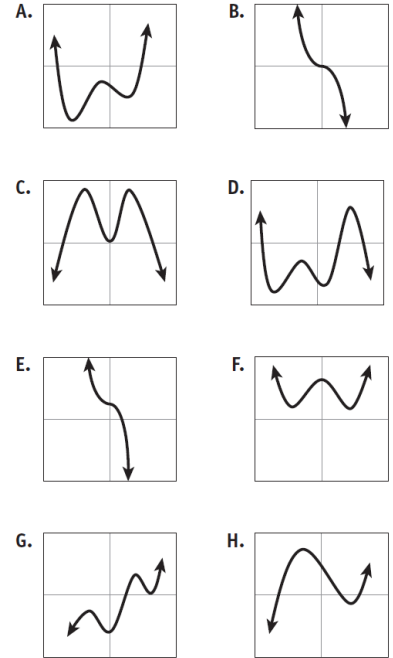


11.REV.2 ~ POLYNOMIAL FUNCTIONS

Problems 1 – 8, match each equation or description to one of the graphs.

1. An even function with no x -intercepts and a positive leading term
2. An even function with three real zeros and a negative leading coefficient
3. An odd function with one real root/zero and a negative leading coefficient
4. $f(x) = -ax^3 + b$
5. $g(x) = ax^3 + \dots + d$
6. $h(x) = ax^4 + \dots - e$
7. $p(x) = ax^5 + \dots - f$
8. $q(x) = -ax^5 + \dots + g$



Determine the long-run/end behavior of the polynomial function.

9. $f(x) = (x^5 - 1)^2(x^2 + 2)^3$ $\lim_{x \rightarrow -\infty} f(x) = \underline{\hspace{2cm}}$
 $\lim_{x \rightarrow \infty} f(x) = \underline{\hspace{2cm}}$
10. $f(x) = (10 - 3x^5)^2(5 - x^4)^3(x + 4)$ $\lim_{x \rightarrow -\infty} f(x) = \underline{\hspace{2cm}}$
 $\lim_{x \rightarrow \infty} f(x) = \underline{\hspace{2cm}}$

Factor the cubic polynomials.

11. $f(x) = 64x^3 - 8$
12. $f(x) = 27x^3 + 125$

Analyze each polynomial function for its long-run and short-run behavior. Use the appropriate method: factoring (if necessary) and the Zero Product Property, the Square Root Property, or the Quadratic Formula, to find the x -intercepts/zeros of the polynomial function. *If necessary, round to 2 decimal places.*

- | | |
|---|--|
| <p>13. $f(x) = 7x^2 - 16x + 4$</p> <p>DEGREE: _____ $\lim_{x \rightarrow -\infty} f(x) = \underline{\hspace{2cm}}$</p> <p>LEADING COEFFICIENT: _____ $\lim_{x \rightarrow \infty} f(x) = \underline{\hspace{2cm}}$</p> <p>CONSTANT: _____</p> <p>WRITE IN FACTORED FORM. ROOTS/ZEROS:</p> | <p>14. $f(x) = 3x^3 + x^2 - 48x - 16$</p> <p>DEGREE: _____ $\lim_{x \rightarrow -\infty} f(x) = \underline{\hspace{2cm}}$</p> <p>LEADING COEFFICIENT: _____ $\lim_{x \rightarrow \infty} f(x) = \underline{\hspace{2cm}}$</p> <p>CONSTANT: _____</p> <p>WRITE IN FACTORED FORM. ROOTS/ZEROS:</p> |
|---|--|

- | | |
|---|--|
| <p>15. $f(x) = -x^6 + 3x^4 - 2x^2$</p> <p>DEGREE: _____ $\lim_{x \rightarrow -\infty} f(x) = \underline{\hspace{2cm}}$</p> <p>LEADING COEFFICIENT: _____ $\lim_{x \rightarrow \infty} f(x) = \underline{\hspace{2cm}}$</p> <p>CONSTANT: _____</p> <p>WRITE IN FACTORED FORM. ROOTS/ZEROS:</p> | <p>16. $f(x) = (4x^2 - 5)(x^2 - 2x - 5)$</p> <p>DEGREE: _____ $\lim_{x \rightarrow -\infty} f(x) = \underline{\hspace{2cm}}$</p> <p>LEADING COEFFICIENT: _____ $\lim_{x \rightarrow \infty} f(x) = \underline{\hspace{2cm}}$</p> <p>CONSTANT: _____</p> <p>ROOTS/ZEROS:</p> |
|---|--|

Analyze each polynomial function for its long-run and short-run behavior. Sketch its graph of by hand.

17. $f(x) = 2(x - 2)^2(x - 4)^3$

LEADING TERM:

END BEHAVIOR:

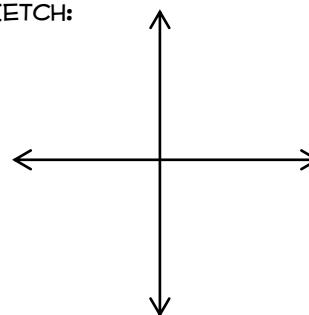
$$\lim_{x \rightarrow -\infty} f(x) = \quad \lim_{x \rightarrow \infty} f(x) =$$

y -INTERCEPT:

x -INTERCEPTS:

ZERO MULTIPLICITY CROSS OR TOUCH

SKETCH:



18. $f(x) = -x^3(x - 1)^2(x + 4)$

LEADING TERM:

END BEHAVIOR:

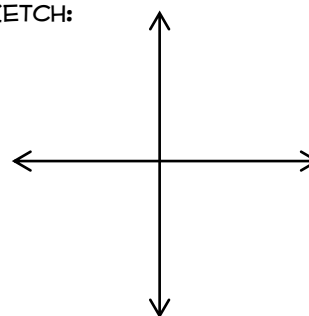
$$\lim_{x \rightarrow -\infty} f(x) = \quad \lim_{x \rightarrow \infty} f(x) =$$

y -INTERCEPT:

x -INTERCEPTS:

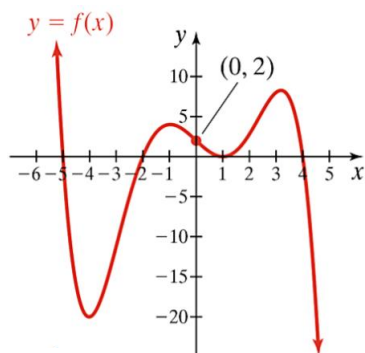
ZERO MULTIPLICITY CROSS OR TOUCH

SKETCH:

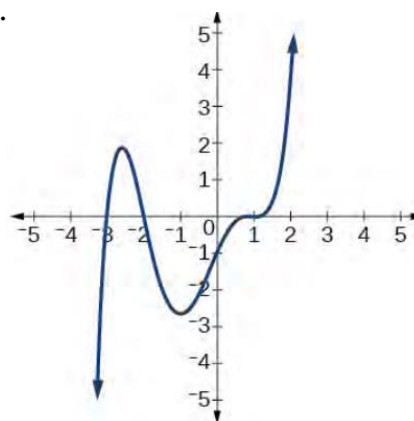


Find a formula for the polynomial whose graph is shown.

19.



20.



21. Zeros at $x = 1$ & $x = -2$; end behavior: $\lim_{x \rightarrow -\infty} f(x) =$
 $\lim_{x \rightarrow \infty} f(x) = -\infty$; y -intercept of $(0, -12)$

22. Degree 5; double zero at $x = 1$; triple zero at $x = 3$; passes through the point $(2, 15)$