MATH 10 C-H

Worksheet – Factoring

Name: _____

Factor the following

a) $27m^4n^2 - 18mn^5$

b) $x^2 + 3x - 40$

c) $a^2 - 10a + 21$

d) $y^2 - 9y - 22$

e) $3x^2 + 30x + 72$

f) $6d^2 + d - 2$

g) $15x^2 - 26x + 8$

h) $21x^2 + 29x + 10$

i) $12m^2 - m - 6$

j) $-30x^2 + 5x + 5$

Math 10C-H

Extra Factoring Practice

1. $8x^2y - 12x^3y^2 + 16x^4y^4$

2. $-6m^3t^4 - 18m^2t^5$

3. $x^2 - 8x + 12$

4. $m^2 + 15m + 44$

5. $r^2 - 49$

6. $4m^2 - 81t^2$

7. $2x^2 - 5x - 7$

8. $8x^2 - 13x - 6$

9. $7x^2 + 9x - 10$

10. $12p^2 - 27$

11. $4m^2 - 11m - 3$

12. $m^2 - 81$

13. $c^2 - 18cd + 80d^2$

14. $4t^2 - 18t + 81$

15. $6x^2 - 5xy - 6y^2$

16. $25x^2 + 70x + 49$

17. $15 + 8k + k^2$

18. $90z^4 + 75z^3$

19. $2y^2 - 3y - 2$

20. $5x^2 + 20$

Key P.1 Worksheet – Factoring

a) $9mn^2(3m^3 - 2n^3)$

b) $(x-5)(x+8)$

c) $(a-7)(a-3)$

d) $(y-11)(y+2)$

e) $3(x^2+10x+24)$
$3(x+6)(x+4)$

f) $(2d-1)(3d+2)$

g) $(5x-2)(3x-4)$

h) $(7x+5)(3x+-2)$

i) $(4m-3)(3m+2)$

j) $-5(6x^2-x-1)$
$-5(3x+1)(2x-1)$

16) $(5x+7)^2$

17) $(5+k)(3+k)$ or $(k+5)(k+3)$

18) $15z^3(6z+5)$

19) $(2y+1)(y-2)$

20) $5(x^2+4)$

P.2

1) $4x^2y(2-3xy+4x^2y^3)$

2) $-6m^2t^4(m+3t)$

3) $(x-6)(x-2)$

4) $(m+11)(m+4)$

5) $(r-7)(r+7)$

6) $(2m-9t)(2m+9t)$

7) $(2x-7)(x+1)$

8) $(8x+3)(x-2)$

9) $(7x-5)(x+2)$

10) $3(4p^2-9)$
$3(2p-3)(2p+3)$

11) $(4m+1)(m-3)$

12) $(m-9)(m+9)$

13) $(c-8)(c-10)$

14) (non factorable)

15) $(3x+2y)(2x-3y)$

MULTIPLY EACH POLYNOMIAL.

1. $(x + 5)(x + 4) =$ _____
2. $(x - 7)(x - 4) =$ _____
3. $(x - 4)(x + 6) =$ _____
4. $(x + 9)(x - 8) =$ _____
5. $(x - 12)(x + 2) =$ _____
6. $(x + 15)(x - 6) =$ _____
7. $(x + 7)(x + 4) =$ _____
8. $(x + 8)(x + 9) =$ _____
9. $(x - 5)(x + 7) =$ _____
10. $(x + 5)(x - 4) =$ _____
11. $(x - 5)(x + 2) =$ _____
12. $(x-3)^2 =$ _____
13. $(x+14)^2 =$ _____
14. $(x-11)^2 =$ _____
15. $(3x+20)^2 =$ _____
16. $(2x-15)^2 =$ _____
17. $(x - 15)(x +15) =$ _____
18. $(x + 8)(x - 8) =$ _____
19. $(x - 7)(x + 7) =$ _____
20. $(x + 5)(x - 5) =$ _____

FACTOR EACH POLYNOMIAL COMPLETELY.

