

MATH 111 B
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: $q = 36$ Things

- (b) (4 points) HINT: Plug $q = 36$ into your formula for profit.

ANSWER: \$580

- (c) (4 points) HINT: $TC(q + 1) = (q + 1)^2 + 716 = q^2 + 2q + 717$. $MC(q) = (q^2 + 2q + 717) - (q^2 + 716)$.

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

- (d) (5 points) HINT: $AC(q) = \frac{TC(q)}{q} = q + \frac{716}{q}$. Set $AC = 63$ and solve for q .

ANSWER: $q = 14.88$ and $q = 48.12$ Things

2. (17 points)

- (a) (4 points) HINT: Set $A(t) = B(t)$ and solve for t .

ANSWER: $t = 12.8$ minutes

- (b) (4 points) HINT: Find a formula for $A(t) - B(t)$ and use the vertex formula.

ANSWER: $t = 6.4$ minutes

- (c) (4 points) HINT: Set $A(t) = B(t) + 30$ and move everything to one side of the equation.

ANSWER: $(1.25)t^2 + (-16)t + (30) = 0$ OR $(-1.25)t^2 + (16)t + (-30) = 0$

- (d) (5 points) HINT: $C(t)$ is linear. $C(1) = B(1) = 152.5$ and $C(6) = A(6) = 231$. So, the graph of $C(t)$ goes through the points $(1, 152.5)$ and $(6, 231)$.

ANSWER: $C(t) = 15.7t + 136.8$

3. (16 points – 4 each)

- (a) HINT: $FC = TC(0)$

ANSWER: $FC = \$20$

- (b) HINT: $TC(10) = 3(10)^2 + N(10) + 20 = 320 + 10N$ and $TC(10) = 344$. So, $320 + 10N = 344$. Solve for N .

ANSWER: $N = 2.4$

- (c) HINT: $MC(6) = TC(7) - TC(6) = \$183.80 - 142.40$

ANSWER: $MC(6) = \$41.40$

- (d) HINT: $TR(q) = 34.50q$. So, profit is $34.50q - (3q^2 + 2.4q + 20)$. Set this equal to 50 and move everything to one side of the equation.

ANSWER: $(3)q^2 + (-32.1)q + (70) = 0$ OR $(-3)q^2 + (32.1)q + (-70) = 0$

NOTE: If you used the value $N = 7.4$, then (c) is \$46.40 and (d) is $(3)q^2 + (-27.1)q + (70) = 0$ OR $(-3)q^2 + (27.1)q + (-70) = 0$.