Problems for Chapter One

1. Which of the following functions has its domain identical with its range?
   (a) $f(x) = x^2$
   (b) $g(x) = \sqrt{x}$
   (c) $h(x) = x^3$
   (d) $i(x) = |x|$

2. Which of the following lines represent decreasing functions?
   (a) $x + y = 2$ (b) $x - y = -2$ (c) $2x - 3y = 6$ (d) $2x + 3y = -6$

3. Which of the following graphs represent y as directly proportional to x?
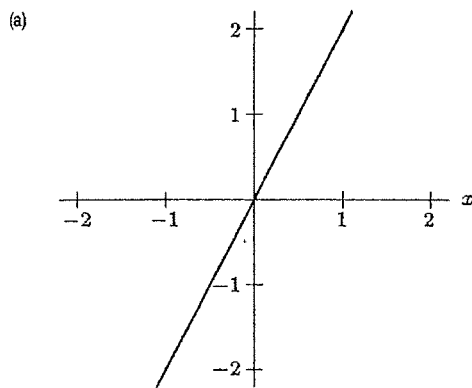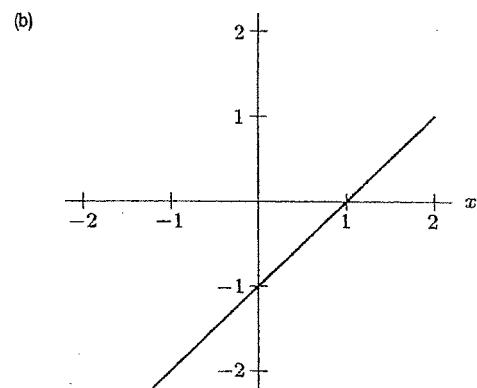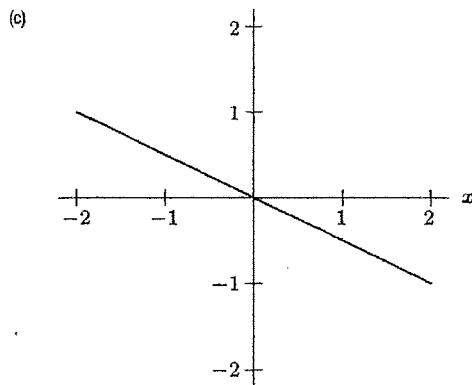
(a)

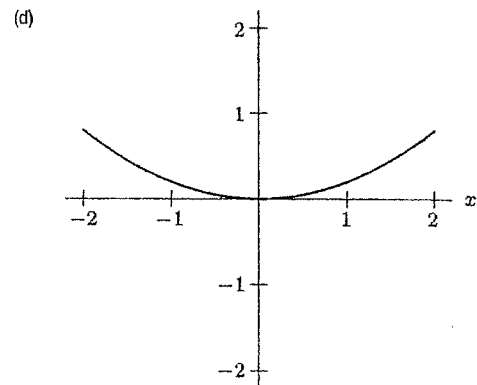Figure 1.1

(b)

Figure 1.2
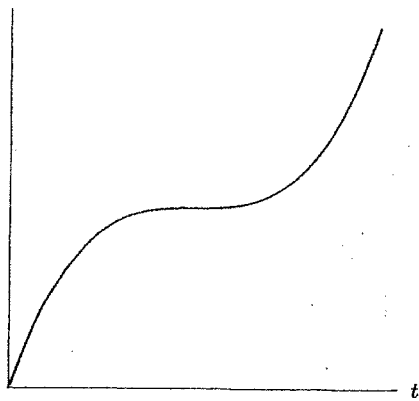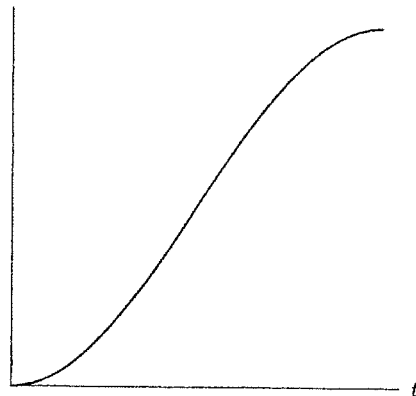
(c)

