

MATH 111 C
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: $q = 82$ Things

- (b) (4 points) HINT: Plug $q = 82$ into your formula for profit.

ANSWER: \$150

- (c) (4 points) HINT: $TC(q+1) = (q+1)^2 + 6574 = q^2 + 2q + 6575$. $MC(q) = (q^2 + 2q + 6575) - (q^2 + 6574)$.

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

- (d) (5 points) HINT: $AC(q) = \frac{TC(q)}{q} = q + \frac{6574}{q}$. Set $AC = 172$ and solve for q .

ANSWER: $q = 57.33$ and $q = 114.67$ Things

2. (17 points)

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

ANSWER: $t = 11.2$ minutes

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

ANSWER: $t = 5.6$ minutes

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

ANSWER: $(1.25)t^2 + (-14)t + (30) = 0$ OR $(-1.25)t^2 + (14)t + (-30) = 0$

- (d) (5 points) HINT: $C(t)$ is linear. $C(1) = A(1) + 10 = 23.5$ and $C(5) = A(5) = 57.5$. So, the graph of $C(t)$ goes through the points $(1, 23.5)$ and $(5, 57.5)$.

ANSWER: $C(t) = 8.5t + 15$

3. (16 points – 4 each)

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

ANSWER: $FC = \$35$

- (b) HINT: $TC(10) = 3(10)^2 + N(10) + 35 = 335 + 10N$ and $TC(10) = 384$. So, $335 + 10N = 384$. Solve for N .

ANSWER: $N = 4.9$

- (c) HINT: $MC(6) = TC(7) - TC(6) = \$216.30 - 172.40$

ANSWER: $MC(6) = \$43.90$

- (d) HINT: $TR(q) = 56.70q$. So, profit is $56.70q - (3q^2 + 4.9q + 35)$. Set this equal to 50 and move everything to one side of the equation.

ANSWER: $(3)q^2 + (-51.80)q + (85) = 0$ OR $(-3)q^2 + (51.80)q + (-85) = 0$

NOTE: If you used the value $N = 5.4$, then (c) is \$44.40 and (d) is $(3)q^2 + (-51.3)q + (85) = 0$ OR $(-3)q^2 + (51.3)q + (-85) = 0$.