

Assignment

Date _____ Period _____

Name each polynomial by degree and number of terms.

1) $-2n^7 - n$

2) 6

3) $-7k^2 + 8k - 7$

4) $x^7 + 6x^5 + 7$

5) $-3m^4$

6) $-9n^3$

7) $-10k^2$

8) $6v^7 - 3v^6 + 9v^2$

9) $-2p^7 - 7p^3$

10) $-4n^2$

11) $-7b^3 + 8b^2 + 9b - 8$

12) $7k^5$

13) $4p^4 - 8p^2 + 3p + 4$

14) $3n^4 + 3n + 10$

15) $7p - 7$

16) $-8x^5 - 7x$

17) $x^7 + 7x^6 + 8x^5 - 4x^3$

18) $8x^7 + 6x^6 + 8x^5 - 3x^3$

19) $9x^2 + x + 8$

20) $-9r^5 + 7r^4 - 3r^3$

Find all roots.

21) $(x - 4)(5x^2 + 2) = 0$

22) $(x + 5)(2x^2 - 1) = 0$

23) $(x - 2)(4x^2 + 3) = 0$

24) $(x^2 + 3)(4x^2 - 3)(4x^2 + 3) = 0$

25) $(3x + 1)(x^2 - 5) = 0$

26) $(x^2 + 4)(2x^2 - 1)(2x^2 + 1) = 0$

$$27) (x - 5)(3x^2 + 1) = 0$$

$$28) (5x + 2)(x^2 + 4) = 0$$

$$29) (x^2 - 5)(2x^2 - 5)(2x^2 + 5) = 0$$

$$30) (x^2 + 2)(5x^2 - 1)(5x^2 + 1) = 0$$

$$31) (3x - 4)(x^2 + 2) = 0$$

$$32) (3x - 4)(x^2 + 1) = 0$$

$$33) (x^2 + 5)(2x - 1)(2x + 1)(4x^2 + 1) = 0$$

$$34) (2x^2 - 5)(x^2 - 3)(x^2 + 3) = 0$$

$$35) x(2x - 3)(x^2 + 4) = 0$$

$$36) (x + 3)(2x^2 - 5) = 0$$

$$37) (x^2 + 1)(3x^2 - 2)(3x^2 + 2) = 0$$

$$38) (3x - 1)(x^2 - 2) = 0$$

$$39) (2x + 3)(x^2 - 2) = 0$$

$$40) (5x^2 + 3)(x^2 - 2)(x^2 + 2) = 0$$

$$41) (x^2 + 5)(5x^2 - 2)(5x^2 + 2) = 0$$

$$42) (x^2 + 2)(5x^2 - 4)(5x^2 + 4) = 0$$

$$43) (5x - 1)(x^2 - 3) = 0$$

$$44) (5x^2 + 3)(x^2 - 5)(x^2 + 5) = 0$$

45) $(x^2 + 2)(3x^2 - 2)(3x^2 + 2) = 0$

46) $(x + 1)(3x^2 + 1) = 0$

47) $(x - 5)(5x^2 - 2) = 0$

48) $(5x^2 + 2)(x^2 - 2)(x^2 + 2) = 0$

49) $(4x + 1)(x^2 + 5) = 0$

50) $(x^2 + 1)(2x^2 - 1)(2x^2 + 1) = 0$

51) $(5x^2 + 3)(x^2 - 3)(x^2 + 3) = 0$

52) $(5x - 2)(x - 1)(x + 1) = 0$

53) $(x^2 + 2)(2x^2 - 5)(2x^2 + 5) = 0$

54) $(3x^2 - 1)(x^2 - 2)(x^2 + 2) = 0$

55) $(3x^2 - 1)(x - 1)(x + 1)(x^2 + 1) = 0$

56) $(4x^2 + 1)(x^2 - 2)(x^2 + 2) = 0$

57) $x(5x + 3)(x - 3) = 0$

58) $(3x - 5)(x - 2)(x + 2) = 0$

59) $(x^2 + 5)(5x^2 - 4)(5x^2 + 4) = 0$

60) $x(3x^2 - 5)(x - 1)(x + 1)(x^2 + 1) = 0$

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

61) $-\frac{4}{5}, \frac{3}{2}, 3$

62) $-\frac{3}{5}, -3, \frac{3}{5}$

$$63) -\frac{5}{4}, \frac{5}{4}, -4$$

$$64) 0, -1, -4$$

$$65) 0 \text{ mult. } 2, 2 \text{ mult. } 2$$

$$66) \frac{4}{3}, -2, -\frac{1}{3}$$

$$67) 2, -\frac{5}{3}, -1$$

