

MATH 111 D
Exam II — Version 1
Hints and Answers

1. (17 points)

- (a) (4 points) HINT: Find the formula for profit ($TR(q) - TC(q)$) and use the vertex formula.

ANSWER: $q = 61$ Things

- (b) (4 points) HINT: Plug $q = 61$ into your formula for profit.

ANSWER: \$940

- (c) (4 points) HINT: $TC(q+1) = (q+1)^2 + 2781 = q^2 + 2q + 2782$. $MC(q) = (q^2 + 2q + 2782) - (q^2 + 2781)$.

ANSWER: $MC(q) = (0)q^2 + (2)q + (1)$

- (d) (5 points) HINT: $AC(q) = \frac{TC(q)}{q} = q + \frac{2781}{q}$. Set $AC = 115$ and solve for q .

ANSWER: $q = 34.58$ and $q = 80.42$ Things

2. (16 points – 4 each)

- (a) HINT: $w(t)$ is linear. $w(0) = 18$ and $w(5) = v(5) = 17$. So, the graph of $w(t)$ goes through the points $(0, 18)$ and $(5, 17)$.

ANSWER: $w(t) = -\frac{1}{5}t + 18$

- (b) HINT: $m = 2$ and $b = 7$ for vat V .

ANSWER: $V(t) = t^2 + 7t$

- (c) HINT: Set $V(t) = 40$ and solve for t .

ANSWER: $t = 3.73$ minutes

- (d) HINT: Set $U(t) = V(t) + 20$ and move everything to one side of the equation.

ANSWER: $(4)t^2 + (-41)t + (10) = 0$ OR $(-4)t^2 + (41)t + (-10) = 0$

3. (17 points)

- (a) (4 points) HINT: $TR(q) = pq$, which is a quadratic. Use the vertex formula to find the highest point on the parabola.

ANSWER: from $q = 0$ to $q = 17$

- (b) (4 points) HINT: $AVC(10) = 30 + N$ and $AVC(10) = 35.70$. Solve $30 + N = 35.70$ for N .

ANSWER: $N = 5.7$

- (c) (5 points) HINT: $AVC(q) = 3q + 5.7$. $VC(q) = AVC(q) \cdot q = 3q^2 + 5.7q$. $TC(q) = VC(q) + FC = 3q^2 + 5.7q + 20$.

ANSWER: $TC(5) = \$123.50$

- (d) (4 points) HINT: $MC(6) = TC(7) - TC(6) = \$206.90 - 162.20$

ANSWER: $MC(6) = \$44.70$

NOTE: If you used the value $N = 3.2$, then (c) is \$112.50 and (d) is \$42.20.