

MATH 111 – EXAM II Hints and Answers
Version Beta
Autumn 2007

1. (a) (3 points) ANSWER: $TR(q) = 20.10q - 0.1q^2$
(b) (4 points) HINT: TR is a quadratic whose graph is a parabola that opens downward. TR increases from $q = 0$ to the q -coordinate of its vertex.
ANSWER: from $q = 0$ to $q = 100.5$
(c) (3 points) ANSWER: $TC(q) = 2q + 5$
(d) (4 points) HINT: TC is a line with positive slope. It is highest at $q = 6$. Compute $TC(6)$.
ANSWER: 17 thousand dollars
(e) (4 points) HINT: $P(q) = TR(q) - TC(q) = -0.1q^2 + 18.10q - 5$. Profit is a quadratic function whose graph is a parabola that opens downward. The maximum profit occurs at its vertex.
ANSWER: 90.5 thousand Quipples
2. (4 points each)
 - (a) HINT: Set $MR = MC$ and solve for q .
ANSWER: 5.3 hundred Items
 - (b) HINT: Set $MR - MC = 0.50$ and solve for q .
ANSWER: $q = 4.43$ hundred Items
 - (c) HINT: MC is a quadratic whose graph is a parabola that opens upward. MC is lowest at the vertex.
ANSWER: $q = 4$ hundred Items
 - (d) HINT: Either set $MC = AVC$ and solve for q or find the q -coordinate of the vertex of AVC . Then plug that q value into either MC or AVC to get the shutdown price.
ANSWER: \$0.65 per Item
3. (4 points each)
 - (a) HINT: Plug 0 into $f(x)$ to see that $f(0) = c$. But we know that $f(0) = 3$. So, $c = 3$. Next, plug 4 into $f(x)$ to see that $f(4) = 16a - 5$. But we know that $f(4) = 11$. So, $16a - 5 = 11$. Solve for a .
ANSWER: $a = 1, c = 3$
 - (b) HINT: Compute $\frac{f(2)}{2}$.
ANSWER: 1.5
 - (c) HINT: $f(1+h) = (1+h)^2 - 2(1+h) + 3 = h^2 + 2$ and $f(1) = 2$.
ANSWER: $\frac{f(1+h) - f(1)}{h} = h$
 - (d) HINT: $\frac{f(x) - f(0)}{x} = \frac{x^2 - 2x + 3 - 3}{x} = x - 2$. Set this equal to $\frac{10}{3}$ and solve for x .
ANSWER: $x = \frac{16}{3}$