

Polynomials Test Review

**Part I:** Write the CAPITAL LETTER of your choice on the available line. You may use your calculator.

1. Find the sum:  $(2x^3 + 5x^2 - 2x + 1) + (-4x^3 + x^2 + 7x - 17)$

A)  $(2x^3 + 4x^2 - 5x - 18)$

B)  $(6x^3 + 6x^2 + 5x + 16)$

C)  $(-2x^3 + 6x^2 + 5x - 16)$

D) none of the above

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2. Add and simplify:  $(t + 4 + 3t^2) + (4t - 8)$

A)  $3t^2 + 3t + 4$

B)  $5t - 4$

C)  $3t^2 + 5t + 4$

D) none of the above

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3. What is the difference when  $-59x^2 + 32xy + 45y$  is subtracted from  $-22x^2 + 15xy - 37y$ ?

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4. Simplify:  $\left(\frac{1}{4}x^2 + \frac{2}{3}x + 4\right) + \left(-\frac{1}{2}x^2 - \frac{5}{3}x - 1\frac{1}{2}\right)$

A)  $\frac{1}{4}x^2 - \frac{2}{3}x + 5\frac{1}{2}$

B)  $-\frac{1}{2}x^2 + x + 3\frac{1}{2}$

C)  $-\frac{1}{4}x^2 - x + 2\frac{1}{2}$

D) none of the above

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5. Evaluate:  $(16x^2y + 14xy - 5x) - (13x^2y - 7xy + 6x - 2)$

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6. Rewrite each of the following without zero or negative exponents.

- A)  $4^{-2}$       B)  $4^0$       C)  $\frac{r^3t^{-2}}{t^{-4}}$       D)  $2x^{-3}$       E)  $\frac{x^{-3}y^6}{x^{-7}y^{-4}}$

7. Write the polynomial in standard form.  $10x^5 + 3 - 2x^7 + 8x^8 - 4x^6$

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8. Simplify:  $4xy + 3x^2 - 2y^2 - xy - 4x^2 + 5y^2$

- A)  $x^2 - 3xy + 2y^2$   
B)  $7x^2 + 5xy + 7y^2$   
C)  $-x^2 + 3xy + 3y^2$   
D) none of the above

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9. The polynomial:  $2x^2y + 5xy^2$  is equal to  $7x^3y^3$ .

- A) *True*  
B) *False*

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10.  $\frac{4xy}{z}$  is an example of a monomial.

- A) *True*  
B) *False*

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11. Simplify:  $5x^2(-2x^3 + 3x^2 + x - 4)$

- A)  $(10x^6 + 15x^4 + 5x^2 - 20)$   
B)  $(-10x^5 + 15x^4 + 5x^3 - 20x^2)$   
C)  $(3x^3 + 8x^2 + 6x + 1)$   
D) none of the above

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12. Simplify  $(6x^4)^5$

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13. Simplify:  $4a^2b(3a^2b + 2ab^2 - 5abc)$

- A)  $7a^4b^2 + 6a^3b^3 - a^3b^2c$
- B)  $12a^4b^2 + 8a^3b^3 + 20a^3b^2c$
- C)  $12a^4b^2 + 8a^2b^2 - 20a^2bc$
- D) none of the above

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14. When multiplying a monomial by a polynomial, the most commonly used property at the first step is the Distributive Property.

- A) *True*
- B) *False*

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15. Evaluate:  $(4xy + y)(2x + 3)$

- A)  $8x^2y + 14xy + 3y$
- B)  $6x^2y + 9xy + 3y$
- C)  $8x^2y + 10xy + 3y$
- D) none of the above

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16. Multiply:  $(x - 6)(3x - 5)$

- A)  $3x^2 - 5x - 30$
- B)  $3x^2 - 23x + 30$
- C)  $x^2 + 18x - 11$
- D) none of the above

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17. Find the solution:  $(2x^2 + 1)(-4x^2 - 3)$

- A)  $-8x^4 - 10x^2 - 3$
- B)  $-2x^2 - 2$
- C)  $-6x^4 - 9x^2 - 3$
- D) none of the above

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18. Simplify:  $(8x^8y^5z^3)(4x^5y^2z)$

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19. The expression  $3x^2y(6x^4y^3 - 7x^2y^5)$  is equal to  $18x^8y^6 - 21x^4y^5$ .

