Math 120F
Final Exam (Autumn 1997)-Answers

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1. (a) (i) $3 + 4h + h^2$. (ii) $4 + h$.
   (b) $f(g(-1)) = -3/4$. $g(f(-1)) = -1$
   (c) $x = -4\ln(1.4) = -1.3459$
   (d) $y = 2^{3x+1} - 5$.
2. (a) $A = 15, B = 4, C = 3, D = 215$. Also, $C = 3 + 4k$, k an integer is acceptable.
   (b) 225.6^o.
   (c) $t = 3.216, 4.784, 7.216, 0.784$.
3. (a) $y = 59000(1.12)^t$.
   (b) \$92,823
   (c) $f(t) = 100000e^{0.047t}$.
   (d) 7.96 years after January 1, 1997.
4. (a) $x(t) = 3\cos(\frac{\pi}{2} - \frac{2\pi}{3}t)$. $y(t) = 3\sin(\frac{\pi}{2} - \frac{2\pi}{3}t) + 4$.
   (b) $(-2.88, 4.85)$
5. (a) $x(t) = 61.1t$. $y(t) = 91.5t - 16t^2$.
   (b) $y = 1.497x - 0.0043x^2$.
   (c) $t = 3.8$ seconds. $(232.6, 116.3)$
   (d) 51.3 ft/sec.
6. (a) Area $= -2.145y^2 + 30y$.
   (b) 15 inches by 6.995 inches.
7. (a) $x(t) = 20 - 5t, y(t) = -20 + 2.5t$.
   (b)
$$d(x) = \begin{cases} 20 - 2.5t & \text{if } 0 \le t \le 4 \\ \sqrt{(20-5t)^2 + (-20+2.5t)^2} & \text{if } 4 \le t \le 8 \end{cases}$$
   (c) $t = 2, 6.95$.