$$68) -2, -3, 3, \frac{3}{2}$$

$$69) \frac{4}{5}, -\frac{5}{4}, -\frac{1}{5}$$

$$70) \frac{2}{3} \text{ mult. } 2, 3$$

$$71) -2 \text{ mult. } 3$$

$$72) -1, -4, \frac{2}{5}$$

$$73) -2, \frac{2}{5}, \frac{3}{2}$$

$$74) 5, 4, 1$$

$$75) \frac{3}{2} \text{ mult. } 2, -5$$

$$76) -\frac{3}{4} \text{ mult. } 2, 0$$

$$77) 2 \text{ mult. } 2, \frac{5}{2}$$

$$78) 2, -2, 0$$

$$79) \frac{5}{2}, -\frac{5}{3}, -\frac{4}{3}$$

$$80) -\frac{4}{5}, \frac{5}{4}, -\frac{4}{3}$$

$$81) -\frac{4}{3}, 5, -\frac{5}{2}$$

$$82) -\frac{5}{4}, -\frac{2}{3}, \frac{1}{5}$$

$$83) -\frac{3}{2}, 3, 1$$

$$84) \frac{2}{3}, 2, -\frac{5}{2}$$

$$85) \frac{2}{5} \text{ mult. } 2, 5$$

$$86) 3, -1, -5$$

$$87) 1, \frac{5}{3}, -\frac{5}{2}$$

$$88) 3, 4, \frac{1}{3}$$

$$89) 0 \text{ mult. } 2, 3$$

$$90) 3, -2, -5$$

Assignment

Date _____ Period _____

Name each polynomial by degree and number of terms.

1) $-2n^7 - n$

seventh degree binomial

2) 6

constant monomial

3) $-7k^2 + 8k - 7$

quadratic trinomial

4) $x^7 + 6x^5 + 7$

seventh degree trinomial

5) $-3m^4$

fourth degree monomial

6) $-9n^3$

cubic monomial

7) $-10k^2$

quadratic monomial

8) $6v^7 - 3v^6 + 9v^2$

seventh degree trinomial

9) $-2p^7 - 7p^3$

seventh degree binomial

10) $-4n^2$

quadratic monomial

11) $-7b^3 + 8b^2 + 9b - 8$

cubic polynomial with four terms

12) $7k^5$

fifth degree monomial

13) $4p^4 - 8p^2 + 3p + 4$

fourth degree polynomial with four terms

14) $3n^4 + 3n + 10$

fourth degree trinomial

15) $7p - 7$

linear binomial

16) $-8x^5 - 7x$

fifth degree binomial

17) $x^7 + 7x^6 + 8x^5 - 4x^3$

seventh degree polynomial with four terms

18) $8x^7 + 6x^6 + 8x^5 - 3x^3$

seventh degree polynomial with four terms

19) $9x^2 + x + 8$

quadratic trinomial

20) $-9r^5 + 7r^4 - 3r^3$

fifth degree trinomial

Find all roots.

21) $(x - 4)(5x^2 + 2) = 0$

$$\left\{ 4, \frac{i\sqrt{10}}{5}, -\frac{i\sqrt{10}}{5} \right\}$$

22) $(x + 5)(2x^2 - 1) = 0$

$$\left\{ -5, \frac{\sqrt{2}}{2}, -\frac{\sqrt{2}}{2} \right\}$$

23) $(x - 2)(4x^2 + 3) = 0$

$$\left\{ 2, \frac{i\sqrt{3}}{2}, -\frac{i\sqrt{3}}{2} \right\}$$

24) $(x^2 + 3)(4x^2 - 3)(4x^2 + 3) = 0$

$$\left\{ i\sqrt{3}, -i\sqrt{3}, \frac{\sqrt{3}}{2}, -\frac{\sqrt{3}}{2}, \frac{i\sqrt{3}}{2}, -\frac{i\sqrt{3}}{2} \right\}$$

