

MATH 122B AND 125  
ADDITIONAL REVIEW PROBLEMS - ANSWERS

1. a)  $x > 0$

b)  $-\infty$

c)  $-\infty$

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

e) No

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

g) Yes at  $x = 9$ .

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

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

j) Yes

k) No

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

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

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)  $g'(x) = 3(f(x))^2 f'(x) \quad g'(7) = 3(6.059)^2 (\ln(7/51) + 2).$

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 1<sup>st</sup> and 4<sup>th</sup> hours.