

MATH 112 A - Spring 2003
Exam 2, Version 1 - Hints and Answers

1. (a) ANSWER: $\frac{\partial E}{\partial b} = 2b + 5m - 0.3$, $\frac{\partial E}{\partial m} = 15m + 5b - 0.875$.
(b) ANSWER: $z = 0.05t + 0.025$
(c) HINT: The line of best fit is the line that minimizes the MSE function.
ANSWER: $E(0.025, 0.05) = 0.000225$
(d) HINT: $\ln V(t) = 0.05t + 0.025$. Solve for $V(t)$ and compute $V(6)$.
ANSWER: \$1.38
2. (a) ANSWER: $\frac{\partial z}{\partial t} = 2te^m - \frac{m^2 + 2m}{2t^{3/2}}$ (simplified)
(b) HINTS: $S(x) = \frac{1}{5}x - 4 + \frac{32}{x}$, $S'(x) = \frac{1}{5} - \frac{32}{x^2}$. Set $S'(x) = 0$ and solve for x .
ANSWER: $x = 12.65$
(c) SOLUTION: $k'(x) = x^3 - 11x^2 + 40x - 48$ and $k''(x) = 3x^2 - 22x + 40$. $k'(3) = 0$ and $k''(3) = 1$. Since the graph of $k(x)$ has a horizontal tangent at $x = 3$ and is concave up there, the graph has a minimum at $x = 3$.
3. (a) ANSWERS: objective function $P(x, y) = 25.80x + 21.50y$;
constraints: $40x + 80y \leq 480$ and $30x + 20y \leq 240$
(b) ANSWER: The vertices of the feasible region are $(0, 0)$, $(0, 6)$, $(8, 0)$, and $(6, 3)$.
(c) HINT: Plug all four vertices of the feasible region into the profit function.
ANSWER: 6 batches of cookies, 3 batches of cupcakes
(d) ANSWER: \$219.30