

MATH 112 – EXAM I Hints and Answers
Version Alpha
Winter 2009

1. ANSWER: $f'(x) = 3 + \frac{3}{2}x^{1/2} + \frac{5}{3}x^{-2/3}$
2. (a) (3 points) HINT: Approximate $MR(6)$ by computing the slope of the tangent line to the TC graph at $q = 6$.
ANSWER: approximately 0.67 dollars per Item (or dollars)
- (b) (3 points) HINT: Draw a reference line with slope 3 and find the quantity at which the tangent line to TR is parallel to your reference line.
ANSWER: $q \approx 2.5$ thousand Items
- (c) v; iii; i; iii
3. (a) (3 points) ANSWER: 0.005025
- (b) (4 points) ANSWER: $\frac{4}{(4.96 - r)(5 - r)}$
- (c) (3 points) ANSWER: $\frac{4}{(5 - a)^2}$
- (d) (4 points) HINT: Set $\frac{4}{(5 - a)^2} = 64$ and solve for a .
ANSWER: $a = 4.75$ or 5.25
4. (a) (4 points) HINT: Set $a(t) = 0$ and solve for t .
ANSWER: from $t = 0.8$ to $t = 12.2$
- (b) (2 points) ANSWER: $b(t) = 0.4t - 3.2$
- (c) (6 points) HINT: The graph of $b(t)$ is a line with positive slope and negative “ y ”-intercept. This means that Balloon B falls until $b(t) = 0$ and then begins to rise. To find the time at which Balloon B is at its lowest altitude, set $0.4t - 3.2 = 0$ and solve for t . Plug that value of t into the formula for $a(t)$.
ANSWER: 9.072 feet per minute
- (d) (4 points) HINT: Either use the vertex formula to find the t -coordinate of the vertex of $a(t)$ OR find the value of t at which $a'(t) = 0$.
ANSWER: $t = 6.5$ minutes