Math. 250-01, Fall, 2015, Second exam answers page 1

1 a $f'(-.5) \approx \frac{0.0625-0.25}{-.25-(-.5)} = \boxed{-0.75} \approx f'(-.5)$

$f'(-.25) \approx \frac{0-0.0625}{0-(-0.25)} = \boxed{-0.25} \approx f'(-.25)$

$f'(0) \approx \frac{0.0625-0}{0.25-0} = \boxed{0.25} \approx f'(0)$

$f'(0.25) \approx \frac{0.25-0.0625}{0.5-0.25} \approx \boxed{0.75} \approx f'(0.5)$

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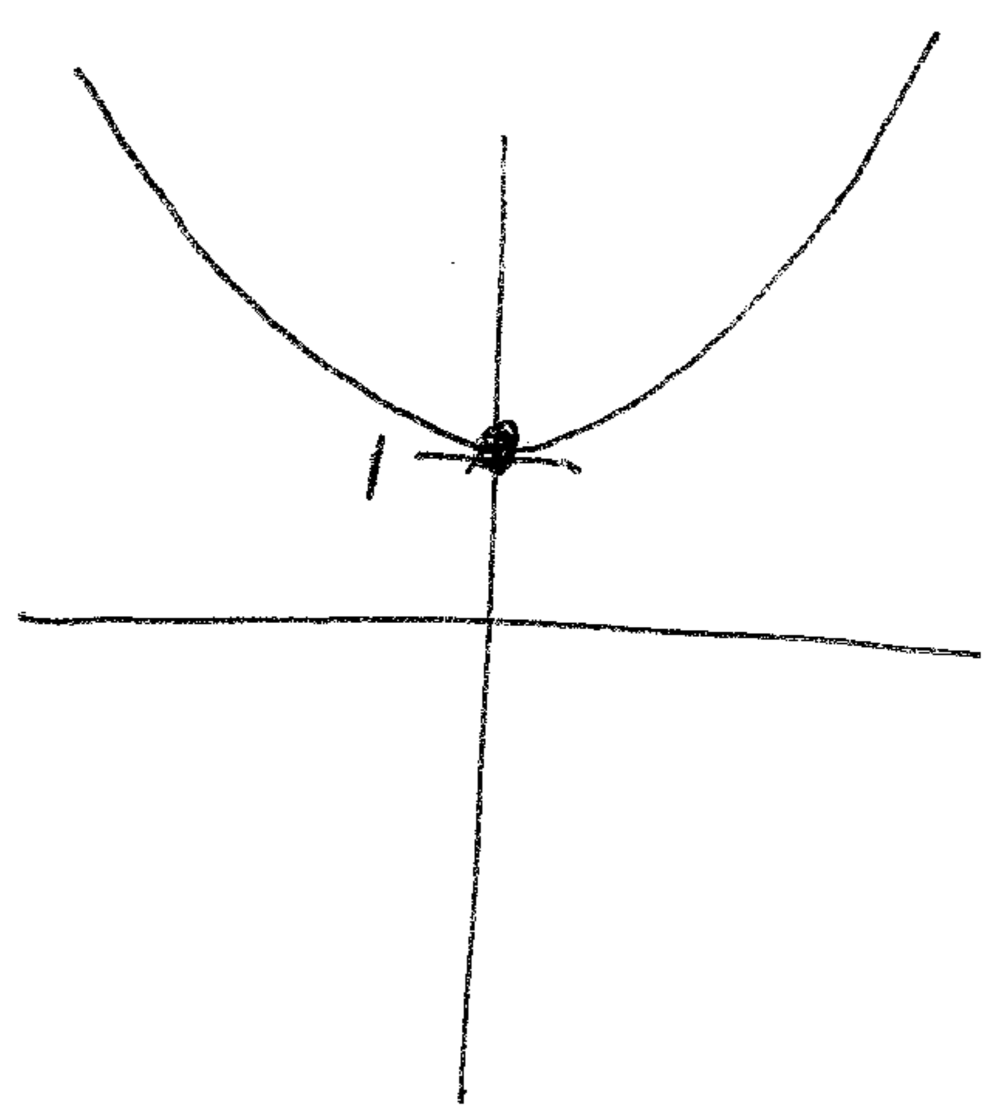
b Since f' is apparently increasing, f appears to have a graph that is concave up.

2



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3 a $f(10) = 92.63$ means 92.63 million metric tons of meat were produced in 2010.
$f'(10) = 0.64$ means that, in 2010, meat production was increasing by 640,000 metric tons per year.

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b $f(15) \approx 92.63 + (0.64)(5) \approx 95.83$.
This means that, in 2015, approximately 95.83 million metric tons of meat will have been produced.

4) a) $\pi(2000) = R(2000) - C(2000) = 7780 - 5930 = \boxed{1850}$ dollars.

b) $\pi'(2000) = MR(2000) - MC(2000) = 2.5 - 2.1 = 0.4$
The 2001st item would net \$0.40 additional profit. Since $M\pi = \pi'(2000) > 0$, the company should increase production.

c) In this case, $\pi'(2000) = 4.32 - 4.77 = -0.45 < 0$, so the company should decrease production to make more money.