

PRACTICE FINAL

(SOLNS SOON!)

MULTIPLE CHOICE 10 problems, 5 pts each

1) The equation of the line joining $(3, -2)$ and $(1, 6)$ is

a) $y = x + 5$

b) $y + 2 = \frac{1}{6}(x - 3)$

c) $y = 10 - 4x$

d) $3x - 2y = 6$

2) $\lim_{x \rightarrow \infty} \frac{x}{x^2 + 1} =$

a) 0
b) $-\infty$
c) ∞
d) 1

3) $\lim_{x \rightarrow \infty} \frac{2x^2 + 3x + 1}{4x^2 - 2} =$

a) $-\infty$
b) ∞
c) $\frac{1}{2}$
d) $\frac{2}{3}$

4) $f(x) = \begin{cases} x^2 & \text{if } x > 1 \\ \frac{c-x}{2} & \text{if } x \leq 1 \end{cases}$ what c value makes $f(x)$ continuous

a) 3
b) 0
c) NONE OF ABOVE
d) 2

5) $\int_0^1 x + e^x =$

a) e
b) DNE
c) $1 - e$
d) $e - \frac{1}{2}$

6) $\int_2^3 f(x) dx = 3$, $\int_3^5 \frac{f(x)}{2} dx = 6$. Then $\int_2^5 f(x) dx =$

a) CAN'T BE DET'D FROM INFO
 b) 9
 c) 3
 d) 15

7) The derivative of $\ln(2x^3+1) =$

a) e^{2x^3+1}
 b) $(\ln(2x^3+1)) \cdot 6x^2$
 c) $\frac{6x}{2x^3+1}$
 d) $\frac{6x^2}{2x^3+1}$

8) Find eqn of line thru (1,2), \perp to the line $y = 2x + 2$

a) $y - 1 = 2(x - 2)$
 b) $y - 1 = -2(x - 2)$
 c) $y - 2 = -\frac{1}{2}(x - 1)$
 d) $y - 2 = \frac{1}{2}(x - 1)$

9) Bacteria grows at a rate proportional to amount present, doubling every minute. If there are 10 at $t=0$ and 20 at $t=1$, find the amount at time t

a) $10e^t$
 b) $10 \cdot 2^{2t}$
 c) $10e^{2t}$
 d) $\frac{10}{e^2} e^{2t}$

10) If $f(x,y) = x^2 + \frac{y}{x}$, then $f_x =$

a) $2x + \frac{x \cdot y' - y}{x^2}$
 b) $2x - y/x^2$
 c) $x^2 + \ln(y/x)$
 d) $2x + \ln(y/x)$

WORKOUT PROBS

5 probs, 20 pts each

1) For $f(x) = \frac{x}{(x+1)^2}$

a) compute f' and find crit pts,
Where is f inc, dec, slope zero.b) find f'' , find inflection pts

c) find all vertical / horz. asymptotes

d) graph the function.

2) Compute the integrals: Hint one is u-sub, one is \int by parts

a) $\int x^2 (x^3+1)^{3/4} dx$

b) $\int x (\ln(x))^2 dx$

3) Cost $C(x) = \frac{1}{5}x^2 + 4x + 57 =$ cost of x units

a) Find the equation of the tangent line to the curve $C(x)$, at $x = 4$.

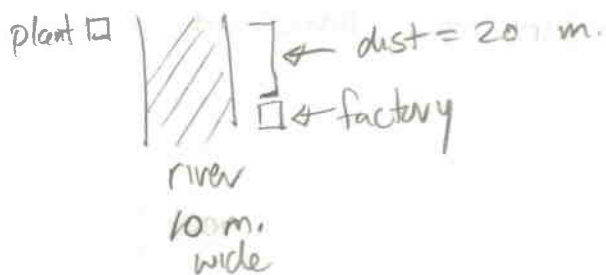
b) If price at which x units sell is $\frac{1}{4}(36-x)$, compute marginal cost + marginal revenue

c) Find marg. cost of prod. 5th unit and actual cost of 5th unit. In words, describe the relation of this to part a)

4) For $f(x,y) = \frac{16}{x} + \frac{6}{y} + x^2 - 3y^2$, Find all critical points. State the criterion to determine if a crit pt. is a max/min/saddle, and apply it to the problem.

- 5) a) If demand $q = 10 - p$, compute the elasticity of demand as a fn. of p .
 Hint: $\frac{1}{2}$ credit = write down formula for $E(p)$
 What is elasticity when $p = 5$?
 (inelastic/elastic/unit?)

- Hardest!!
 (10) b) Run cable from power plant on one side of a river to a factory on the other.



Cost to run cable over water = 10\$/meter, over ground = 1\$/meter. What is cheapest way to run cable? (Set up, find right deriv and explain how to solve).

5 pts bonus answer to H!