MATH 122B AND 125
ADDITIONAL REVIEW PROBLEMS - ANSWERS
(Fall 2013)

1. a) $x > 0$

b) $-\infty$

c) $-\infty$

d) $x = \dfrac{e^2 \pm \sqrt{e^4 - 8}}{2}$

e) No

f) $x = \dfrac{e^2 - \sqrt{e^4 - 8}}{2}$

g) Yes at $x = 9$.

h) $y = \big(2 - \ln(3)\big)(x - 1) + 3$

i) $\left(f^{-1}\right)'(3) = \dfrac{1}{2 - \ln 3}$ (simplified)

j) Yes

k) No

l) $f''(x) = \dfrac{2 - x^2}{x(x^2 + 2)}$

m) 0

n) $x = \sqrt{2}$

o) $0 < x < \sqrt{2}$

p) It would be an underestimate. We know f is concave up on the interval containing $x = 1.2$ (see above), so the y-values on the tangent line would be smaller than the actual y-values on f.

q) $f(7) - f(1) = 3.059$

r) $\ln\left(\dfrac{5}{27}\right) - \ln\left(\dfrac{3}{11}\right)$

s) $f(5) = \int_1^5 f'(x)dx + 3 \approx 5.7442$

t) It would be an overestimate because f' is decreasing on this interval.

u) It would be an underestimate because f is increasing on this interval.

v) $h'(x) = \ln\left(\frac{x}{x^2+2}\right) + 2$.

w) $g'(x) = 3\left(f(x)\right)^2 f'(x) \qquad g'(7) = 3(6.059)^2\left(\ln(7/51) + 2\right)$.

x) Approximately 0.7 degrees per hour. Between the 3rd and 4th hours, the temperature would increase by approximately 0.7 degrees.

y) The change in temperature in degrees between the 1st and 4th hours.