Name: KEY

Final Exam Practice Pack – Section 6

Term: Any variable, constant, or product of the two

Example: $3, \quad 4x, \quad t, \quad 2r^2, \quad xyz$

Like Terms: Terms that have the **same variable(s)** to the same **exponents**

Example: $x^2 \; and \; 4x^2, \quad 7t \; and \; 3t, \quad 4 \; and \; 9$

Degree of a Term: The **exponent** on the **variable** or **sum** of exponents on **different variables** of one term

Example: $3x \; is \; Degree \; 1, \quad 4x^2 \; is \; Degree \; 2, \quad 5xyz \; is \; Degree \; 3$

Polynomial: Any term or terms **separated by addition or subtraction** where all **exponents** on the variables are **whole numbers**

Example: $5t^2 + 2t - 7$

Example: Combine the **Like Terms** and leave the simplified expression in **Descending Order**

$$5xy + 5x^2 + 2x - 6 - 4yx + 2x + 6 - 3x^2$$

Like Terms are:

$+5x^2 and -3x^2$	so	$5x^2 - 3x^2 = 2x^2$	$Degree \; of \; 2$
$5xy \; and - 4yx$	so	$5xy - 4xy = xy$	$Degree \; of \; 2$
$+2x \; and + 2x$	so	$2x + 2x = 4x$	$Degree \; of \; 1$
$-6 \; and + 6$	so	$-6 + 6 = 0$	$Degree \; of \; 0$

xy and yx are the same, in multiplication order doesn't matter, $xy = yx$

Since $x^2 and \; xy$ are both degree 2, which one goes first?

We list them **ALPHABETICALLY**, $x^2 = xx \; and \; xx \; comes \; before \; xy$

$$\mathbf{2x^2 + xy + 4x}$$

Identify the number of terms, what are they, and their degrees

1. $2x^4 - 4x^2 - 5$

→ 3 terms

→ $2x^4$, $-4x^2$, -5

↓ ↓ ↓

dg 4 dg 2 dg 0

2. $4x^3yz$

→ 1 term

→ $4x^3y^1z^1$

↓

dg 5

3. $xy - 5xy^3 + 4y$

→ 3 terms

→ xy, $-5xy^3$, $4y$

↓ ↓ ↓

dg 2 dg 4 deg 1

4. $5x^4y + 4xy^2 - 6xy$

→ 3 terms

→ $5x^4y$, $4xy^2$, $-6xy$

↓ ↓ ↓

dg 5 deg 3 deg 2

5. -3

→ 1 term

→ -3

↓

dg 0

6. $3xyz + 5z - x^4$

→ 3 terms

→ $3xyz$, $5z$, $-x^4$

↓ ↓ ↓

deg 3 deg 1 deg 4

Put the following Polynomials in DESCENDING ORDER

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

$5x^2 - 7x - 2$

8. $-3t + 6t^3 + t - 8t^2$

$6t^3 - 8t^2 - 3t + t$

9. $12 - 3x + 4x^2$

$4x^2 - 3x + 12$

10. $3z^2 - 4z - 5$

✓

11. $xy^2 + xy + xz - y^3$

$-y^3 + xy^2 + xy + xz$

12. $-5xy - 4y + x^2$

$x^2 - 5xy - 4y$

Simplify the following, put your answer in DESCENDING ORDER

13. $-4t + 7 - 3t - 7t^2 + 14 - 6t^2$

$= -7t^2 - 6t^2 - 4t - 3t + 7 + 14$

$= -13t^2 - 7t + 21$

14. $-4z^3 - 4z - 7z^2 + 8 - 5z^2 - 9 + 2z^2 + 3z$

$= -4z^3 - 7z^2 + 2z^2 - 5z^2 - 4z + 3z + 8 - 9$

$= -4z^3 - 10z^2 - z - 1$

15. $-5xy + 7 + 5yx - 7$

$= -5xy + 5xy + 7 - 7$

$= 0$

16. $-q + 10q^2 - 17 - 3q^2 + 9q + 14$

$= 10q^2 - 3q^2 - q + 9q - 17 + 14$

$= 7q^2 + 8q - 3$

17. $6 \times \left(\frac{2}{3}i^2 + 4i - \frac{5}{6}i^2 - 3i + 6\right)$

$= 4i^2 - 5i^2 + 24i - 18i + 36$

$= -i^2 + 6i + 36$

18. $-5.6x - 4.2y - 2.3x + 7.2y - 3$

$= -5.6x - 2.3x - 4.2y + 7.2y - 3$

$= -7.9x + 3y - 3$

19. $15\left(\frac{7}{5}x + \frac{1}{3}y - \frac{4}{5}x - \frac{2}{3}y + 6\right)$

$= 21x - 12x + 5y - 10y + 90$

$= 9x - 5y + 90$

20. $16\left(\frac{3}{4}j^2 - 3j - \frac{1}{2}j + \frac{5}{8}j^2 + \frac{3}{16}j^2\right)$

$= 12j^2 + 10j^2 + 3j^2 - 48j - 8j$

$= 25j^2 - 56j$

Add the following Polynomials, leave answer in DESCENDING order.