21. $x^2 + 5x + 6 =$ _____
22. $x^2 + 12x + 35 =$ _____
23. $x^2 - 8x + 15 =$ _____
24. $x^2 + 13x + 42 =$ _____
25. $x^2 - 16x + 55 =$ _____
26. $x^2 + 5x - 24 =$ _____
27. $x^2 - 7x - 30 =$ _____
28. $x^4 - 9x^2 + 20 =$ _____
29. $x^2 - 22x + 105 =$ _____
30. $x^2 + 12x + 36 =$ _____
31. $x^2 - 24x + 144 =$ _____
32. $x^2 + 16x - 36 =$ _____
33. $x^2 - 6x - 16 =$ _____
34. $4x^2 + 20x + 25 =$ _____
35. $25x^2 - 30x + 9 =$ _____
36. $x^2 - 16 =$ _____
37. $x^2 - 64 =$ _____
38. $x^2 - 81 =$ _____
39. $9x^2 - 169 =$ _____
40. $49x^2 - 16y^2 =$ _____

MULTIPLY EACH POLYNOMIAL.

41. $3x(12x + 5) =$ _____

42. $2x(x - 14) =$ _____

43. $5x(x^2 + 5x + 6) =$ _____

44. $(3x + 1)(x - 8) =$ _____

45. $(4x - 1)(2x + 2) =$ _____

46. $(3x + 5)(x - 6) =$ _____

47. $(x + 7)(2x + 3) =$ _____

48. $(x - 8)(4x + 3) =$ _____

49. $(2x - 5)(2x + 7) =$ _____

50. $(3x + 2)(5x - 4) =$ _____

51. $(6x - 1)(9x + 2) =$ _____

52. $(2x-3)^2 =$ _____

53. $(4x+1)^2 =$ _____

54. $(3x-1)^2 =$ _____

55. $(3x+7)^2 =$ _____

56. $(5x-9)^2 =$ _____

57. $(3x - 5)(3x + 5) =$ _____

58. $(5x - 8)(5x + 8) =$ _____

59. $(3x - 7)(3x + 7) =$ _____

60. $(4x + 5)(3x - 8) =$ _____

FACTOR EACH POLYNOMIAL COMPLETELY.

61. $2x^2 - 5x - 3 =$ _____

62. $2x^2 + 3x - 35 =$ _____

63. $8x^2 - 40x + 50 =$ _____

64. $4x^2 + 4x + 1 =$ _____

65. $6x^2 + 17x + 12 =$ _____

66. $9x^2 - 12x + 4 =$ _____

67. $2x^2 - 12x + 18 =$ _____

68. $3x^2 - 24x + 45 =$ _____

69. $15x^2 - 28x + 5 =$ _____

70. $3x^2 + 5x - 2 =$ _____

71. $5x^2 - 20x + 15 =$ _____

72. $2x^2 + 7x + 3 =$ _____

73. $4x^2 - 21x + 5 =$ _____

74. $4 - 12x + 9x^2 =$ _____

75. $20 + 7x - 6x^2 =$ _____

76. $64x^2 - 16 =$ _____

77. $x^4 + 4x^2 + 4 =$ _____

78. $3x^4 + 9x^2 - 12 =$ _____

79. $2x^4 + 9x^2 - 18 =$ _____

80. $8x^2 - 26xy + 21y^2 =$ _____

MULTIPLY EACH POLYNOMIAL.

