MATH 111 – EXAM II Hints and Answers
Autum 2018

Version 1: In #, the total cost is $TC(q) = 0.1q^3 - 1.5q^2 + 8q + 36$.

1. (a) (3 points) ANSWER: 11.28 dollars per Thing
   (b) (2 points) ANSWER: $AVC(q) = 0.1q^2 - 1.5q + 8$
   (c) (3 points) ANSWER: $q = 1.32, 13.68$ hundred Things
   (d) (3 points) ANSWER: \$2.38 per Thing
   (e) (3 points) HINT: TR always goes through the origin. Since profit is 0 when $q = 24$, $TR(24) = TC(24)$ and you can use the formula for TC to compute $TC(24) = 746.4$. Then TR is a line through the points $(0, 0)$ and $(24, 746.4)$.
   ANSWER: $TR(q) = 31.1q$

2. (a) (4 points) HINT: Draw a graph of $B(t)$, a parabola that opens up whose vertex is at $x = 0.125$. You can then see that, on the interval from $t = 2$ to $t = 2.5$, the graph of B is **increasing** and thus, on this interval, its highest value is at $t = 2.5$. $B(2.5) = 29.5$.
   ANSWER: 29.5
   (b) (5 points) ANSWER: $\dfrac{B(t+h) - B(t)}{h} = 8t + 4h - 1$

3. HINT: Find the equation of the line through the points $(0, 60)$ and $(20, 0)$: $y = 60 - 3x$.
   ANSWER: vertices: $(7, 6)$, $(18, 6)$, $(7, 39)$; maximum value of $P(x, y) = 618$

4. ANSWER: $(q, p) = (76, 36)$

5. HINT: Let x be the number of Sparkle Bars sold and y be the number of Charkle Bars sold. Solve the system: $x + y = 500$ and $3.75x + 4.25y = 1969$.
   ANSWER: 312 Sparkle Bars and 188 Charkle Bars