A) *True*

B) *False*

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20. Simplify:  $(x^2 + 2x + 1)(x^2 + 5x + 6)$

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21a. Simplify:  $\frac{18y^3 + 12y^2 - 24y}{3y}$

21b. Simplify:  $\frac{y^2 - 16y}{y}$

22. Simplify:  $(x + 6)^2$

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23. Simplify:  $\frac{4x^3 - 8x^2 + 4x}{4x}$

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24. Simplify:  $(x - 3)^2$

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**Part II:** Show all organized work for the following problems.

25. A) Draw a box diagram to represent  $(x - 3)(x + 6)$ .

B) Find the answer.

26. A) Find the area of a rectangle if the length is represented by  $x^2 - 4x + 2$  and the width is represented by  $x - 5$ . Show all organized work.

B) What is the area of the rectangle if  $x = 6$  units?

27. From the sum of  $6x^2 - 2x + 5$  and  $-3x^2 + 6x + 2$ , subtract  $4x^2 + 3x - 6$ .

28. Given:  $12x^3 + 6x^2 - 2 + 7x^4 + 7 - 3x^2 + 4x^3 - 4x^2 + 8$

A) Simplify the expression and write in standard form.

\_\_\_\_\_

B) How many different terms does the polynomial have?

\_\_\_\_\_

C) What is the degree of the polynomial?

\_\_\_\_\_

D) What the leading coefficient of the polynomial?

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Exponent Rules: ① Add/sub  $\rightarrow$  keep them the same

Name \_\_\_\_\_  
Algebra 1: 8A

② multiply  $\rightarrow$  ADD

Date \_\_\_\_\_

③ Divide  $\rightarrow$  Subtract

Period \_\_\_\_\_

Polynomials Test Review

④ power to power  $\rightarrow$  multiply

**Part I:** Write the CAPITAL LETTER of your choice on the available line. You may use your calculator.

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A)  $(2x^3 + 4x^2 - 5x - 18)$

B)  $(6x^3 + 6x^2 + 5x + 16)$

C)  $(-2x^3 + 6x^2 + 5x - 16)$

D) none of the above

$$\begin{array}{r} (2x^3 + 5x^2 - 2x + 1) \\ + (-4x^3 + x^2 + 7x - 17) \\ \hline -2x^3 + 6x^2 + 5x - 16 \end{array}$$

~~A~~ Don't add exponents

C

2. Add and simplify:  $(t + 4 + 3t^2) + (4t - 8)$

A)  $3t^2 + 3t + 4$

B)  $5t - 4$

C)  $3t^2 + 5t + 4$

D) none of the above

$$\begin{array}{r} (t + 4 + 3t^2) \\ + (4t - 8) \\ \hline 5t - 4 + 3t^2 \\ 3t^2 + 5t - 4 \end{array}$$