1. $(x + 5)(x + 4) =$ $x^2 + 9x + 20$
2. $(x - 7)(x - 4) =$ $x^2 - 11x + 28$
3. $(x - 4)(x + 6) =$ $x^2 + 2x - 24$
4. $(x + 9)(x - 8) =$ $x^2 + x - 72$
5. $(x - 12)(x + 2) =$ $x^2 - 10x - 24$
6. $(x + 15)(x - 6) =$ $x^2 + 9x - 90$
7. $(x + 7)(x + 4) =$ $x^2 + 11x + 28$
8. $(x + 8)(x + 9) =$ $x^2 + 17x + 72$
9. $(x - 5)(x + 7) =$ $x^2 + 2x - 35$
10. $(x + 5)(x - 4) =$ $x^2 + x - 20$
11. $(x - 5)(x + 2) =$ $x^2 - 3x - 10$
12. $(x-3)^2 =$ $x^2 - 6x + 9$
13. $(x+14)^2 =$ $x^2 + 28x + 196$
14. $(x-11)^2 =$ $x^2 - 22x + 121$
15. $(3x+20)^2 =$ $9x^2 + 120x + 400$
16. $(2x-15)^2 =$ $4x^2 - 60x + 225$
17. $(x - 15)(x +15) =$ $x^2 - 225$
18. $(x + 8)(x - 8) =$ $x^2 - 64$
19. $(x - 7)(x + 7) =$ $x^2 - 49$
20. $(x + 5)(x - 5) =$ $x^2 - 25$

FACTOR EACH POLYNOMIAL COMPLETELY.

21. $x^2 + 5x + 6 =$ $(x+3)(x+2)$
22. $x^2 + 12x + 35 =$ $(x+7)(x+5)$
23. $x^2 - 8x + 15 =$ $(x-5)(x-3)$
24. $x^2 + 13x + 42 =$ $(x+6)(x+7)$
25. $x^2 - 16x + 55 =$ $(x-5)(x-11)$
26. $x^2 + 5x - 24 =$ $(x+8)(x-3)$
27. $x^2 - 7x - 30 =$ $(x-10)(x+3)$
28. $x^4 - 9x^2 + 20 =$ $(x^2-5)(x^2-4) =$ $(x^2-5)(x+2)(x-2)$ *
29. $x^2 - 22x + 105 =$ $(x-7)(x-15)$
30. $x^2 + 12x + 36 =$ $(x+6)^2$
31. $x^2 - 24x + 144 =$ $(x-12)^2$
32. $x^2 + 16x - 36 =$ $(x+18)(x-2)$
33. $x^2 - 6x - 16 =$ $(x-8)(x+2)$
34. $4x^2 + 20x + 25 =$ $(2x+5)^2$
35. $25x^2 - 30x + 9 =$ $(5x-3)^2$
36. $x^2 - 16 =$ $(x-4)(x+4)$
37. $x^2 - 64 =$ $(x+8)(x-8)$
38. $x^2 - 81 =$ $(x-9)(x+9)$
39. $9x^2 - 169 =$ $(3x-13)(3x+13)$
40. $49x^2 - 16y^2 =$ $(7x+4y)(7x-4y)$

MULTIPLY EACH POLYNOMIAL.

41. $3x(12x + 5) =$ $36x^2 + 15x$

42. $2x(x - 14) =$ $2x^2 - 28x$

43. $5x(x^2 + 5x + 6) =$ $5x^3 + 25x^2 + 30x$

44. $(3x + 1)(x - 8) =$ $3x^2 - 23x - 8$

45. $(4x - 1)(2x + 2) =$ $8x^2 + 6x - 2$

46. $(3x + 5)(x - 6) =$ $3x^2 - 13x - 30$

47. $(x + 7)(2x + 3) =$ $2x^2 + 17x + 21$

48. $(x - 8)(4x + 3) =$ $4x^2 - 29x - 24$

49. $(2x - 5)(2x + 7) =$ $4x^2 + 4x - 35$

50. $(3x + 2)(5x - 4) =$ $15x^2 - 2x - 8$

51. $(6x - 1)(9x + 2) =$ $54x^2 + 3x - 2$

52. $(2x-3)^2 =$ $4x^2 - 12x + 9$

53. $(4x+1)^2 =$ $16x^2 + 8x + 1$

54. $(3x-1)^2 =$ $9x^2 - 6x + 1$

55. $(3x+7)^2 =$ $9x^2 + 42x + 49$

56. $(5x-9)^2 =$ $25x^2 - 90x + 81$

57. $(3x - 5)(3x + 5) =$ $9x^2 - 25$

58. $(5x - 8)(5x + 8) =$ $25x^2 - 64$

59. $(3x - 7)(3x + 7) =$ $9x^2 - 49$

60. $(4x + 5)(3x - 8) =$ $12x^2 - 17x - 40$

FACTOR EACH POLYNOMIAL COMPLETELY.