21. $(2x + 7) + (3x - 17)$

$= 2x + 7 + 3x - 17$

$= 2x + 3x + 7 - 17$

$= 5x - 10$

22. $(2x^2 + 5x + 7) + (-3x^2 + 7 + 4x)$

$= 2x^2 + 5x + 7 - 3x^2 + 7 + 4x$

$= 2x^2 - 3x^2 + 5x + 4x + 7 + 7$

$= -x^2 + 9x + 14$

23. $(2xy + 5x^3 - 7) + (5xy - 2x^3 + 8)$

$= 2xy + 5x^3 - 7 + 5xy - 2x^3 + 8$

$= 5x^3 - 2x^3 + 2xy + 5xy - 7 + 8$

$= 3x^3 + 7xy + 1$

24. $(-5 + 7t^2 - 4t) + (-2t + 7t^2 + 8)$

$= -5 + 7t^2 - 4t - 2t + 7t^2 + 8$

$= 7t^2 + 7t^2 - 4t - 2t - 5 + 8$

$= 14t^2 - 6t + 3$

25. $(-4j^3 + 3j^2 - 5j + 7) + (-3j^3 + 2j^2 - 5j + 12)$

$= -4j^3 - 3j^3 + 3j^2 + 2j^2 - 5j - 5j + 7 + 12$

$= -7j^3 + 5j^2 - 10j + 19$

26. $(-4 + 3x - 4x^2) + (-7x^2 - x)$

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

$= -11x^2 + 2x - 4$

27. $(-2t^2 + 7) + (-3t^2 - 6)$

$= -2t^2 - 3t^2 + 7 - 6$

$= -5t^2 + 1$

28. $(2x^2 - 2 - 3x) + (4x^2 - x + 5)$

$= 2x^2 + 4x^2 - 3x - x - 2 + 5$

$= 6x^2 - 4x + 3$

29. $(2x - 3x^2 + 2y^2) + (y^2 - 3x - 2x^2)$

$= -3x^2 - 2x^2 + 2y^2 + y^2 + 2x - 3x$

$= -5x^2 + 3y^2 - x$

30. $(-4x + 2x^2) + (5 + 3x^2)$

$= 2x^2 + 3x^2 - 4x + 5$

$= 5x^2 - 4x + 5$

31. $(-5 + 7x^2 - 4x) + (-5x + 2x^2 - 4)$

$= 7x^2 + 2x^2 - 4x - 5x - 5 - 4$

$= 9x^2 - 9x - 9$

32. $(-3x + 2xy - 2y) + (2xy + 3y) + (3y - 7x)$

$= 2xy + 2xy - 3x - 7x - 2y + 3y + 3y$

$= 4xy - 10x + 4y$

33. $(2y - 3x + 5xy) + (-2xy - 3x + 7y) + (-2x + 4xy)$

$= 5xy - 2xy + 4xy - 3x - 3x - 2x + 2y + 7y$

$= 7xy - 8x + 9y$

Subtract the Polynomials, leave answer in DESCENDING order.