~~A~~ Don't add exponents

D

3. What is the difference when  $-59x^2 + 32xy + 45y$  is subtracted from  $-22x^2 + 15xy - 37y$ ?

$$(-22x^2 + 15xy - 37y)$$

$$+ (+59x^2 - 32xy + 45y)$$

$$37x^2 - 17xy - 82y$$

$$(-22x^2 + 15xy - 37y) - (-59x^2 + 32xy + 45y)$$

OR  $-22x^2 + 15xy - 37y + 59x^2 - 32xy - 45y$

$$37x^2 - 17xy - 82y$$

~~A~~ Don't add/sub exponents

4. Simplify:  $(\frac{1}{4}x^2 + \frac{2}{3}x + 4) + (-\frac{1}{2}x^2 - \frac{5}{3}x - 1\frac{1}{2})$

A)  $\frac{1}{4}x^2 - \frac{2}{3}x + 5\frac{1}{2}$

B)  $-\frac{1}{2}x^2 + x + 3\frac{1}{2}$

C)  $-\frac{1}{4}x^2 - x + 2\frac{1}{2}$

D) none of the above

$$\begin{array}{r} (\frac{1}{4}x^2 + \frac{2}{3}x + 4) \\ + (-\frac{1}{2}x^2 - \frac{5}{3}x - 1\frac{1}{2}) \\ \hline -\frac{1}{4}x^2 - 1x + 2\frac{1}{2} \end{array}$$

~~A~~ Don't add exponents

5. Evaluate:  $(16x^2y + 14xy - 5x) - (13x^2y - 7xy + 6x - 2)$

$$(16x^2y + 14xy - 5x) + (-13x^2y + 7xy - 6x + 2)$$

$$3x^2y + 21xy - 11x + 2$$

✗ Don't add/sub exponents

6. Rewrite each of the following without zero or negative exponents.

A)  $4^{-2} = \frac{1}{4^2} = \frac{1}{16}$

B)  $4^0 = 1$

C)  $\frac{x^3t^{-2}}{t^{-2+4}} = \frac{x^3t^2}{t^2}$

D)  $2x^{-3} = \frac{2}{x^3}$

E)  $\frac{x^3y^6}{x^7y^{-4}} = x^{-3-7}y^{6-(-4)} = x^{-10}y^{10} = \frac{1}{x^{10}}y^{10}$

7. Write the polynomial in standard form.  $10x^5 + 3 - 2x^7 + 8x^8 - 4x^6$

$$8x^8 - 2x^7 - 4x^6 + 10x^5 + 3$$

8. Simplify:  $4xy + 3x^2 - 2y^2 - xy - 4x^2 + 5y^2$

A)  $x^2 - 3xy + 2y^2$

B)  $7x^2 + 5xy + 7y^2$

C)  $-x^2 + 3xy + 3y^2$

D) none of the above

$$3x^2 - 4x^2 - 2y^2 + 5y^2 + 4xy - xy$$

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

✗ Don't add exponents

✗ Doesn't have to be in descending power order b/c of multiple variables.

9. The polynomial:  $2x^2y + 5xy^2$  is equal to  $7x^3y^3$ .

- A) True
- B) False

Can't add, they are NOT like terms

10.  $\frac{4xy}{z}$  is an example of a monomial / polynomial; exponents of the variables must be whole numbers

- A) True
- B) False

4xy z  $\rightarrow$  yes! No you! Can't have variables in the denominator

Ex #2  $\sqrt{x} = x^{\frac{1}{2}}$   $\rightarrow$  No you!

11. Simplify:  $5x^2(-2x^5 + 3x^4 + x - 4)$

- A)  $(10x^6 + 15x^4 + 5x^2 - 20)$
- B)  $(-10x^5 + 15x^4 + 5x^3 - 20x^2)$
- C)  $(3x^3 + 8x^2 + 6x + 1)$
- D) none of the above

$$-10x^5 + 15x^4 + 5x^3 - 20x^2$$

✗ Multiply coeff

✗ Add exponents

B



12. Simplify  $(6x^4)^5$   
 $(6)^5 \cdot (x^4)^5 = 7776x^{20}$  or  $(6x^4)(6x^4)(6x^4)(6x^4)(6x^4) = 7776x^{20}$   
*Write 5 times b/c it's to the 5th power*

13. Simplify:  $4a^2b(3a^2b + 2ab^2 - 5abc)$   
 A)  $7a^4b^2 + 6a^3b^3 - a^3b^2c$   
 B)  $12a^4b^2 + 8a^3b^3 + 20a^3b^2c$   
 C)  $12a^4b^2 + 8a^2b^2 - 20a^2bc$   
 D) none of the above  
 $12a^4b^2 + 8a^3b^3 - 20a^3b^2c$   
 \* multiply coeff  
 \* Add exponent

