

EMT111

Test III(Practice)

November 17, 2011

1. Use the remainder theorem to find the remainder when $2x^3 + 3x^2 + 9$ is divided by $x + 2$.
2. Differentiate $f(x) = e^{2x} \tan x$ with respect to x .
3. Oil flows into a cylindrical drum of radius 10 metres. At time $t = 0$ the drum was empty and at time t the oil level in the drum is rising at the rate $10 \left(\frac{1}{1+t} - \frac{1}{4} \right)$ metres per second.
 - (a) What is the rate of increase in volume V of oil in the drum?
 - (b) At what time is the rate of increase in oil level zero?
4. Solve the equation $81^{x+1} = 27^x$
5. Using differentiation determine the range of real values of x for which the function $f(x) = 12 + 6x^2 - x^3$ is decreasing.
6. For $y = \log_2(x + 4)$.
 - (a) Express x in terms of y .
 - (b) Find $\frac{dy}{dx}$
7. A piece of property is to be fenced on the front and two sides. Fencing for the sides cost \$700 per foot and fencing for the front cost \$1120 per foot. What are the dimensions of the largest such rectangular lot if the available money is \$168,000?
8. Find the extreme points of the function, $f(x) = x + \frac{25}{x}$ and tell whether the extreme point is a local maximum or a local minimum or neither.
9. Find the absolute extrema of $f(x) = \frac{1}{3}x^3 - x^2 - 8x$ on $[-1, 10]$.