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

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

$= x^2 + 3x^2 \cancel{- 4x + 4x} + 7 - 3$

$= 4x^2 + 4$

35. $(-t^3 - 5t + 4t^2) - (-2t^2 + 7t + 2t^2)$

$= -t^3 + 4t^2 + 2t^2 - 2t^2 - 7t - 5t$

$= -t^3 + 4t^2 - 12t$

36. $-(z + 4) - (-3z + 5)$

$= -z - 4 + 3z - 5$

$= 2z - 9$

37. $(w + 2) - (2w - 9)$

$= w + 2 - 2w + 9$

$= -w + 11$

38. $(3r - 6) - (-5r + 12)$

$= 3r + 5r - 6 - 12$

$= 8r - 18$

39. $(j - 14) - (-7j - 11)$

$= j + 7j - 14 + 11$

$= 8j - 3$

40. $(-2k^2 + 5k - 8k) - (-3k^2 - 2k + 6k) - (-6k^2 + 9k + k)$

$= -2k^2 + 3k^2 + 6k^2 + 5k + 2k - 9k - 8k - 6k - k$

$= 7k^2 - 17k$

41. $(5 - 2t) - (-3 + 9t) - (12 + 4t)$

$= -2t - 9t - 4t + 5 + 3 - 12$

$= -15t - 4$

42. $(-2x + 3y) - (-4x + 12y) - (-x - 7y)$

$= -2x + 4x + x + 3y - 12y + 7y$

$= 3x - 2y$

43. $(-7x - 6y + 13z) - (-4x + 7y) - (-2x + 2y - z)$

$= 7x + 4x + 2x - 6y - 7y - 2y + 13z - 7z + z$

$= 13x - 15y + 7z$

Perform the Combined Operations

44. $(-2st - 3s - 9t) - (-12st + 8t) + (-3s + 2t)$

$= -2st + 12st - 3s - 3s - 9t - 8t + 2t$

$= 10st - 6s - 15t$

45. $(-x + 8y) + (12x - 10y) - (5x - 11y + 5z)$

$= -x + 12x - 5x + 8y - 10y + 11y - 5z$

$= 6x + 9y - 5z$

46. $(-3xy + 8z) + (-4x^2 - 7z) - (-6x^2 - 8xy + 5z)$

$= -4x^2 + 6x^2 - 3xy + 8xy + 8z - 7z - 5z$

$= 2x^2 + 5xy - 4z$

Multiply the following. Leave answer in DESCENDING order.

47. $-2(x-5)$

$= -2x + 10$

48. $-(2t^2 + t - 4)$

$= -2t^2 - t + 4$

49. $4tp(-3t^2 - 7p)$

$= -12t^3p - 28tp^2$

50. $-4k^2(k^2 - k + 2)$

$= -4k^4 + 4k^3 - 8k^2$

51. $-z(-3z - 8)$

$= 3z^2 + 8z$

52. $2x(-2y + 3x - 7z)$

$= -4xy + 6x^2 - 14xz$

53. $xy(-2xyz + 3z - xy)$

$= -2x^2y^2z + 3xyz + x^2y^2$

$= -2x^2y^2z + x^2y^2 + 3xyz$

54. $2st(3s - 4t + st)$

$= 6s^2t - 8st^2 + 2s^2t^2$

$= 2s^2t^2 + 6s^2t - 8st^2$

55. $-2x^2(-x^2 + 3y^2 + z^2)$

$= 2x^4 - 6x^2y^2 - 2x^2z^2$

Divide the following. Leave answer in DESCENDING order

56. $\frac{-6x+15}{3}$

$= -2x+5$

57. $\frac{7t^2+5t}{t}$

$= 7t+5$

58. $\frac{-6x^2-12x+18}{3}$

$= -2x^2-4x+6$

59. $\frac{3q^3+12q^2-15q}{5q}$

$= \frac{3}{5}q^2+\frac{12}{5}q-3$

60. $\frac{-4t^2+2t}{t}$

$= -4t+2$

61. $\frac{-3a^2bc-ab^2c+abc^2}{-abc}$

$= 3a+b-c$

62. $\frac{21z^4-9z^3+3z^2}{-3z^2}$

$= -7z^2+3z-1$

63. $\frac{12r^{12}+8r^3-4r^2}{-2r^{-2}}$

$= -6r^{14}-4r^5+2r^4$

64. $\frac{-a^2b^2c+ab^2c^2-a^2b^2c^2}{-ab^2c}$

$= a-c+ac$

$= ac+a-c$

Perform the Combined Operations. Answer in DESCENDING order.

65. $-3(-2x^2 - 7x) + 5x(3x + 6)$

$= 6x^2 + 21x + 15x^2 + 30x$

$= 21x^2 + 51x$

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66. $\frac{-2t(t^2+4t)}{t} - 3t(-4t - 7)$

$= -2t^2 - 8t + 12t^2 + 21t$

$= 10t^2 + 13t$

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67. $\frac{7q(3q^2+4q)}{7} + \frac{9q(4q^2-q)}{3}$

$-q(3q^2+4q) + 3q(4q^2-q)$

$= -3q^3 - 4q^2 + 12q^3 - 3q^2$

$= 9q^3 - 7q^2$

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68. $\frac{-3z^3(z-3)}{3} - \frac{4z^2(3z+6z^2)}{3}$

$= -z^3(z-3) + 4z^2(z + 2z^2)$

$= -z^4 + 3z^3 + 4z^3 + 8z^4$

$= 7z^4 + 7z^3$