14. When multiplying a monomial by a polynomial, the most commonly used property at the first step is the Distributive Property.  
 A) True  
 B) False

15. Evaluate:  $(4xy + y)(2x + 3)$   
 A)  $8x^2y + 14xy + 3y$   
 B)  $6x^2y + 9xy + 3y$   
 C)  $8x^2y + 10xy + 3y$   
 D) none of the above  
 $8x^2y + (12xy + 2xy) + 3y$   
 $8x^2y + 14xy + 3y$   
 \* multiply coeff  
 \* Add exponents

16. Multiply:  $(x - 6)(3x - 5)$   
 A)  $3x^2 - 5x - 30$   
 B)  $3x^2 - 23x + 30$   
 C)  $x^2 + 18x - 11$   
 D) none of the above  
 $3x^2 - 5x - 18x + 30$   
 $3x^2 - 23x + 30$   
 \* multiply coeff  
 \* Add exponent

17. Find the solution:  $(2x^2 + 1)(-4x^2 - 3)$   
 A)  $-8x^4 - 10x^2 - 3$   
 B)  $-2x^2 - 2$   
 C)  $-6x^4 - 9x^2 - 3$   
 D) none of the above  
 $-8x^4 - 6x^2 - 4x^2 - 3$   
 $-8x^4 - 10x^2 - 3$   
 \* multiply coeff  
 \* Add exponents  
 \* Distribute

18. Simplify:  $(8x^8y^5z^3)(4x^5y^2z)$   
 A)  $32x^{13}y^7z^4$   
 B)  $32x^{13}y^7z^4$   
 C)  $32x^{13}y^7z^4$   
 D)  $32x^{13}y^7z^4$   
 \* Don't Distribute b/c they are not binomials.  
 \* multiply coeff  
 \* Add exponents

19. The expression  $3x^2y(6x^4y^3 - 7x^2y^5)$  is equal to  $18x^8y^6 - 21x^4y^5$ .

A) True

B) False

$$18x^6y^4 - 21x^4y^6$$

✗ mult. coeff  
✗ Add exponent

20. Simplify:  $(x^2 + 2x + 1)(x^2 + 5x + 6)$

$$\begin{aligned} & x^4 + 5x^3 + 6x^2 + 2x^3 + 10x^2 + 12x + x^2 + 5x + 6 \\ & x^4 + 5x^3 + 2x^3 + 6x^2 + 10x^2 + x^2 + 12x + 5x + 6 \\ & \boxed{x^4 + 7x^3 + 17x^2 + 17x + 6} \end{aligned}$$

✗ Distribute  
✗ multiply coeff  
✗ Add exponent

21a. Simplify:  $\frac{18y^3 + 12y^2 - 24y}{3y}$

21b. Simplify:  $\frac{y^2 - 16y}{y}$

$$\begin{aligned} & \frac{18y^3}{3y} + \frac{12y^2}{3y} - \frac{24y}{3y} \quad \leftarrow \begin{array}{l} \text{✗ Divide} \\ \text{coeff} \end{array} \\ & \boxed{6y^2 + 4y - 8} \quad \leftarrow \begin{array}{l} \text{✗ Subtract} \\ \text{exponents} \end{array} \end{aligned}$$

$$\begin{aligned} & \frac{y^2}{y} - \frac{16y}{y} \\ & \boxed{y - 16} \end{aligned}$$

22. Simplify:  $(x + 6)^2$

Must write twice

$$\begin{aligned} & (x+6)(x+6) \\ & x^2 + 6x + 6x + 36 \\ & \boxed{x^2 + 12x + 36} \end{aligned}$$

✗ multiply coeff  
✗ Add exponent

23. Simplify:  $\frac{4x^3 - 8x^2 + 4x}{4x}$

$$\begin{aligned} & \frac{4x^3}{4x} - \frac{8x^2}{4x} + \frac{4x}{4x} \\ & \boxed{x^2 - 2x + 1} \end{aligned}$$

