

Polynomial Unit Test Review

Date _____ Period _____

Write a polynomial function of least degree with integral coefficients that has the given zeros.

1) $-2, i, -i$

2) $4, -1, -2$

3) $0, i, -i$

4) $3, 5, 1, 2$

Describe the end behavior of each function.

5) $f(x) = x^4 - x^3 - 4x^2 + 5$

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

7) $f(x) = -x^2 + 6x - 8$

8) $f(x) = -x^3 + 3x^2 - 5$

Sketch the general shape of each function.

9) $f(x) = x^2 + 6x + 5$

10) $f(x) = x^5 - 4x^3 + x - 1$

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

12) $f(x) = x^3 + 8x^2 + 21x + 19$

Factor each and find all zeros.

13) $f(x) = x^4 - 12x^2 + 27$

14) $f(x) = x^3 - 125$

15) $f(x) = x^6 - 3x^4 - 9x^2 + 27$

16) $f(x) = x^3 - 4x^2 - 4x + 16$

Factor each and find all zeros. One factor has been given. Start by dividing by that factor.

17) $f(x) = x^4 - 5x^3 + 27x - 135; x - 5$

18) $f(x) = x^4 - 6x^3 + 8x^2 - 18x + 15; x - 5$

19) $f(x) = x^4 + 5x^3 + 8x + 40; x + 5$

20) $f(x) = x^4 - 5x^3 - 8x + 40; x - 5$

21) $f(x) = x^5 - 3x^4 + 11x^3 - 33x^2 + 28x - 84; x - 3$

Evaluate each function at the given value.

22) $f(a) = -6a^5 - 19a^4 + 17a^3 - 15a^2 - 14a + 2$ at $a = -4$

23) $f(n) = -n^5 - 3n^4 + 10n^3 + 2n^2 - 2n - 7$ at $n = 2$

24) $f(x) = -4x^4 + 18x^3 + 32x^2 + 28x - 31$ at $x = 6$

25) $f(n) = n^5 + 4n^4 + 20n^2 - 30n - 29$ at $n = -5$

State the maximum number of turns the graph of each function could make. State the number of real zeros.

26) $f(x) = x^5 - 2x^3 - 1$

27) $f(x) = -x^3 - 14x^2 - 60x - 75$

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

29) $f(x) = x^5 - 4x^3 + 3x + 2$

Name each polynomial by degree and number of terms.

30) $-3m^6 + 4m^4 + 2m - 8$

31) $-8b^2 - 5$

32) $4x^5$

33) $-9x^2 - 5x - 7$

Polynomial Unit Test Review

Write a polynomial function of least degree with integral coefficients that has the given zeros.

1) $-2, i, -i$

$$f(x) = x^3 + 2x^2 + x + 2$$

2) $4, -1, -2$

$$f(x) = x^3 - x^2 - 10x - 8$$

3) $0, i, -i$

$$f(x) = x^3 + x$$

4) $3, 5, 1, 2$

$$f(x) = x^4 - 11x^3 + 41x^2 - 61x + 30$$

Describe the end behavior of each function.

5) $f(x) = x^4 - x^3 - 4x^2 + 5$

Rises to the left. Rises to the right

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

Falls to the left. Falls to the right

7) $f(x) = -x^2 + 6x - 8$

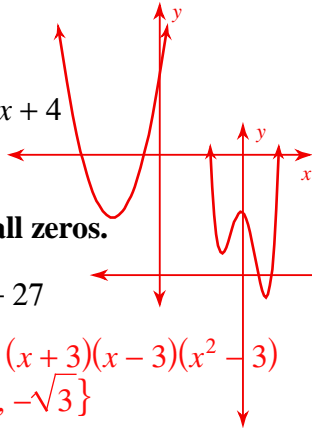
Falls to the left. Falls to the right

8) $f(x) = -x^3 + 3x^2 - 5$

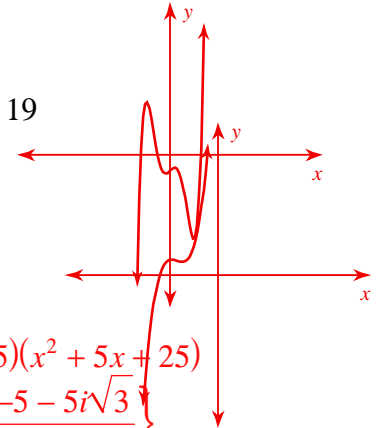
Rises to the left. Falls to the right

Sketch the general shape of each function.

