

HW: 5-3 Practice

Polynomial Functions

Write each expression in standard order. State the degree and leading coefficient of each polynomial in one variable.

1. $-12 - 8x^2 + 5x - 21x^7$
 $-21x^7 - 8x^2 + 5x - 12$

7th degree

$-21 \rightarrow$ LC.

3. $(3x^2 + 1)(2x^2 - 9)$

$6x^4 - 27x^2 + 2x^2 - 9$

$6x^4 - 25x^2 - 9$

4th degree

$6 \rightarrow$ LC.

2. $7x^4 + 3x^7 - 2x^8 + 7$

$-2x^8 + 3x^7 + 7x^4 + 7$

8th degree

$-2 \rightarrow$ LC.

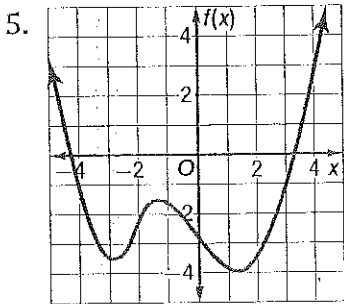
4. $\frac{1}{5}a^3 - \frac{3}{5}a^2 + \frac{4}{5}a$

LC $\rightarrow \frac{1}{5}$

Degree: 3

For each graph,

- determine whether it represents an odd-degree or an even-degree function,
- describe the end behavior,
- determine whether the leading coefficient is positive or negative, and
- state the number of real zeros.

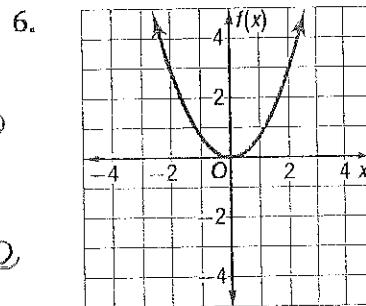


even

As $x \rightarrow -\infty, y \rightarrow \infty$
 $x \rightarrow \infty, y \rightarrow \infty$

LC +

Real zeros $\rightarrow 2$

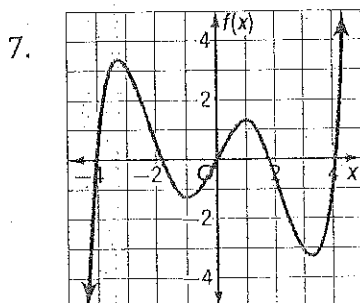


even

As $x \rightarrow -\infty, y \rightarrow \infty$
 $x \rightarrow \infty, y \rightarrow \infty$

LC +

Real zeros $\rightarrow 1$
 (double root)

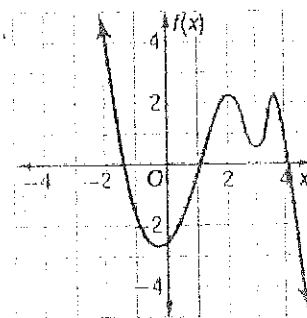


odd

As $x \rightarrow -\infty, y \rightarrow -\infty$
 $x \rightarrow \infty, y \rightarrow \infty$

LC +

Real zeros $\rightarrow 5$



odd

As $x \rightarrow -\infty, y \rightarrow \infty$
 $x \rightarrow \infty, y \rightarrow -\infty$

LC -

Real zeros $\rightarrow 3$

For each polynomial function,

- a. determine whether it represents an odd-degree or an even-degree function,
- b. determine whether the leading coefficient is positive or negative, and
- c. describe the end behavior.

LC

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

Degree: 3 - odd

Leading coefficient: 1

Ending behavior: As $x \rightarrow -\infty, y \rightarrow -\infty$
 $x \rightarrow \infty, y \rightarrow \infty$

10. $f(x) = -2x^2 + 8x + 5$

Degree: 2

Leading coefficient: -2

Ending behavior: As $x \rightarrow -\infty, y \rightarrow -\infty$
 $x \rightarrow \infty, y \rightarrow -\infty$

11. $f(x) = x^4 - 3x^2 + 6x$

Degree: 4

Leading coefficient: 1

Ending behavior: As $x \rightarrow -\infty, y \rightarrow \infty$
 $x \rightarrow \infty, y \rightarrow \infty$

12. $f(x) = -4x^3 - 4x^2 + 8$

Degree: 3

Leading coefficient: -4

Ending behavior: As $x \rightarrow -\infty, y \rightarrow \infty$
 $x \rightarrow \infty, y \rightarrow -\infty$

Find $p(-2)$ and $p(3)$ for each function.

13. $p(x) = x^3 - x^5$

$$p(-2) = (-2)^3 - (-2)^5$$

$$= -8 + 32$$

$$= 24$$

$$p(3) = 3^3 - 3^5$$

$$= 27 - 243$$

$$= -216$$

14. $p(x) = -7x^2 + 5x + 9$

$$p(-2) = -7 \cdot 4 + -20 + 9$$

$$= -28 - 20 + 9$$

$$= -39$$

$$p(3) = -7 \cdot 9 + 15 + 9$$

$$= -63 + 24$$

$$= -39$$

$p(x) = 3x^2 - 4$ and $r(x) = 2x^2 - 5x + 1$, find each value.

$$\begin{aligned} 15. p(8a) &= 3(8a)^2 - 4 \\ &= 3 \cdot 64a^2 - 4 \\ &= 192a^2 - 4 \end{aligned}$$

$$\begin{aligned} 16. r(x+2) &= 2(x+2)^2 - 5(x+2) + 1 \\ &= 2(x^2 + 4x + 4) - 5x - 10 + 1 \\ &= 2x^2 + 8x + 8 - 5x - 9 \\ &= 2x^2 + 3x - 1 \end{aligned}$$

17. WIND CHILL The function $C(w) = 0.013w^2 - w - 7$ estimates the wind chill temperature $C(w)$ at 0°F for wind speeds w from 5 to 30 miles per hour. Estimate the wind chill temperature at 0°F if the wind speed is 20 miles per hour.

$$\begin{aligned} C(20) &= 0.013(20)^2 - 20 - 7 \\ &= -21.8^\circ\text{F} \end{aligned}$$