✗ Divide coeff  
✗ Subtract exponent

24. Simplify:  $(x - 3)^2$

Must write twice

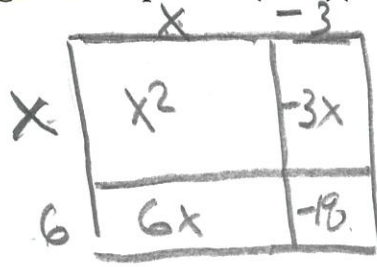
$$\begin{aligned} & (x-3)(x-3) \\ & x^2 - 3x - 3x + 9 \\ & \boxed{x^2 - 6x + 9} \end{aligned}$$

✗ multiply coeff  
✗ Add exponent

**Part II:**

Show all organized work for the following problems.

25. a) Draw a **box diagram** to represent  $(x-3)(x+6)$ .



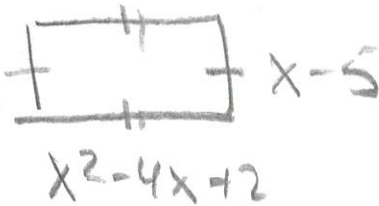
- b) Find the answer.

$$x^2 - 3x + 6x - 18$$

$$\boxed{x^2 + 3x - 18}$$

Don't add exponents

26. a) Find the **area** of a rectangle if the length is represented by  $x^2 - 4x + 2$  and the width is represented by  $x - 5$ . Show all organized work.



$$A = L \cdot W$$

$$A = (x^2 - 4x + 2)(x - 5)$$

$$A = x^3 - 5x^2 - 4x^2 + 20x + 2x - 10$$

$$A = x^3 - 9x^2 + 22x - 10$$

multiply coefficients  
Add exponents

Don't add exponents when combining like terms  
→ length → width

- b) What is the area of the rectangle if  $x = 6$  units?

$$A = x^3 - 9x^2 + 22x - 10$$

$$A = (6)^3 - 9(6)^2 + 22(6) - 10$$

$$A = 216 - 9(36) + 22(6) - 10$$

$$A = 216 - 324 + 132 - 10$$

$$\boxed{A = 140^2}$$

OR

$$A = (x^2 - 4x + 2)(x - 5)$$

$$A = ((6)^2 - 4(6) + 2)(6 - 5)$$

$$A = ((6)^2 - 4(6) + 2)(1)$$

$$A = (36 - 24 + 2)(1)$$

$$A = (14)(1)$$

$$\boxed{A = 140^2}$$

27. From the sum of  $6x^2 - 2x + 5$  and  $-3x^2 + 6x + 2$ , subtract  $4x^2 + 3x - 6$ .

Don't add exponents

$$\begin{array}{r} (6x^2 - 2x + 5) \\ + (-3x^2 + 6x + 2) \\ \hline 3x^2 + 4x + 7 \end{array}$$

or

$$\begin{array}{r} (3x^2 + 4x + 7) \\ + (-4x^2 - 3x + 6) \\ \hline -x^2 + x + 13 \end{array}$$

skip, switch change

Don't add exponents

$$\begin{array}{r} (3x^2 + 4x + 7) - (4x^2 + 3x - 6) \\ 3x^2 + 4x + 7 - 4x^2 - 3x + 6 \\ \hline -x^2 + x + 13 \end{array}$$

28. Given:  $12x^3 + 6x^2 - 2 + 7x^4 + 7 - 3x^2 + 4x^3 - 4x^2 + 8$

a) Simplify the expression and write in standard form.

b) How many different terms does the polynomial have?

c) What is the degree of the polynomial?

d) What is the leading coefficient of the polynomial?

$$7x^4 + 12x^3 + 4x^3 + 6x^2 - 3x^2 - 4x^2 - 2 + 7 + 8$$

$$\underline{7x^4 + 16x^3 - x^2 + 13}$$

Descending Power order

4
4
7

Coefficient of 1<sup>st</sup> term

When they are in  
Descending Power order

or  
the coefficient of the term with the  
highest exponent