Figure 1.3

(d)

Figure 1.4

4. Which of the graphs represents the position of an object that is speeding up and then slowing down?
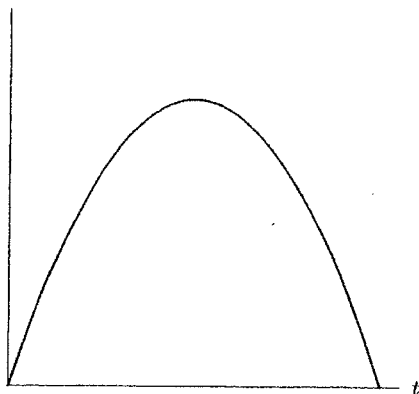
(a)   *Distance*

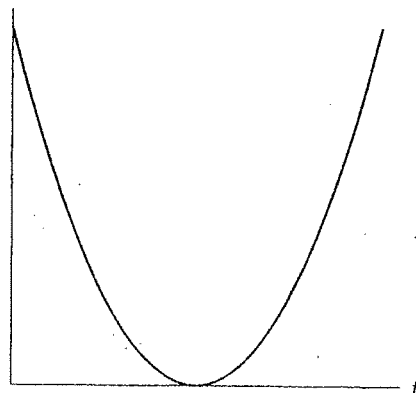(b)   *Distance*

(c)   *Distance*

(d)   *Distance*

5. Which of the following tables could represent an exponential function?

(a)	x	$f(x)$		(b)	x	$g(x)$		(c)	x	$h(x)$		(d)	x	$k(x)$
	1	1/16			1	9			1	1			1	10
	2	1/8			2	−3			2	4			2	5
	3	1/4			3	1			4	16			3	2
	4	1/2			4	−1/3			8	64			4	1

6. Let $f(x) = ab^x$, $b > 0$. Then $\dfrac{f(x+h)}{f(x)} =$

(a) b^h

(b) h

(c) $b^{x+h} - b^x$

(d) a

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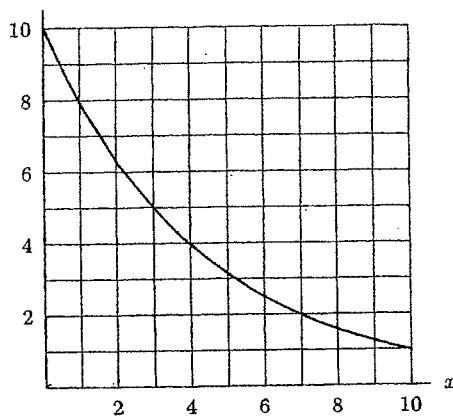**7.** Estimate the half-life for the exponential decay shown in Figure 1.5.

Figure 1.5

8. *"During 1988, Nicaragua's inflation rate averaged 1.3% a day."* Which formula represents the above statement? Assume t is measured in days.

