaystyle\int_2^5 (-3x+4)\,dx$

b. $\displaystyle\int_3^{10} \left(e^x - x^{-1}\right) dx$

c. $\displaystyle\int_0^2 \frac{x\,dx}{\sqrt{1+2x^2}}$

d. $\displaystyle\int_2^3 \frac{x+1}{x^2+2x-3}\,dx$

10. Find the average value of $f(x)=\dfrac{1}{(x-3)^2}$ **on the interval [0,2].**

11. Find the area of the region in the plane bounded by the curves $f(x)=x^3-3x^2+3x$ **and** $g(x)=x^2.$

12. Find the Gini index for the Lorentz curve, $L(x)=\dfrac{2}{3}x^{3.7}+\dfrac{1}{3}x.$

14. Given the demand function, $D(q)=\dfrac{16}{q+2}-3$**, and supply function,** $S(q)=\dfrac{1}{3}(q+1)$**, where q thousands of a commodity will be demanded (sold) at a price p = D(q) dollars per unit, while q thousands will be supplied by producers when the price is p = S(q) dollars per unit, find:**

a. The equilibrium price p, where supply equals demand.

b. The consumers' and producers' surpluses at the equilibrium price.