Unit 2 Test Study Guide
(Algebraic Expressions)

Name: _____

Date: _____ Per: _____

Topic 1: Translating Expressions

Directions: Translate each expression.

1. "the product of -6 and a number" $-6n$	**2.** "the difference between a number and 25" $n-25$
3. "17 more than the quotient of a number and 4" $\frac{n}{4}+17$	**4.** "13 less than two-thirds of a number" $\frac{2}{3}n-13$
5. "the sum of renting bowling shoes and $3 per game" $3g+s$	**6.** "nine subtracted from twice a number" $2n-9$

Topic 2: Simplifying Expressions

Directions: Simplify each expression.

7. $18-6x+5x-11$ $-x+7$	**8.** $-2a-6+15a-21+5$ $13a-22$	**9.** $7m+19m-11n-4m+3n$ $22m-8n$
10. $6(w+2)$ $6w+12$	**11.** $-4(2p-7)$ $-8p+28$	**12.** $5(a-2b)$ $5a-10b$
13. $7(5x-2)-29x+10$ $35x-14-29x+10$ $\boxed{6x-4}$	**14.** $-3(2-k)+11-10k$ $-6+3k+11-10k$ $\boxed{-7k+5}$	
15. $18+7(4c-2)-15c$ $18+28c-14-15c$ $\boxed{13c+4}$	**16.** $-19-2(a+9)+5a-3$ $-19-2a-18+5a-3$ $\boxed{3a-40}$	
17. $8p-(5p-13)-27+4p$ $8p-5p+13-27+4p$ $\boxed{7p-14}$	**18.** $-5x-4(x+2y)+9y-7x$ $-5x-4x-8y+9y-7x$ $\boxed{-16x+y}$	

Topic 3: Factoring Expressions

Directions: Factor each expression. If it cannot be factored, write "prime."

19. $3x-15$ $3(x-5)$	**20.** $10c-10$ $10(c-1)$	**21.** $8k+36$ $4(2k+9)$
22. $9r+24$ $3(3r+8)$	**23.** $27r-15$ $3(9r-5)$	**24.** $40a+24b$ $8(5a+3b)$

Directions: Simplify, then factor each expression.

25. $-7m-16+9m+2$ $2m-14$ $\boxed{2(m-7)}$	**26.** $18y-(2y+17)-11$ $18y-2y-17-11$ $16y-28$ $\boxed{4(4y-7)}$
27. $-5+3(10-x)+9x-1$ $-5+30-3x+9x-1$ $6x+24$ $\boxed{6(x+4)}$	**28.** $3a-5(a+2b)+8(4a-b)$ $3a-5a-10b+32a-8b$ $30a-18b$ $\boxed{6(5a-3b)}$

Topic 4: Operations with Monomials

Directions: Complete the following rules.

Zero Exponent	Negative Exponent	Product Rule	Quotient Rule	Power Rule
$x^0 = 1$	$x^{-a} = \frac{1}{x^a}$	$x^a \cdot x^b = x^{a+b}$	$\frac{x^a}{x^b} = x^{a-b}$	$(x^a)^b = x^{ab}$

Directions: Simplify each expression. Final answers must have positive exponents only.

29. $2ab+9ab$ $\boxed{11ab}$	**30.** $-14m^3n^2-2m^3n^2$ $\boxed{-16m^3n^2}$	**31.** $2k^2-2k-8k+k^2$ $\boxed{3k^2-10k}$
32. $5^{10}\cdot 5^2$ $\boxed{5^{12}}$	**33.** $r^{-4}s^2\cdot r^{-3}s^{12}$ $r^{-7}s^{14} = \boxed{\frac{s^{14}}{r^7}}$	**34.** $(-8p^3q^7)(2p^{-1}q^{-7})$ $-16p^2q^0 = \boxed{-16p^2}$
35. $\frac{2^2}{2^9}$ $2^{-7} = \boxed{\frac{1}{2^7}}$	**36.** $\frac{48k^{20}}{-8k^4}$ $\boxed{-6k^{16}}$	**37.** $\frac{3a^{-1}b^2}{6a^8b^{-3}}$ $\frac{1}{2}a^{-9}b^5 = \boxed{\frac{b^5}{2a^9}}$

