In Problems 1-8, match the polynomial function with its graph. [The graphs are labelled (a) through (h).]

1. \( f(x) = -2x + 3 \)
2. \( f(x) = x^2 - 4x \)
3. \( f(x) = -2x^2 - 5x \)
4. \( f(x) = 2x^3 - 3x + 1 \)
5. \( f(x) = -\frac{1}{3}x^4 + 3x^2 \)
6. \( f(x) = -\frac{1}{3}x^3 + x^2 - \frac{4}{3} \)
7. \( f(x) = x^3 + 2x^2 \)
8. \( f(x) = \frac{1}{3}x^5 - 2x^3 + \frac{9}{3}x \)

9. When \( x = \alpha \) is a zero of a polynomial function \( f \), then fill in the following statements to make them true.
   a. \( x = \alpha \) is a ____________ of the polynomial equation \( f(x) = 0 \).
   b. ____________ is a factor of the polynomial \( f(x) \).
   c. The point ___________ is an \( x \)-intercept of the graph of \( f \).

In Problems 10-12, use the graph to the right of the polynomial function \( f \).
10. Can \( f \) be a fourth-degree polynomial function?
11. Can the leading coefficient of \( f \) be negative?
12. Does the repeated zero of \( f \) at \( x = 2 \) have a multiplicity of two or three?

In Problems 13-18, use the Leading Coefficient Test to determine the left-hand and right-hand behavior of the graph of the polynomial function.

13. \( f(x) = 2x^5 - 5x + 7.5 \)
14. \( g(x) = 1 - x^6 \)
15. \( h(x) = \frac{3x^4 - 2x + 5}{4} \)
16. \( f(x) = -\frac{7}{8}(x^3 + 5x^2 - 7x + 1) \)

In Problems 17-21, sketch the graph of the polynomial function using its zeros. Be certain to include tick marks on the \( x \)-axis; do not include tick marks on the \( y \)-axis.

17. \( f(x) = (x + 3)(x + 1)(x - 2) \)
18. \( g(x) = -x^2(x + 2)(x - 3) \)
19. \( h(x) = -x(x - 4)^3(x + 2)^2 \)
20. \( f(x) = -x(x + 2)^2(x - 3)^2 \)
21. \( f(x) = x(x + 7)(x + 4)^3(x - 3)^2 \)
Ans.
1. f 2. h 3. c 4. a 5. e 6. d 7. g
8. b 9. a. zero  b. $x - a$ c. $(a,0)$ 10. no 11. no 12. two
13. LHB: lower left, RHB: upper right 14. LHB: lower left, RHB: lower right
15. LHB: upper left, RHB: upper right 16. LHB: upper left, RHB: lower right
17. 18. 19. 20. 21.