    (a) $I = I_0 e^{0.013t}$

    (b) $I = I_0 (1.013)^t$

    (c) $I = I_0 (1.013)t$

    (d) $I = I_0 (1.3)^t$

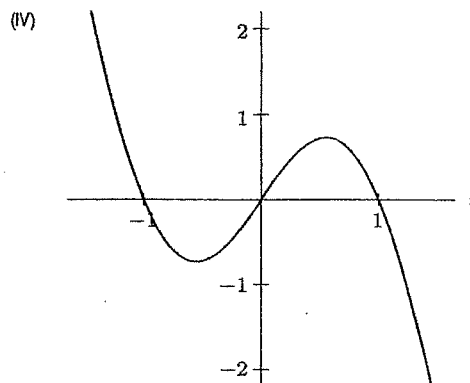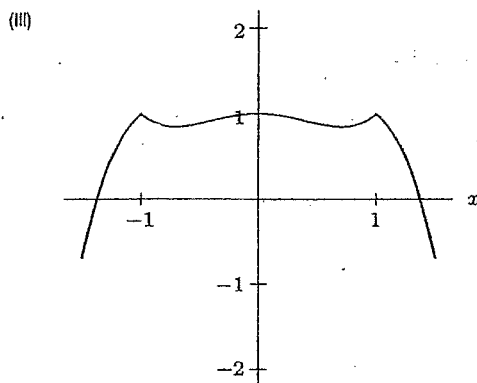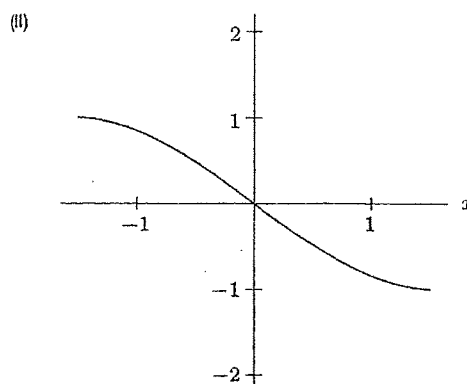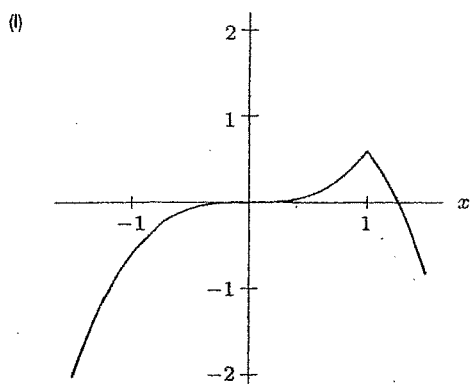**9.** If $f(x) = \sqrt{x^2 + 1}$ and $g(x) = e^{x^2}$ then $f(g(x)) =$

    (a) $e^{(x^2+1)}$

    (b) $\sqrt{e^{2x^2} + 1}$

    (c) $e^{\sqrt{x^2+1}}$

    (d) $\sqrt{e^{x^4} + 1}$

10. If $y = \arcsin x$, then $\cos y =$

    (a) $\sqrt{1 - x^2}$

    (b) $\sqrt{x^2 - 1}$

    (c) $\dfrac{1}{\sqrt{x^2 - 1}}$

    (d) $\dfrac{1}{\sqrt{1 - x^2}}$

    (e) $\dfrac{1}{x}$

HINT: $\sin^2 y + \cos^2 y = 1$

For Problems 11–12, consider the four graphs.

(I)

(II)

(III)

(IV)

