

## EXERCISE 2-1

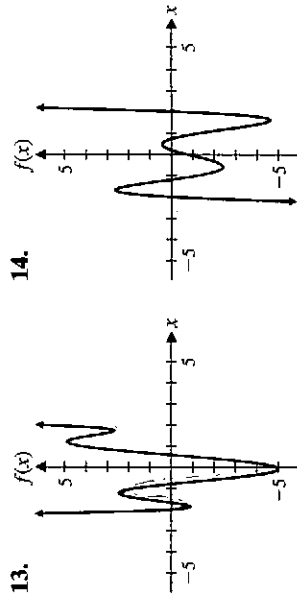
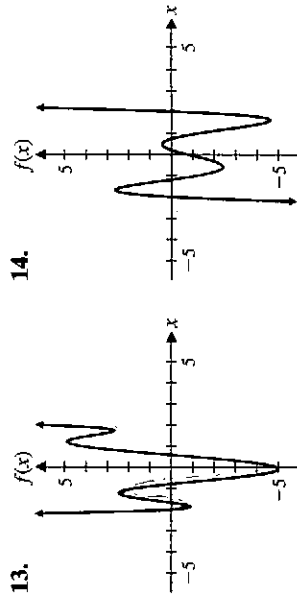
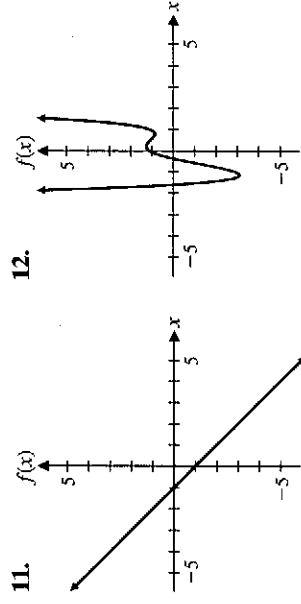
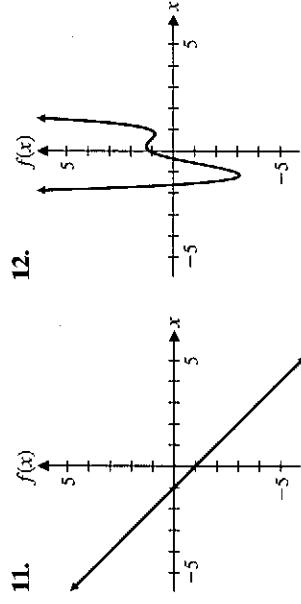
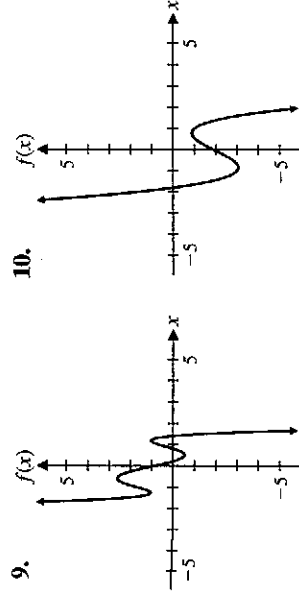
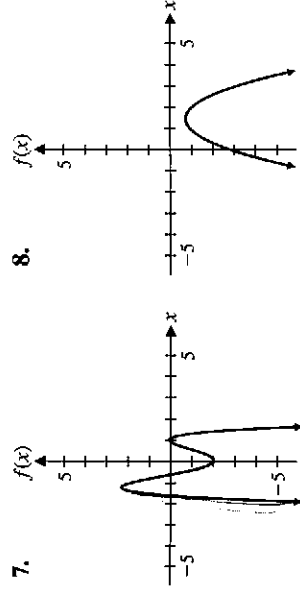
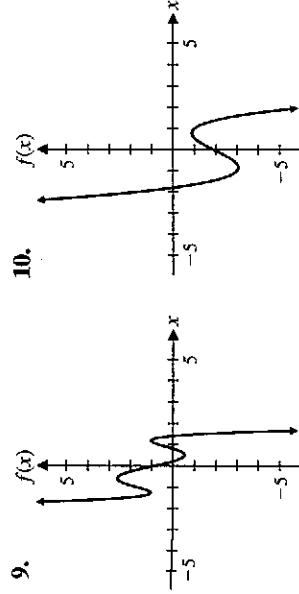
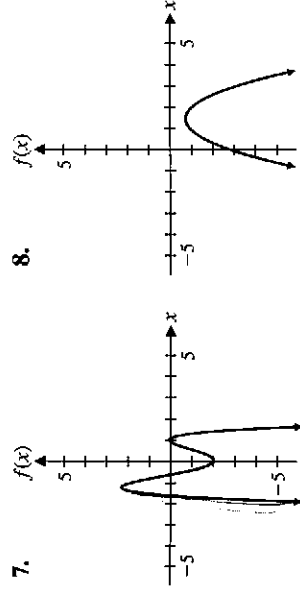
**A** For each polynomial function in Problems 1–6, find the following:

