

MATH 111C – EXAM II Hints and Answers  
Version Beta  
Autumn 2011

1. (a) (4 points) HINT: Set  $MR(q) = MC(q)$  and solve for  $q$ .  
ANSWER:  $q = 3.75$  hundred Things
- (b) (3 points) HINT: Compute  $MR(4)$ .  
ANSWER: \$21
- (c) (5 points) HINT: Set  $AC(q) = MC(q)$  and solve for  $q$ . Then plug that value of  $q$  back into either  $AC(q)$  or  $MC(q)$  to find the breakeven price.  
ANSWER: \$15.25 per Thing
2. (a) (4 points) HINT: Set  $TR(q) = TC(q)$  and solve for  $q$ . Choose the largest value of  $q$ .  
ANSWER:  $q = 99.28$  thousand Kleems
- (b) (6 points) HINT: Both  $TR(q)$  and profit  $P(q)$  are quadratics whose graphs are parabolas that open down. Find the vertex of each and then use their graphs to determine where both are increasing.  
ANSWER: from  $q = 0$  to  $q = 56.25$
- (c) (3 points) HINT: Find the “ $y$ ”-coordinate of the vertex of the profit function.  
ANSWER: 296.25 thousand dollars OR \$296,250.
3. (a) (5 points) ANSWER:  $\frac{A(5+h) - A(5)}{h} = -0.15h + 7.5$
- (b) (4 points) HINT: The graph of  $B$  is the line through the points  $(0, A(0)) = (0, 0)$  and  $(55, A(55)) = (55, 41.25)$ .  
ANSWER:  $B(t) = 0.75t$
- (c) (4 points) HINT:  $\frac{A(t)}{t} = -0.15t + 9$  and  $\frac{B(t)}{t} = 0.75$ . Solve the equation  $0.75 - (-0.15t + 9) = 4$  for  $t$ .  
ANSWER:  $t = 81.67$  minutes
4. (a) (4 points) HINT:  $FC = TC(0)$  and  $VC(q) = TC(q) - FC$ .  
ANSWER:  $FC = \$11$  and  $VC(q) = \sqrt{q+36} - 6$
- (b) (3 points) HINT:  $MC(20) = TC(21) - TC(20)$   
ANSWER:  $MC(20) = 0.07$  dollars
- (c) (5 points) HINT:  $AC(q) = \frac{TC(q)}{q} = \frac{5 + \sqrt{q+36}}{q}$ . Set  $AC(q) = 3$  and solve for  $q$ .  
ANSWER:  $q = 3.77$