25) $(3x + 1)(x^2 - 5) = 0$

$$\left\{ -\frac{1}{3}, \sqrt{5}, -\sqrt{5} \right\}$$

26) $(x^2 + 4)(2x^2 - 1)(2x^2 + 1) = 0$

$$\left\{ 2i, -2i, \frac{\sqrt{2}}{2}, -\frac{\sqrt{2}}{2}, \frac{i\sqrt{2}}{2}, -\frac{i\sqrt{2}}{2} \right\}$$

$$27) (x - 5)(3x^2 + 1) = 0$$

$$\left\{ 5, \frac{i\sqrt{3}}{3}, -\frac{i\sqrt{3}}{3} \right\}$$

$$28) (5x + 2)(x^2 + 4) = 0$$

$$\left\{ -\frac{2}{5}, 2i, -2i \right\}$$

$$29) (x^2 - 5)(2x^2 - 5)(2x^2 + 5) = 0$$

$$\left\{ \sqrt{5}, -\sqrt{5}, \frac{\sqrt{10}}{2}, -\frac{\sqrt{10}}{2}, \frac{i\sqrt{10}}{2}, -\frac{i\sqrt{10}}{2} \right\}$$

$$30) (x^2 + 2)(5x^2 - 1)(5x^2 + 1) = 0$$

$$\left\{ i\sqrt{2}, -i\sqrt{2}, \frac{\sqrt{5}}{5}, -\frac{\sqrt{5}}{5}, \frac{i\sqrt{5}}{5}, -\frac{i\sqrt{5}}{5} \right\}$$

$$31) (3x - 4)(x^2 + 2) = 0$$

$$\left\{ \frac{4}{3}, i\sqrt{2}, -i\sqrt{2} \right\}$$

$$32) (3x - 4)(x^2 + 1) = 0$$

$$\left\{ \frac{4}{3}, i, -i \right\}$$

$$33) (x^2 + 5)(2x - 1)(2x + 1)(4x^2 + 1) = 0$$

$$\left\{ i\sqrt{5}, -i\sqrt{5}, \frac{1}{2}, -\frac{1}{2}, \frac{i}{2}, -\frac{i}{2} \right\}$$

$$34) (2x^2 - 5)(x^2 - 3)(x^2 + 3) = 0$$

$$\left\{ \frac{\sqrt{10}}{2}, -\frac{\sqrt{10}}{2}, \sqrt{3}, -\sqrt{3}, i\sqrt{3}, -i\sqrt{3} \right\}$$

$$35) x(2x - 3)(x^2 + 4) = 0$$

$$\left\{ 0, \frac{3}{2}, 2i, -2i \right\}$$

$$36) (x + 3)(2x^2 - 5) = 0$$

$$\left\{ -3, \frac{\sqrt{10}}{2}, -\frac{\sqrt{10}}{2} \right\}$$

$$37) (x^2 + 1)(3x^2 - 2)(3x^2 + 2) = 0$$

$$\left\{ i, -i, \frac{\sqrt{6}}{3}, -\frac{\sqrt{6}}{3}, \frac{i\sqrt{6}}{3}, -\frac{i\sqrt{6}}{3} \right\}$$

$$38) (3x - 1)(x^2 - 2) = 0$$

$$\left\{ \frac{1}{3}, \sqrt{2}, -\sqrt{2} \right\}$$

$$39) (2x + 3)(x^2 - 2) = 0$$

$$\left\{ -\frac{3}{2}, \sqrt{2}, -\sqrt{2} \right\}$$

$$40) (5x^2 + 3)(x^2 - 2)(x^2 + 2) = 0$$

$$\left\{ \frac{i\sqrt{15}}{5}, -\frac{i\sqrt{15}}{5}, \sqrt{2}, -\sqrt{2}, i\sqrt{2}, -i\sqrt{2} \right\}$$

$$41) (x^2 + 5)(5x^2 - 2)(5x^2 + 2) = 0$$

$$\left\{ i\sqrt{5}, -i\sqrt{5}, \frac{\sqrt{10}}{5}, -\frac{\sqrt{10}}{5}, \frac{i\sqrt{10}}{5}, -\frac{i\sqrt{10}}{5} \right\}$$

$$42) (x^2 + 2)(5x^2 - 4)(5x^2 + 4) = 0$$

$$\left\{ i\sqrt{2}, -i\sqrt{2}, \frac{2\sqrt{5}}{5}, -\frac{2\sqrt{5}}{5}, \frac{2i\sqrt{5}}{5}, -\frac{2i\sqrt{5}}{5} \right\}$$