11. Which of these graphs could represent even functions?

12. Which of these graphs could represent odd functions?

13. Use the properties of logarithms to decide which of the following is largest.

    (a) $\ln(30) - \ln(2)$

    (b) $2 \ln 4$

    (c) $\ln 3 + \ln 4$

    (d) $\frac{\ln 4}{\ln 2}$

14. Which of the following functions are decreasing and concave up?

    (a) $-\ln(4 + x)$

    (b) 3^{x-4}

    (c) 3^{4-x}

    (d) $\ln(4 - x)$

15. The range of which of the following functions can take on all values between -2 and 2.

    (a) $y = \arcsin(2x)$

    (b) $y = 2 \arctan x$

    (c) $y = 1 + \cos x$

    (d) $y = \dfrac{1}{(1 - x)^2}$

    (e) $y = \dfrac{1}{9 - x^2}$

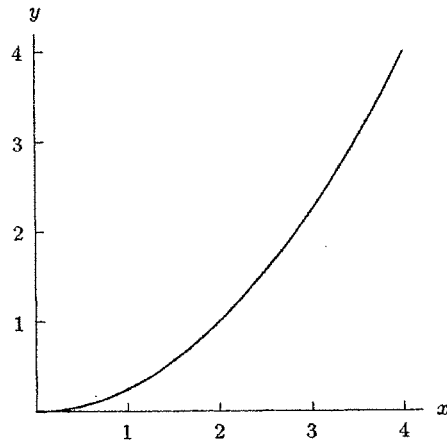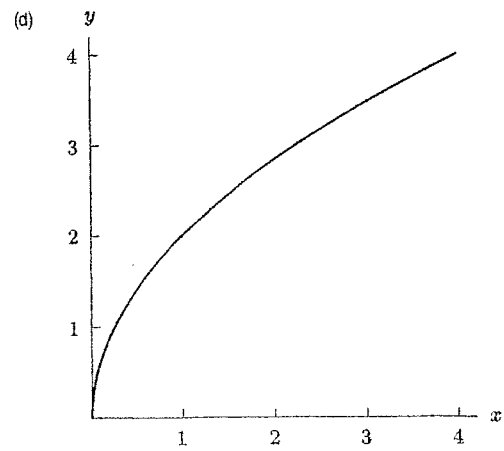**16.** Which of the following graphs represents the inverse of the graph shown in Figure 1.6?
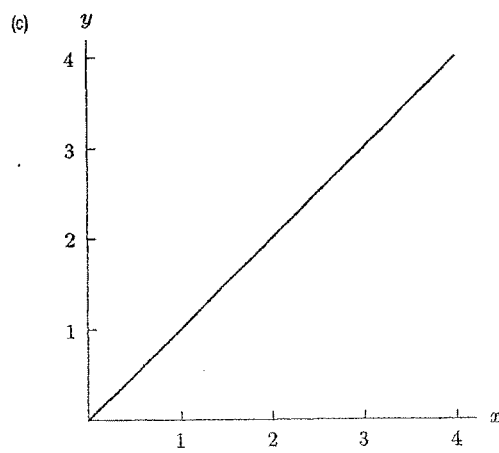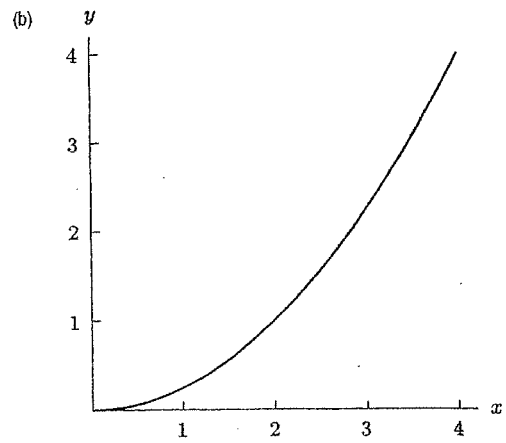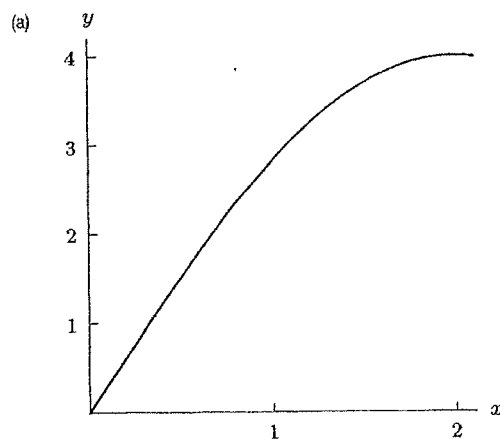

Figure 1.6

17. The graph in Figure 1.7 could be that of

   (a) $y = \ln x + \frac{1}{2}$
   (b) $y = \ln x - \frac{1}{2}$
   (c) $y = \ln(x + \frac{1}{2})$
   (d) $y = \ln(x - \frac{1}{2})$
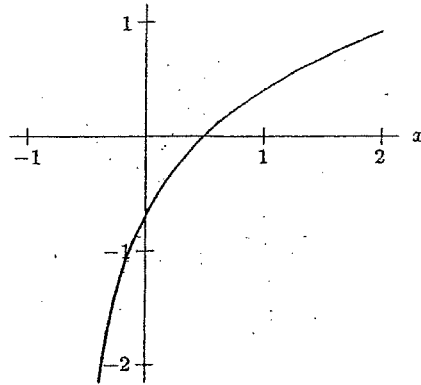

Figure 1.7