Pre-Calculus Name_____ ID: 1

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

71) -2 mult. 3

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

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

74) $5, \ 4, \ 1$

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

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

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

86) 3, -1, -5

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

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

89) 0 mult. 2, 3

90) 3, -2, -5

Pre-Calculus Name_____ ID: 1

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

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

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

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

65) 0 mult. 2, 2 mult. 2

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

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

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

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

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

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

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

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

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

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

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

71) -2 mult. 3

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

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

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

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

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

74) $5,\ 4,\ 1$

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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