Quiz Questions 3 for Mathematics 224
Introductory Analysis II - Spring 2001
Material Covered: Sections 6.1, 6.2 of workbook and text
For: Friday, 23rd February

This is a 15 minute quiz, worth 5% and marked out of 5 points. The total possible points awarded for each question is given in square brackets at the beginning of each question. Anything that can fit on one side of an $8\frac{1}{2}$ by 11 inch piece of paper may be used as a reference during this quiz. A calculator may also be used. No other aids are permitted.

Name (please print): _____ . **ID Number:** _____.
last first

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1. [3 points] Consider the demand function, $D(x) = (x-8)^2$,
and the supply function, $S(x) = x^2$.

(a) The market equilibrium is
(circle closest one) **(4, 16)** / **(5, 9)** / **(5, 25)** / **(6, 4)** / **(6, 36)**

(b) The consumer's surplus at the

equilibrium point is _____

(c) The producer's surplus at the

equilibrium point is _____

2. [2 points] How much iron ore was used in the last 8.5 years (world wide), if there was an initial (at time $t = 0$) demand of 11 (million tons) and the demand grows at an exponential rate of 2.5%?

1.

(a) $(Q, P) = (x, D) = (4, 16)$
$x^2 - 16x + 64 = x^2$, so $-16x + 64 = 0$ or $x = Q = 4$
and so equilibrium price is $S(4) = 4^2 = 16$

(b) $\frac{256}{3} = 85.3$
$\int_0^Q D(x)\,dx - QP = \int_0^4 (x^2 - 16x + 64)\,dx - (4)(16) = \left[\frac{1}{3}x^3 - 8x^2 + 64x\right]_0^4 - 64$

(c) $\frac{128}{3} = 42.7$
$QP - \int_0^Q S(x)\,dx = 64 - \int_0^4 x^2\,dx = 64 - \left[\frac{1}{3}x^3\right]_0^4$

2. 104.18
$\frac{P_0}{k}\left(e^{kT} - 1\right) = \int_0^{8.5} 11e^{0.025t}\,dt = \frac{11}{0.025}\left(e^{0.025(8.5)} - 1\right)$