

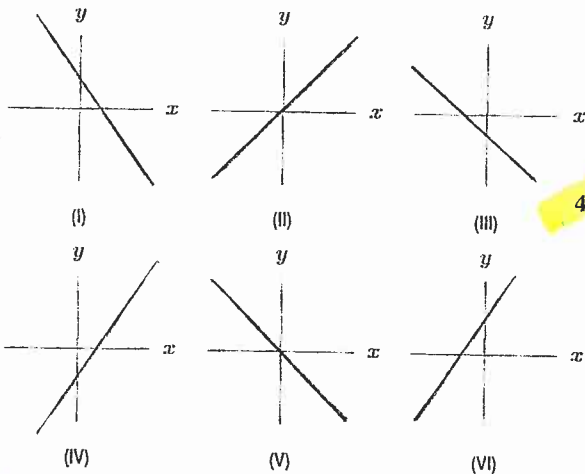
1.5

Exercises

DO #S 1-4, 6-11, 13-15, 17, 18, & 21

1. Without using a calculator, match the equations (a)–(f) to the graphs (I)–(VI).

- (a)  $y = -2.72x$  (b)  $y = 0.01 + 0.001x$   
 (c)  $y = 27.9 - 0.1x$  (d)  $y = 0.1x - 27.9$   
 (e)  $y = -5.7 - 200x$  (f)  $y = x/3.14$



3. Figure 1.45 gives lines, A, B, C, D, and E. Without a calculator, match each line to  $f, g, h, u$  or  $v$ :

- $f(x) = 20 + 2x$   
 $g(x) = 20 + 4x$   
 $h(x) = 2x - 30$   
 $u(x) = 60 - x$   
 $v(x) = 60 - 2x$

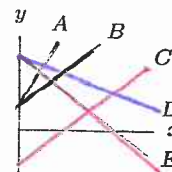


Figure 1.45

4. Without a calculator, match the following functions to the lines in Figure 1.46:

- $f(x) = 5 + 2x$   
 $g(x) = -5 + 2x$   
 $h(x) = 5 + 3x$   
 $j(x) = 5 - 2x$   
 $k(x) = 5 - 3x$

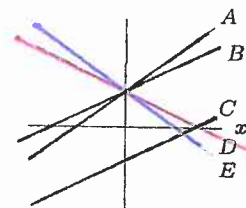
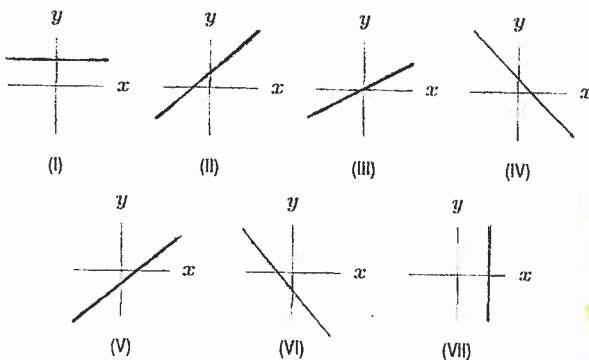


Figure 1.46

2. Without a calculator, match the equations (a)–(g) to the graphs (I)–(VII).

- (a)  $y = x - 5$  (b)  $-3x + 4 = y$   
 (c)  $5 = y$  (d)  $y = -4x - 5$   
 (e)  $y = x + 6$  (f)  $y = x/2$   
 (g)  $5 = x$



~~5. (a) By hand, graph  $y = 3$  and  $x = 3$ .  
 (b) Can the equations in part (a) be written in slope-intercept form?~~

Are the lines in Exercises 6–11 perpendicular? Parallel? Neither?

6.  $y = 5x - 7; y = 5x + 8$   
 7.  $y = 4x + 3; y = 13 - \frac{1}{4}x$   
 8.  $y = 2x + 3; y = 2x - 7$   
 9.  $y = 4x + 7; y = \frac{1}{4}x - 2$   
 10.  $f(q) = 12q + 7; g(q) = \frac{1}{12}q + 96$   
 11.  $2y = 16 - x; 4y = -8 - 2x$

Problems

- ~~12. Sketch a family of functions  $y = -2 - ax$  for five different values of  $a$  with  $a < 0$ .~~  
 13. Find the equation of the line parallel to  $3x + 5y = 6$  and passing through the point  $(0, 6)$ .  
 14. Find the equation of the line passing through the point  $(2, 1)$  and perpendicular to the line  $y = 5x - 3$ .  
 15. Find the equations of the lines parallel to and perpendicular to the line  $y + 4x = 7$ , and through the point  $(1, 5)$ .