38. $(4^{-2})^3$

$4^{-6} = \boxed{\frac{1}{4^6}}$

39. $(9c^4d^7)^2$

$\boxed{81c^8d^{14}}$

40. $(-3m^{-5}n^4)^4$

$81m^{-20}n^{16} = \boxed{\frac{81n^{16}}{m^{20}}}$

41. $-2x^7y^4 + \frac{18x^{10}y^3}{3x^3y^{-1}}$

$-2x^7y^4 + 6x^7y^4$

$\boxed{4x^7y^4}$

42. $(2k^3)^4 \cdot -3k^2$

$16k^{12} \cdot -3k^2$

$\boxed{-48k^{14}}$

43. $\frac{8r^7s^{-2}}{10r^4s \cdot 3r^2s^3}$

$\frac{8r^7s^{-2}}{30r^6s^4} = \boxed{\frac{4r}{15s^6}}$

44. $(-6a^5b^7)^2 - 17a^{10}b^{14}$

$36a^{10}b^{14} - 17a^{10}b^{14}$

$\boxed{19a^{10}b^{14}}$

45. $\left(\frac{4}{3}v^7 \cdot 6v^{-4}\right)^2$

$(8v^3)^2$

$\boxed{64v^6}$

46. $18m^9n^2 + 7m^{10}n \cdot -3m^{-1}n$

$18m^9n^2 - 21m^9n^2$

$\boxed{-3m^9n^2}$

47. Subtract $9x^3y$ from $-4x^3y$.

$-4x^3y - 9x^3y$

$\boxed{-13x^3y}$

48. Find the product of $18p^3q^{-15}$ and $3p^5q^4$.

$54p^8q^{-11} = \boxed{\frac{54p^8}{q^{11}}}$

49. Find the quotient of $-28a^{14}b^5$ and $4a^{11}b^6$.

$-7a^3b^{-1} = \boxed{\frac{-7a^3}{b}}$

50. Find $9a^8$ more than the product of $-12a^5$ and $2a^3$.

$-12a^5 \cdot 2a^3 + 9a^8$

$-24a^8 + 9a^8 = \boxed{-15a^8}$

Topic 5: Polynomials

Directions: Write each expression in standard form.

51. $25 - 3x$

$-3x + 25$

52. $-11 - 2p^2 + 8p$

$-2p^2 + 8p - 11$

53. $4y^2 + 25 - 13y + y^3$

$y^3 + 4y^2 - 13y + 25$

Directions: Simplify each expression. Write all final answers in standard form.

54. $(4w - 7) + (2w + 23)$

$6w + 16$

55. $(9h + 10) - (7 + 12h)$

$-3h + 3$

56. $(4x^2 + 13x - 2) + (x^2 - 5x + 16)$

$5x^2 + 8x + 14$

57. $(2a^2 - a - 11) - (4a^2 + 10a - 11)$

$-2a^2 - 11a$

58. $(10 + k^2 - 8k) - (3k + 17 - 2k^2)$

$3k^2 - 11k - 7$

59. $(-2c - 17 + 9c^2) + (24 - 2c^2 - 2c)$

$7c^2 - 4c + 7$

60. What is $7m - 19$ less than $6 - 2m$?

$(6 - 2m) - (7m - 19)$

$\boxed{-9m + 25}$

61. What is $-6p + 1$ increased by $4 - 11p$?

$(-6p + 1) + (4 - 11p)$

$\boxed{-17p + 5}$

Topic 6: Operations with Scientific Notation

Directions: Evaluate each expression. Give all final answers in scientific notation.

62. $(9 \times 10^{-4})(4 \times 10^{10})$

36×10^6

$\boxed{3.6 \times 10^7}$

63. $(8.6 \times 10^{-7})(2.5 \times 10^{-2})$

21.5×10^{-9}

$\boxed{2.15 \times 10^{-8}}$

64. $(2 \times 10^{13}) \div (5 \times 10^3)$

0.4×10^{10}

$\boxed{4 \times 10^9}$

65. $\dfrac{1.1 \times 10^{-2}}{1.6 \times 10^4}$

$.6875 \times 10^{-6}$

$\boxed{6.875 \times 10^{-7}}$

66. $(8.2 \times 10^9) + (2.5 \times 10^8)$

$8.2 \times 10^9 + .25 \times 10^9$

$\boxed{8.45 \times 10^9}$

67. $(4 \times 10^{-3}) - (9.8 \times 10^{-5})$

$4 \times 10^{-3} - .098 \times 10^{-3}$

$\boxed{3.902 \times 10^{-3}}$

68. Asia is approximately 1.7×10^7 square miles while Europe is 3.8×10^6 square miles. How many more square miles is Asia than Europe?

$(1.7 \times 10^7) - (3.8 \times 10^6)$

$1.7 \times 10^7 - .38 \times 10^7$

$\boxed{1.32 \times 10^7 \text{ square miles}}$

69. An average of 3.53×10^5 babies are born each day around the world. How many babies are born around the world in January?

$31 = 3.1 \times 10^1$

$(3.53 \times 10^5)(3.1 \times 10^1)$

10.943×10^6

$\boxed{1.0943 \times 10^7 \text{ babies}}$

70. The volume of the moon is approximately 2.2×10^{10} cubic kiliometers while the volume of the sun is 1.4×10^{18} cubic kilometers. How many times larger is the volume of the sun than the moon?

$\dfrac{1.4 \times 10^{18}}{2.2 \times 10^{10}}$ $\approx .6364 \times 10^8$

$\boxed{\approx 6.364 \times 10^7 \text{ cubic kilometers}}$