

MATH 112 FINAL EXAM
WINTER 2017

1. (a) $h_r(r, t) = 3te^{3r} + \frac{4}{r^5}$
 $h_t(r, t) = e^{3r} + \frac{1}{8t}$
(b) $f_x(x, y) = 6(x^2y + xy^2)^5(2xy + y^2)$
(c) $\frac{\partial z}{\partial y} = y^5 \cdot e^{(x^2+4y)} \cdot 4 + e^{(x^2+4y)} \cdot 5y^4$
2. (a) 8150 bottles
(b) 20 gallons of Mat 1; 85 gallons of Mat 2
(c) 126 bottles
(d) 127.5 gallons of Mat 2
3. (b) consumer surplus = \$10; producer surplus \approx \$ 14.5
4. 62,012 dollars
5. (a) $t = 14.95$ minutes
(b) $t = 7.2$ minutes
(c) 948 gallons
(d) from $t = 0$ to $t = 14.82$ minutes
6. (a) $f'(3) \approx 0.86$
(b) $\int_5^6 f(x) dx \approx 10$
(c) From $x = 7$ to $x = 13$.
(d) From $x = 1$ to $x = 4$ and from $x = 16$ to $x = 18$.
7. (a) 0.00392
(b) 0.0784
(c) 0.163