$$43) (5x - 1)(x^2 - 3) = 0$$

$$\left\{ \frac{1}{5}, \sqrt{3}, -\sqrt{3} \right\}$$

$$44) (5x^2 + 3)(x^2 - 5)(x^2 + 5) = 0$$

$$\left\{ \frac{i\sqrt{15}}{5}, -\frac{i\sqrt{15}}{5}, \sqrt{5}, -\sqrt{5}, i\sqrt{5}, -i\sqrt{5} \right\}$$

$$45) (x^2 + 2)(3x^2 - 2)(3x^2 + 2) = 0$$

$$\left\{ i\sqrt{2}, -i\sqrt{2}, \frac{\sqrt{6}}{3}, -\frac{\sqrt{6}}{3}, \frac{i\sqrt{6}}{3}, -\frac{i\sqrt{6}}{3} \right\}$$

$$46) (x + 1)(3x^2 + 1) = 0$$

$$\left\{ -1, \frac{i\sqrt{3}}{3}, -\frac{i\sqrt{3}}{3} \right\}$$

$$47) (x - 5)(5x^2 - 2) = 0$$

$$\left\{ 5, \frac{\sqrt{10}}{5}, -\frac{\sqrt{10}}{5} \right\}$$

$$48) (5x^2 + 2)(x^2 - 2)(x^2 + 2) = 0$$

$$\left\{ \frac{i\sqrt{10}}{5}, -\frac{i\sqrt{10}}{5}, \sqrt{2}, -\sqrt{2}, i\sqrt{2}, -i\sqrt{2} \right\}$$

$$49) (4x + 1)(x^2 + 5) = 0$$

$$\left\{ -\frac{1}{4}, i\sqrt{5}, -i\sqrt{5} \right\}$$

$$50) (x^2 + 1)(2x^2 - 1)(2x^2 + 1) = 0$$

$$\left\{ i, -i, \frac{\sqrt{2}}{2}, -\frac{\sqrt{2}}{2}, \frac{i\sqrt{2}}{2}, -\frac{i\sqrt{2}}{2} \right\}$$

$$51) (5x^2 + 3)(x^2 - 3)(x^2 + 3) = 0$$

$$\left\{ \frac{i\sqrt{15}}{5}, -\frac{i\sqrt{15}}{5}, \sqrt{3}, -\sqrt{3}, i\sqrt{3}, -i\sqrt{3} \right\}$$

$$52) (5x - 2)(x - 1)(x + 1) = 0$$

$$\left\{ \frac{2}{5}, 1, -1 \right\}$$

$$53) (x^2 + 2)(2x^2 - 5)(2x^2 + 5) = 0$$

$$\left\{ i\sqrt{2}, -i\sqrt{2}, \frac{\sqrt{10}}{2}, -\frac{\sqrt{10}}{2}, \frac{i\sqrt{10}}{2}, -\frac{i\sqrt{10}}{2} \right\}$$

$$54) (3x^2 - 1)(x^2 - 2)(x^2 + 2) = 0$$

$$\left\{ \frac{\sqrt{3}}{3}, -\frac{\sqrt{3}}{3}, \sqrt{2}, -\sqrt{2}, i\sqrt{2}, -i\sqrt{2} \right\}$$

$$55) (3x^2 - 1)(x - 1)(x + 1)(x^2 + 1) = 0$$

$$\left\{ \frac{\sqrt{3}}{3}, -\frac{\sqrt{3}}{3}, 1, -1, i, -i \right\}$$

$$56) (4x^2 + 1)(x^2 - 2)(x^2 + 2) = 0$$

$$\left\{ \frac{i}{2}, -\frac{i}{2}, \sqrt{2}, -\sqrt{2}, i\sqrt{2}, -i\sqrt{2} \right\}$$

$$57) x(5x + 3)(x - 3) = 0$$

$$\left\{ 0, -\frac{3}{5}, 3 \right\}$$

$$58) (3x - 5)(x - 2)(x + 2) = 0$$

$$\left\{ \frac{5}{3}, 2, -2 \right\}$$

$$59) (x^2 + 5)(5x^2 - 4)(5x^2 + 4) = 0$$

$$\left\{ i\sqrt{5}, -i\sqrt{5}, \frac{2\sqrt{5}}{5}, -\frac{2\sqrt{5}}{5}, \frac{2i\sqrt{5}}{5}, -\frac{2i\sqrt{5}}{5} \right\}$$