- (A) Degree of the polynomial
- (B) Maximum number of turning points of the graph
- (C) Maximum number of x intercepts of the graph
- (D) Minimum number of x intercepts of the graph
- (E) Maximum number of y intercepts of the graph
- (F) Minimum number of y intercepts of the graph

1.  $f(x) = ax^2 + bx + c, a \neq 0$
2.  $f(x) = ax + b, a \neq 0$
3.  $f(x) = ax^5 + bx^4 + cx^3 + dx^2 + ex + f, a \neq 0$
4.  $f(x) = ax^4 + bx^3 + cx^2 + dx + e, a \neq 0$
5.  $f(x) = ax^6 + bx^5 + cx^4 + dx^3 + ex^2 + fx + g, a \neq 0$
6.  $f(x) = ax^3 + bx^2 + cx + d, a \neq 0$

Each graph in Problems 7–14 is the graph of a polynomial function. Answer the following questions for each graph:

- (A) How many turning points are on the graph?
- (B) What is the minimum degree of a polynomial function that could have the graph?
- (C) Is the leading coefficient of the polynomial negative or positive?



**B** For each rational function in Problems 15–20:

- (A) Find the intercepts for the graph.
- (B) Determine the domain.
- (C) Find any vertical or horizontal asymptotes for the graph.
- (D) Sketch any asymptotes as dashed lines. Then sketch a graph of  $y = f(x)$  for  $-10 \leq x \leq 10$  and  $-10 \leq y \leq 10$ .
- (E) Graph  $y = f(x)$  in a standard viewing window using a graphing utility.

15.  $f(x) = \frac{x+2}{x-2}$       16.  $f(x) = \frac{x-3}{x+3}$

17.  $f(x) = \frac{3x}{x+2}$       18.  $f(x) = \frac{2x}{x-3}$

19.  $f(x) = \frac{4-2x}{x-4}$       20.  $f(x) = \frac{3-3x}{x-2}$

21. How does the graph of  $f(x) = 2x^4 - 5x^2 + x + 2$  compare to the graph of  $y = 2x^4$  as we “zoom out” (see Fig. 3)?

22. How does the graph of  $f(x) = x^3 - 2x + 2$  compare to the graph of  $y = x^3$  as we “zoom out”?

23. How does the graph of  $f(x) = -x^5 + 4x^3 - 4x + 1$  compare to the graph of  $y = -x^5$  as we “zoom out”?

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A	B	C	D	E	F
2	1	2	0	1	1
1	0	1	1	1	1
5	4	5	1	1	1
4	3	4	0	1	1
6	5	6	0	1	1
3	2	3	1	1	1

A	B	C
3	4	neg
1	2	neg
4	5	neg
2	3	neg
0	1	neg
3	4	pos
5	6	pos
4	5	pos