9) $f(x) = x^2 + 6x + 5$



10) $f(x) = x^5 - 4x^3 + x - 1$



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

12) $f(x) = x^3 + 8x^2 + 21x + 19$

Factor each and find all zeros.

13) $f(x) = x^4 - 12x^2 + 27$

Factors to: $f(x) = (x+3)(x-3)(x^2-3)$

Zeros: $\{-3, 3, \sqrt{3}, -\sqrt{3}\}$

14) $f(x) = x^3 - 125$

Factors to: $f(x) = (x-5)(x^2+5x+25)$

Zeros: $\left\{5, \frac{-5+5i\sqrt{3}}{2}, \frac{-5-5i\sqrt{3}}{2}\right\}$

15) $f(x) = x^6 - 3x^4 - 9x^2 + 27$

Factors to: $f(x) = (x^2-3)^2(x^2+3)$

Zeros: $\{\sqrt{3} \text{ mult. } 2, -\sqrt{3} \text{ mult. } 2, i\sqrt{3}, -i\sqrt{3}\}$

16) $f(x) = x^3 - 4x^2 - 4x + 16$

Factors to: $f(x) = (x-4)(x+2)(x-2)$

Zeros: $\{4, -2, 2\}$

Factor each and find all zeros. One factor has been given. Start by dividing by that factor.

17) $f(x) = x^4 - 5x^3 + 27x - 135$; $x - 5$

Factors to: $f(x) = (x + 3)(x^2 - 3x + 9)(x - 5)$

Zeros: $\left\{-3, \frac{3 + 3i\sqrt{3}}{2}, \frac{3 - 3i\sqrt{3}}{2}, 5\right\}$

18) $f(x) = x^4 - 6x^3 + 8x^2 - 18x + 15$; $x - 5$

Factors to: $f(x) = (x - 1)(x^2 + 3)(x - 5)$

Zeros: $\{1, i\sqrt{3}, -i\sqrt{3}, 5\}$

19) $f(x) = x^4 + 5x^3 + 8x + 40$; $x + 5$

Factors to: $f(x) = (x + 2)(x^2 - 2x + 4)(x + 5)$

Zeros: $\{-2, 1 + i\sqrt{3}, 1 - i\sqrt{3}, -5\}$

20) $f(x) = x^4 - 5x^3 - 8x + 40$; $x - 5$

Factors to: $f(x) = (x - 2)(x^2 + 2x + 4)(x - 5)$

Zeros: $\{2, -1 + i\sqrt{3}, -1 - i\sqrt{3}, 5\}$

21) $f(x) = x^5 - 3x^4 + 11x^3 - 33x^2 + 28x - 84$; $x - 3$

Factors to: $f(x) = (x^2 + 7)(x^2 + 4)(x - 3)$

Zeros: $\{i\sqrt{7}, -i\sqrt{7}, 2i, -2i, 3\}$

Evaluate each function at the given value.

22) $f(a) = -6a^5 - 19a^4 + 17a^3 - 15a^2 - 14a + 2$ at $a = -4$

10

23) $f(n) = -n^5 - 3n^4 + 10n^3 + 2n^2 - 2n - 7$ at $n = 2$

-3

24) $f(x) = -4x^4 + 18x^3 + 32x^2 + 28x - 31$ at $x = 6$

-7

25) $f(n) = n^5 + 4n^4 + 20n^2 - 30n - 29$ at $n = -5$

-4

State the maximum number of turns the graph of each function could make. State the number of real zeros.

26) $f(x) = x^5 - 2x^3 - 1$

Max # Turns: 4

Real Zeros: 3

27) $f(x) = -x^3 - 14x^2 - 60x - 75$

Max # Turns: 2

Real Zeros: 3

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

Max # Turns: 3

Real Zeros: 2

29) $f(x) = x^5 - 4x^3 + 3x + 2$

Max # Turns: 4

Real Zeros: 1

Name each polynomial by degree and number of terms.

30) $-3m^6 + 4m^4 + 2m - 8$

sixth degree polynomial with four terms

31) $-8b^2 - 5$

quadratic binomial

32) $4x^5$

quintic monomial

33) $-9x^2 - 5x - 7$

quadratic trinomial