$$60) x(3x^2 - 5)(x - 1)(x + 1)(x^2 + 1) = 0$$

$$\left\{ 0, \frac{\sqrt{15}}{3}, -\frac{\sqrt{15}}{3}, 1, -1, i, -i \right\}$$

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

$$61) -\frac{4}{5}, \frac{3}{2}, 3$$

$$f(x) = 10x^3 - 37x^2 + 9x + 36$$

$$62) -\frac{3}{5}, -3, \frac{3}{5}$$

$$f(x) = 25x^3 + 75x^2 - 9x - 27$$

63) $-\frac{5}{4}, \frac{5}{4}, -4$

$$f(x) = 16x^3 + 64x^2 - 25x - 100$$

65) 0 mult. 2, 2 mult. 2

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

67) 2, $-\frac{5}{3}, -1$

$$f(x) = 3x^3 + 2x^2 - 11x - 10$$

69) $\frac{4}{5}, -\frac{5}{4}, -\frac{1}{5}$

$$f(x) = 100x^3 + 65x^2 - 91x - 20$$

71) -2 mult. 3

$$f(x) = x^3 + 6x^2 + 12x + 8$$

73) $-2, \frac{2}{5}, \frac{3}{2}$

$$f(x) = 10x^3 + x^2 - 32x + 12$$

75) $\frac{3}{2}$ mult. 2, -5

$$f(x) = 4x^3 + 8x^2 - 51x + 45$$

77) 2 mult. 2, $\frac{5}{2}$

$$f(x) = 2x^3 - 13x^2 + 28x - 20$$

79) $\frac{5}{2}, -\frac{5}{3}, -\frac{4}{3}$

$$f(x) = 18x^3 + 9x^2 - 95x - 100$$

64) 0, $-1, -4$

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

66) $\frac{4}{3}, -2, -\frac{1}{3}$

$$f(x) = 9x^3 + 9x^2 - 22x - 8$$

68) $-2, -3, 3, \frac{3}{2}$

$$f(x) = 2x^4 + x^3 - 24x^2 - 9x + 54$$

70) $\frac{2}{3}$ mult. 2, 3

$$f(x) = 9x^3 - 39x^2 + 40x - 12$$

72) $-1, -4, \frac{2}{5}$

$$f(x) = 5x^3 + 23x^2 + 10x - 8$$

74) 5, 4, 1

$$f(x) = x^3 - 10x^2 + 29x - 20$$

76) $-\frac{3}{4}$ mult. 2, 0

$$f(x) = 16x^3 + 24x^2 + 9x$$

78) 2, $-2, 0$

$$f(x) = x^3 - 4x$$

80) $-\frac{4}{5}, \frac{5}{4}, -\frac{4}{3}$

$$f(x) = 60x^3 + 53x^2 - 96x - 80$$

$$81) -\frac{4}{3}, 5, -\frac{5}{2}$$

$$f(x) = 6x^3 - 7x^2 - 95x - 100$$

$$82) -\frac{5}{4}, -\frac{2}{3}, \frac{1}{5}$$

$$f(x) = 60x^3 + 103x^2 + 27x - 10$$

$$83) -\frac{3}{2}, 3, 1$$

$$f(x) = 2x^3 - 5x^2 - 6x + 9$$

$$84) \frac{2}{3}, 2, -\frac{5}{2}$$

$$f(x) = 6x^3 - x^2 - 32x + 20$$

$$85) \frac{2}{5} \text{ mult. } 2, 5$$

$$f(x) = 25x^3 - 145x^2 + 104x - 20$$

$$86) 3, -1, -5$$

$$f(x) = x^3 + 3x^2 - 13x - 15$$

$$87) 1, \frac{5}{3}, -\frac{5}{2}$$

$$f(x) = 6x^3 - x^2 - 30x + 25$$

$$88) 3, 4, \frac{1}{3}$$

$$f(x) = 3x^3 - 22x^2 + 43x - 12$$

$$89) 0 \text{ mult. } 2, 3$$

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

$$90) 3, -2, -5$$

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