

Name: Answer Key

Date: _____

Polynomials Review #1

HW# _____

To Add and Subtract Polynomials:

- combine like terms (same variable and same exponent)
- add/subtract coefficients
- keep the base and do not change the exponents
- write all answers in standard form

*Standard form is when terms are written in order from greatest exponent to least exponent.

1. What is the sum of $(8x^4 + 9x^2 - 7)$ and $(12x^3 - 6x^2 + 8)$?

$$\boxed{8x^4 + 12x^3 + 3x^2 + 1}$$

↙ Standard form

2. Subtract $(14x^3 + 8x^2 - 9)$ from $(10x^3 - 4x^2 + 8x + 2)$ write 1st!

$$10x^3 - 4x^2 + 8x + 2 - (14x^3 + 8x^2 - 9)$$

$$\boxed{10x^3} - \boxed{4x^2} + 8x + 2 - \boxed{14x^3} - \boxed{8x^2} + \boxed{9}$$

$$\boxed{-4x^3 - 12x^2 + 8x + 11}$$

3. What is the perimeter of a square if one side is represented by $7x + 3$?

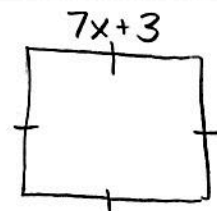
sum of sides

$$\begin{array}{r} 7x+3 \\ 7x+3 \\ 7x+3 \\ + 7x+3 \\ \hline P = 28x+12 \end{array}$$

4 SIDES of a square

$$4(7x+3)$$

$$\boxed{P = 28x + 12}$$



To Multiply Monomials and Polynomials:

- distribute by multiplying the coefficients
- add the exponents of the like bases

4. What is the product of $-3x^2$ and $(7x^2 - 8x + 1)$?

$$-3x^2(7x^2 - 8x + 1)$$

$$\boxed{-21x^4 + 24x^3 - 3x^2}$$

5. Distribute: $4x^2yz^4(-2xy^5z+9x^3y-3xyz)$

$$\boxed{-8x^3y^6z^5 + 36x^7y^2z^4 - 12x^3y^2z^5}$$

6. What is the product of $(x-8)$ and $(x+2)$?

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

OR

	$x + 2$
x	$x^2 + 2x$
-8	$-8x - 16$

Combine Like Terms $x^2 + 2x - 8x - 16$

$$= \boxed{x^2 - 6x - 16}$$

$$\boxed{x^2 - 6x - 16}$$

7. Write the following as a trinomial: $(2x-3)^2 \rightarrow$ Write what's in () twice

Distribute $(2x-3)(2x-3)$

OR

	$2x - 3$
$2x$	$4x^2 - 6x$
-3	$-6x + 9$

Combine Like Terms $= 4x^2 - 6x - 6x + 9$

$$= \boxed{4x^2 - 12x + 9}$$

$$\boxed{4x^2 - 12x + 9}$$

To Divide Monomials and Polynomials:

- if it applies, rewrite each term of the polynomial divided by the monomial
- divide the coefficients
- subtract the exponents of the like bases

8. Divide: $\frac{14m^5n^6p^{10}}{7mn^3p^2}$

$$\boxed{2m^4n^3p^8}$$

9. Simplify the following: $\frac{10x^2y^9 + 25x^3y^8 - 5x^2y}{5x^2y}$

Rewrite:

$$\frac{10x^2y^9}{5x^2y} + \frac{25x^3y^8}{5x^2y} - \frac{5x^2y}{5x^2y}$$

$$= \boxed{2y^8 + 5xy^7 - 1}$$

10. If the area of a rectangle is represented by $18d^9f^7g^{12}$, and the width is represented by $3d^4f^2g^6$, then what is the length represented by?

