

MATH 111 – EXAM II Hints and Answers

Version 1

Autumn 2005

1. (a) (3 points) HINT: Find the  $q$  value of the vertex of  $TR$ .  
ANSWER:  $q = 7.75$  hundred Things
  - (b) (4 points) HINT: The graph of  $TC$  goes through the points  $(2, 216)$  and  $(8, 480)$ . The equation of the line through these two points gives the formula for  $TC$ :  $TC(q) = 44q + 128$ .  $FC$  is the “ $y$ ”-intercept of  $TC$ .  
ANSWER:  $FC = 128$  hundred dollars
  - (c) (4 points) HINT: Set  $TC(q) = 596.6$  and solve for  $q$ .  
ANSWER:  $q = 10.65$  hundred Things
  - (d) (4 points) HINT: Find the “ $y$ ”-coordinate of the vertex of the profit function:  $P(q) = TR(q) - TC(q) = -8q^2 + 80q - 128$ .  
ANSWER: 72 hundred dollars
2. (a) (4 points) HINT:  $MC(6) = TC(7) - TC(6)$ .  
ANSWER:  $MC(6) = 6.4$  dollars
  - (b) i. (3 points) HINT:  $AC(q) = \frac{TC(q)}{q} = 0.2q^3 - 3q + 20 + \frac{120}{q}$ . Set  $AC(q) = 20$ .  
ANSWER:  $0.2q^3 - 3q^2 + 120 = 0$
  - ii. (3 points) HINT:  $VC(q) = TC(q) - FC = 0.2q^3 - 3q^2 + 20q$ . Set  $VC(q) = 90$ .  
ANSWER:  $0.2q^3 - 3q^2 + 20q - 90 = 0$
  - (c) (5 points) HINT:  $AVC(q) = \frac{VC(q)}{q} = 0.2q^2 - 3q + 20$ . Find the “ $y$ ”-coordinate of the vertex of  $AVC$ .  
ANSWER: shutdown price = \$8.75
3. (4 points each)
    - (a) ANSWER:  $\frac{B(t+2) - B(t)}{2} = -90t + 942$
    - (b) HINT: Set  $B(t) - A(t) = 1000$  and solve for  $t$ .  
ANSWER:  $t = 1.26$  minutes
    - (c) HINT: Find the  $t$ -coordinate of the vertex of  $B(t) - A(t)$ .  
ANSWER:  $t = 10.34$  minutes
    - (d) i. T  
ii. T  
iii. F  
iv. F
    - (e) HINT: Balloon  $C$  returns to the ground 10 minutes after Balloon  $A$ . To find when Balloon  $A$  returns to the ground, set  $A(t) = 0$  and solve for  $t$ .  $A$  lands at  $t = 46$ .  
ANSWER:  $t = 56$  minutes