

MATH 120 - Winter 2002  
Exam 1, Version 1 - Hints and Answers

1. (a) ANSWER: domain =  $\{x \mid -1 \leq x \leq 6\}$ , range =  $\{y \mid -3 \leq y \leq 3\}$   
(b) ANSWER: There are many acceptable answers, including:  $0 \leq x \leq 2$  and  $3 \leq x \leq 4$ .  
(c) ANSWER (in verbal form): Squish the graph of  $f(x)$  toward the  $x$ -axis by a factor of 2 and then shift the resulting graph down 3 units. Four points on the new graph are:  $(-\frac{1}{2}, -6)$ ,  $(1, 0)$ ,  $(2, 0)$ , and  $(3, 0)$ .
2. HINT: Find the equation of the line through the points  $(-6, -3)$  and  $(2, 5)$ . Find the equation of the circle (centered at the origin with radius 4). Find the points where the line intersects the circle and use the distance formula to find the distance between them.  
ANSWER: The line intersects the circle at the points  $(0.8979, 3.8979)$  and  $(-3.8979, -0.8979)$ . The distance between these points is 6.78 inches.
3. HINT: You're told that  $f(g(x)) = x^2$ . But  $f(g(x)) = 2g(x)$ , as well. Set those equal to each other and solve for  $g(x)$ .  
ANSWER:  $g(4) = 8$ .
4. (a) HINT: Set  $C(x) = 20 + R(x)$  and solve for  $x$ .  
ANSWER:  $x = 4.196$  and  $x = 85.804$   
(b) HINT:  $P(x)$  is a quadratic function. The maximum occurs at the vertex.  
ANSWER:  $x = 49.5$   
(c) ANSWER:  $P(49.5) = \$502.56$
5. (a) ANSWER: slope =  $\frac{2-b}{3}$   
(b) HINT:  $y = \frac{2-b}{3}x + b$ . Set  $y$  equal to 0 and solve for  $x$  in terms of  $b$ .  
ANSWER:  $x = \frac{3b}{b-2}$   
(c) HINT: The length of the base is the answer from part (b). The height of the triangle is  $b$ .  
ANSWER: area =  $\frac{1}{2} \left( \frac{3b}{b-2} \right) b$