61. $2x^2 - 5x - 3 =$ $(2x + 1)(x - 3)$

62. $2x^2 + 3x - 35 =$ $(2x - 7)(x + 5)$

63. $8x^2 - 40x + 50 =$ $2(2x - 5)^2$

64. $4x^2 + 4x + 1 =$ $(2x + 1)^2$

65. $6x^2 + 17x + 12 =$ $(3x + 4)(2x + 3)$

66. $9x^2 - 12x + 4 =$ $(3x - 2)^2$

67. $2x^2 - 12x + 18 =$ $2(x - 3)^2$

68. $3x^2 - 24x + 45 =$ $3(x - 5)(x - 3)$

69. $15x^2 - 28x + 5 =$ $(5x - 1)(3x - 5)$

70. $3x^2 + 5x - 2 =$ $(3x - 1)(x + 2)$

71. $5x^2 - 20x + 15 =$ $5(x - 3)(x - 1)$

72. $2x^2 + 7x + 3 =$ $(2x + 1)(x + 3)$

73. $4x^2 - 21x + 5 =$ $(4x - 1)(x - 5)$

74. $4 - 12x + 9x^2 =$ $(3x - 2)^2$
$= 9x^2 - 12x + 4$

* 75. $20 + 7x - 6x^2 =$ $(4 + 3x)(5 - 2x)$

76. $64x^2 - 16 =$ $16(2x - 1)(2x + 1)$

* 77. $x^4 + 4x^2 + 4 =$ $(x^2 + 2)^2$

78. $3x^4 + 9x^2 - 12 =$ $3(x^2 + 4)(x^2 - 1)$
$= 3(x^2 + 4)(x - 1)(x + 1)$

79. $2x^4 + 9x^2 - 18 =$ $(2x - 3)(x + 6)$

* 80. $8x^2 - 26xy + 21y^2 =$ $(4x - 7y)(2x - 3y)$

Name _____

Test 1 CHAPTER 3 Polynomials

MATHPOWER™ 10, Western Edition, pp. 94–143

Simplify.

1. $(5a - 3b) + (2a + b)$

2. $(3x + 4y - 2z) + (5x - y - 4z)$

3. $(4m - n) - (2n - 3m)$

4. $(2x^2 - 3x - 4) - (5x^2 - 6x + 7)$

5. $(2a)(5b)(4c)$

6. $(4xy^2)(-7x^3y)$

7. $\dfrac{12xyz}{6yz}$

8. $\dfrac{63a^5b^3}{-7ab^2}$

Expand.

9. $4a(2b - 3c)$

10. $3m(2m^2 - 5m - 7)$

11. $(x + 4)(x + 9)$

12. $(m - 5)(m + 2)$

13. $(3y - 7)(y - 5)$

14. $(2k + 3)(5k - 4)$

15. $(x + 7)^2$

16. $(2r - 5)^2$

17. $(p + 4)(p - 4)$

18. $(4x + 5y)(4x - 5y)$

Expand and simplify.

19. $4(2a - 3b) + 5(-a - 4b) - 7(4a - 5b)$

20. $(x - 4)(2x^2 - 6x + 3)$

21. $(x + 8)^2 + (2x - 7)(2x + 7)$

Name _____

22. $(3y - 5)(2y - 3) - 2(y + 4)(y + 1)$

Factor completely.

23. $4abx + 28acx$

24. $12m^2n - 6mn^2$

25. $6x^2 - 21xy + 8xz - 28yz$

26. $x^2 + 12x + 35$

27. $y^2 - 11y + 30$

28. $a^2 + 6ab - 40b^2$

29. $4m^2 - 20m - 24$

30. $6x^2 + 17x + 12$

31. $3y^2 - 17y + 10$

32. $8b^2 - 10b - 7$

33. $4x^2 - 81$

34. $25y^2 - 120y + 144$

35. $12k^3 - 27k$

Name _____

Test 2 CHAPTER 3 Polynomials

MATHPOWER™ 10, Western Edition, pp. 94–143

Simplify.

