

Previous Final Exam Solutions

1a) $6x$ b) $x^3 - 7x + C$ c) $(\cos(2x))^2$ d) $+\frac{1}{2}$ e) $\frac{(x-1)^2 - 2(x-1)(x+1)}{(x-1)^4}$

2a) $\cos(\sin x) \cos x$ b) $\left[\frac{1}{1+(e^x)^2} \right] e^x$ c) $\tan x + (\sec^2 x)x$
d) $\frac{1}{\sqrt{x}} \cdot (-\frac{1}{2}x^{-2})$ e) $\frac{(-2x-3y)}{(3x+2y)}$

3a) negative, because f is increasing at a slower rate near 7

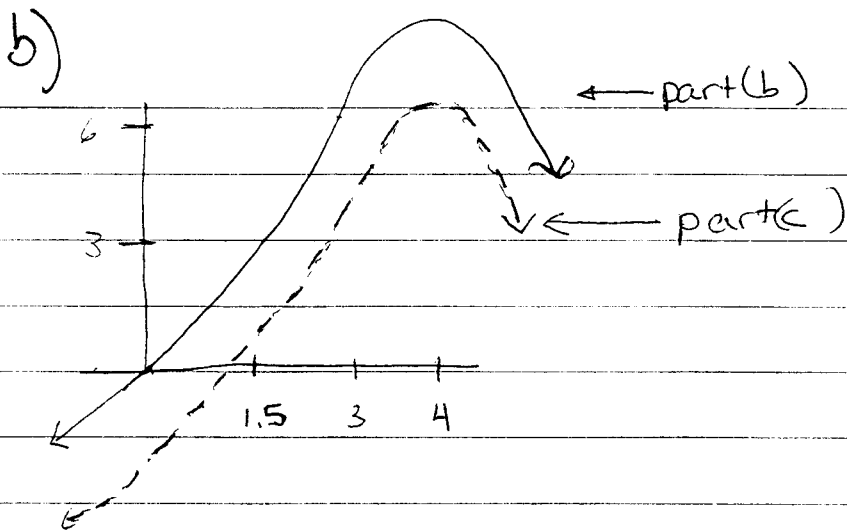
b) $f'(7) \approx \frac{(12.1 - 11.3)}{(7.5 - 7)}$

c) $y = 1.6(x - 7) + 11.3$

d) $y \approx 11.3 + 1.6(7.1 - 7)$

e) too big; f is concave down at 7, so tangent is above graph

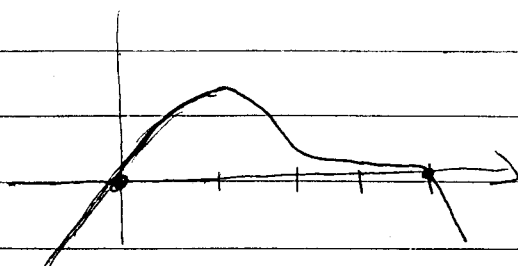
4a) $F(1.5) \approx 3$, $F(3) \approx 6.5$



⑤ a) critical pts: $x=1$ (max), $x=3$ (neither)

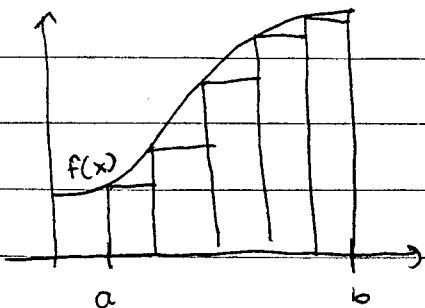
b) $x=2, 4$

c)



⑥ $10' \times 20' \times 10'$

⑦



$\int_a^b f(x) dx$ is area under curve;
LHS is area of rectangles, which
is less than area under curve
since curve is above them

⑧ a) f' is + ; f'' is -

b) If 101 lbs. of fertilizer is used instead of 100, then
approx. 2.5 extra bushels of crops will be produced.

⑨ a) true b) false c) true

⑩ number of subdivisions must be greater than 2,400,000. (Why?)

⑪ $x=0,4$: local min $x=2$: local max

⑫ 16 ft

⑬ $\ln 3$

⑭ False ; $\frac{1}{\sqrt{x^2+9}}$ is positive, so integral = area; area can't be negative

⑮ car is going 24 ft/s ; $11/61$ rad/s

⑯ $\frac{10e^{-2}}{.02} - \frac{10}{.02}$ million people