~~16. Estimate the slope of the line in Figure 1.47 and find an approximate equation for the line.~~

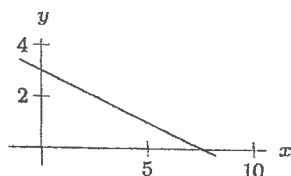


Figure 1.47

17. Line  $l$  in Figure 1.48 is parallel to the line  $y = 2x + 1$ . Find the coordinates of the point  $P$ .

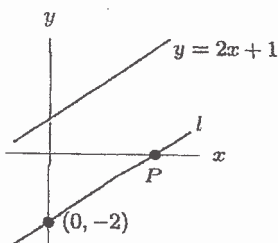


Figure 1.48

18. Find the equation of the line  $l_2$  in Figure 1.49.

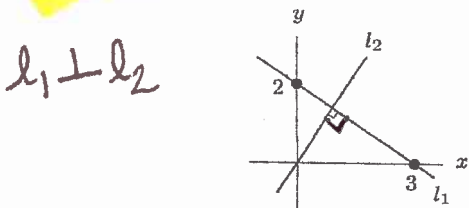


Figure 1.49

~~19.~~ The cost of a Frigbox refrigerator is \$950, and it depreciates \$50 each year. The cost of an Arctic Air refrigerator is \$1200, and it depreciates \$100 per year.

- (a) If a Frigbox and an Arctic Air are bought at the same time, when do the two refrigerators have equal value?
- (b) If both refrigerators continue to depreciate at the same rates, what happens to the values of the refrigerators in 20 years' time? What does this mean?

~~20.~~ You need to rent a car and compare the charges of three different companies. Company A charges 20 cents per mile plus \$20 per day. Company B charges 10 cents per mile plus \$35 per day. Company C charges \$70 per day with no mileage charge.

- (a) Find formulas for the cost of driving cars rented from companies A, B, and C, in terms of  $x$ , the distance driven in miles in one day.

- (b) Graph the costs for each company for  $0 \leq x \leq 500$ . Put all three graphs on the same set of axes.
- (c) What do the slope and the vertical intercept tell you in this situation?
- (d) Use the graph in part (b) to find under what circumstances company A is the cheapest. What about Company B? Company C? Explain why your results make sense.

21. Line  $l$  is given by  $y = 3 - \frac{2}{3}x$  and point  $P$  has coordinates  $(6, 5)$ .

- (a) Find the equation of the line containing  $P$  and parallel to  $l$ .
- (b) Find the equation of the line containing  $P$  and perpendicular to  $l$ .
- ~~(c) Graph the equations in parts (a) and (b).~~

~~22.~~ Assume  $A, B, C$  are constants with  $A \neq 0, B \neq 0$ . Consider the equation

$$Ax + By = C.$$

- (a) Show that  $y = f(x)$  is linear. State the slope and the  $x$ - and  $y$ -intercepts of  $f(x)$ .
- (b) Graph  $y = f(x)$ , labeling the  $x$ - and  $y$ -intercepts in terms of  $A, B$ , and  $C$ , assuming
  - (i)  $A > 0, B > 0, C > 0$
  - (ii)  $A > 0, B > 0, C < 0$
  - (iii)  $A > 0, B < 0, C > 0$

~~23.~~ Fill in the missing coordinates for the points in the following figures.

- (a) The triangle in Figure 1.50.
- (b) The parallelogram in Figure 1.51.

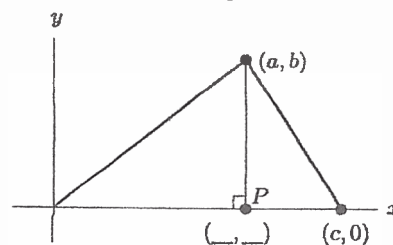


Figure 1.50

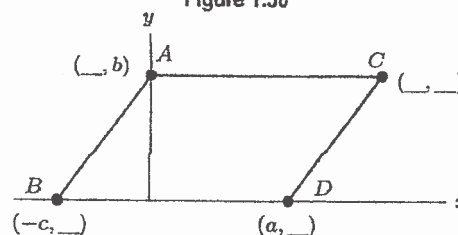


Figure 1.51