1. $(x^2 - 3x - 7) - (2x^2 + 5x - 3) + (4x^2 + x - 9)$

2. $\dfrac{(16a^4b^3c)(-9ac^5)}{-24a^3b^2c^4}$

Expand.

3. $-4ab(3a + 2b - 5c)$

4. $2(x - 5)(3x - 2)$

5. $(2x - 1)(x + 4)(3x - 2)$

Expand and simplify.

6. $3(2x - 5)(4x + 1) - 2(x - 6)(2x - 3)$

7. $(3x - 2y)^2 - (x - 4y)(x + 4y)$

8. $(1 + 3q)^3 + 4(q - 1)(5q^2 - 2q - 3)$

9. Evaluate $\dfrac{24pq - 40p^2q^2 + 16pq^4}{8pq}$ if $p = 5$ and $q = -3$.

Factor completely.

10. $16m^3n^2 + 24mn^4 - 8mn^2$

11. $y^2 - 23y + 112$

12. $3a^2 + 39a - 90$

13. $5y^2 - 12yz - 9z^2$

14. $9k^2 + 3k + \dfrac{1}{4}$

15. $36m^2 - 196n^2$

16. $x^4 - 81$

Factor by grouping.

17. $3xz + 4yz - 15x - 20y - 2z + 10$

37. $(m + 11)(m - 11)$

38. not possible

39. $(8y - 13z)(8y + 13z)$

40. $16y(x^2 - 5)$

41. yes, $(3a - 4)^2$

42. yes, $(2b + 11)^2$

43. no

44. $3(y^2 + 9)(y + 3)(y - 3)$

45. $45(a^2 + 2a + 5)$

46. $(x + 2)(x - 2)(x^2 - 5)$

Test 1

1. $7a - 2b$

2. $8x + 3y - 6z$

3. $7m - 3n$

4. $-3x^2 + 3x - 11$

5. $40abc$

6. $-28x^4y^3$

7. $2x$

8. $-9a^4b$

9. $8ab - 12ac$

10. $6m^3 - 15m^2 - 21m$

11. $x^2 + 13x + 36$

12. $m^2 - 3m - 10$

13. $3y^2 - 22y + 35$

14. $10k^2 + 7k - 12$

15. $x^2 + 14x + 49$

16. $4r^2 - 20r + 25$

17. $p^2 - 16$

18. $16x^2 - 25y^2$

19. $-25a + 3b$

20. $2x^3 - 14x^2 + 27x - 12$

21. $5x^2 + 16x + 15$

22. $4y^2 - 29y + 7$

23. $4ax(b + 7c)$

24. $6mn(2m - n)$

25. $(2x - 7y)(3x + 4z)$

26. $(x + 7)(x + 5)$

27. $(y - 5)(y - 6)$

28. $(a + 10b)(a - 4b)$

29. $4(m - 6)(m + 1)$

30. $(2x + 3)(3x + 4)$

31. $(3y - 2)(y - 5)$

32. $(2b + 1)(4b - 7)$

33. $(2x - 9)(2x + 9)$

34. $(5y - 12)^2$

35. $3k(2k - 3)(2k + 3)$

Test 2

1. $3x^2 - 7x - 13$

2. $6a^2bc^2$

3. $-12a^2b - 8ab^2 + 20abc$

4. $6x^2 - 34x + 20$

5. $6x^3 + 17x^2 - 26x + 8$

6. $20x^2 - 24x - 51$

7. $8x^2 - 12xy + 20y^2$

8. $47q^3 - q^2 + 5q + 13$

9. 24

10. $8mn^2(2m^2 + 3n^2 - 1)$

11. $(y - 7)(y - 16)$

12. $3(a + 15)(a - 2)$

13. $(5y + 3z)(y - 3z)$

14. $\left(3k + \frac{1}{2}\right)^2$

15. $4(3m - 7n)(3m + 7n)$

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

17. $(z - 5)(3x + 4y - 2)$