$l = ?$

$$3d^4f^2g^6 \quad \boxed{A = 18d^9f^7g^{12}}$$

$$\frac{A}{w} = \frac{l \cdot w}{w} \rightarrow l = \frac{18d^9f^7g^{12}}{3d^4f^2g^6}$$

$$\frac{A}{w} = l \quad \boxed{l = 6d^5f^5g^6}$$

To Use the Power Rule:

- raise the coefficient to the power outside the parentheses
- raise each base with an exponent to that same power and multiply the exponents

11. Rewrite each of the following:

a) $(k^8)^3$

$$\boxed{k^{24}}$$

b) $(-4h^6)^2$

$$(-4h^6)(-4h^6)$$

$$= \boxed{16h^{12}}$$

or $(-4)^2(h^6)^2 = 16h^{12}$

c) $(-3m^4n^7p)^5$

$$(-3m^4n^7p)(-3m^4n^7p)(-3m^4n^7p)(-3m^4n^7p)(-3m^4n^7p)$$

$$= \boxed{-243m^{20}n^{35}p^5}$$

OR $(-3)^5(m^4)^5(n^7)^5(p)^5 = -243m^{20}n^{35}p^5$

To Make a Negative Exponent Positive:

- Write its reciprocal (flip) and make the exponent positive

12. Rewrite the following using positive exponents:

a) s^{-5}

$$\boxed{\frac{1}{s^5}}$$

b) $(2m^4)^{-3}$

$$\frac{1}{(2m^4)^3} = \boxed{\frac{1}{8m^{12}}}$$

$\hookrightarrow (2m^4)(2m^4)(2m^4)$

c) $-3x^{-8}$

$$-3\left(\frac{1}{x^8}\right) = \boxed{\frac{-3}{x^8}}$$

To Simplify a Non-Zero Value with a Zero Exponent:

- any non-zero value raise to the zero exponent has a value of 1
- Negative exponents go in the denominator and make the exponent positive
- Positive exponents go in the numerator
- Coefficients always go in the numerator

13. Simplify each of the following:

a) $6x^0$

$$6(1)$$

$$= \boxed{6}$$

b) $\left(\frac{4}{9}y^3\right)^0 + \left(\frac{5}{6}\right)$

$$1 + \frac{5}{6}$$

$$\frac{11}{6} \text{ or } \frac{11}{6}$$

c) $\frac{14x^6y^8}{2x^5y^9}$

$$7y^{-1}$$

$$= \boxed{\frac{7}{y}}$$

Properties:

Replace the question mark with a term that makes the statement true and then name the property being shown:


22. $8 + (2 + 9) = (8 + 2) + ?$ 9 Associative Prop of \oplus

23. $5(\overbrace{7+4}) = 5(7) + ?(4)$ 5 Distributive Property

24. $8 + 1 = ? + 8$ 1 Commutative Prop of \oplus

25. $? \cdot 3 = 3 \cdot 10$ 10 Commutative Prop of \otimes

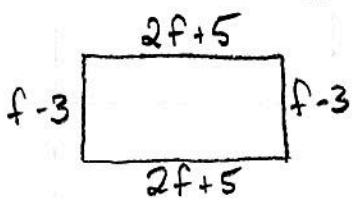
26. The perimeter of a square is $40x + 12$. What is the length of one of its sides?

$P = 40x + 12$ 

$$= \frac{40x + 12}{4} = \boxed{10x + 3}$$

27. The length of a rectangle is $(2f + 5)$ ft. & the width is represented by $(f - 3)$ ft.
Find:

a) the perimeter of the rectangle



$2f + 5$
 $2f + 5$
 $f - 3$
 $f - 3$

OR $\boxed{6f + 4}$

$P = 2l + 2w$

$P = 2(2f + 5) + 2(f - 3)$

$P = 4f + 10 + 2f - 6$

$\rightarrow \boxed{P = 6f + 4}$

b) the area, in square feet, of the rectangle

$A = l \cdot w$

$A = (2f + 5)(f - 3)$

$A = 2f^2 - 6f + 5f - 15$

$\boxed{A = 2f^2 - f - 15}$

28. Multiply $(m + 8)$ by its conjugate and put answer in standard form.

$(m + 8)(m - 8)$

$= m^2 - 8m + 8m - 64$

$= \boxed{m^2 - 64}$

* middle terms
cancel out with conjugates.