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Give the degree of each monomial or polynomial:

1. $6x^3$ 3

6. $-5x^6 + 2x^3$ 6

2. $5x^4p^2$ 6

7. $4m^9 - 2m^6 + 3m$ 9

3. $6x^5p^3m$ 9

8. $2x^6 + 7m^5 - 3p^2$ 6

4. $-8xg$ 2

9. $-6x^3p + 2x^2p^5 - 8x$ 7

5. 11 0

10. $5m^4x + 2m^3x^2 + 3m^2x^6 - 2xm^5$ 8

Name each polynomial based on its degree and number of terms:

11. $7x$ linear monomial

16. $-4x^3 - 6$ cubic binomial

12. $8x^2$ quadratic monomial

17. $8x^2 - 3x + 4$ quadratic trinomial

13. $4x + 2$ linear binomial

18. $2x^3 + 4x^2 + 1$ cubic trinomial

14. $9x^2 - 8$ quadratic binomial

19. $4x^2y - 8xy$ cubic binomial

15. $10m^3$ cubic monomial

20. $5x^4 - 6x^3 + 8x - 3$ 4th degree polynomial

First, write each polynomial in standard form. Then, name it based on its degree and number of terms.

	<u>Standard Form:</u>	<u>Name:</u>
21. $5 + 3x$	$3x + 5$	linear binomial
22. $5x^3 + 4x - x^2$	$5x^3 - x^2 + 4x$	cubic trinomial
23. $8m + 5m^2$	$5m^2 + 8m$	quadratic binomial
24. $7 - 8x^2 + 6x$	$-8x^2 + 6x + 7$	quadratic trinomial

Add or subtract each polynomial. Then name the answer based on its degree and number of terms.

25. $(2x^3 - 4x^2 + 3) + (x^3 - 3x + 1)$	$3x^3 - 4x^2 - 3x + 4$	Cubic polynomial
26. $(6x^2 + 5x) - (3x^2 + 8x)$	$3x^2 - 3x$	quadratic binomials

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Multiply:

1. $6(4x^2 - 3x + 7)$ = $24x^2 - 18x + 42$
2. $5x(2x + 8)$ = $10x^2 + 40x$
3. $-6x(3x^2 + 5x - 2)$ = $-18x^3 - 30x^2 + 12x$
4. $4m(5m^2 - 2m - 1)$ = $20m^3 - 8m^2 - 4m$
5. $x^2(4x + 6)$ = $4x^3 + 6x^2$
6. $-7x^2(3x^2 - 4x + 2)$ = $-21x^4 + 28x^3 - 14x^2$

$$7. 10p^2(8p^5 + 6p^3 - 4p^2 + 3p) = \underline{80p^7 + 60p^5 - 40p^4 + 30p^3}$$

$$8. 3x^3(-2x^6 - 3x^4 + 5x - 4) = \underline{-6x^9 - 9x^7 + 15x^4 - 12x^3}$$

$$9. 6xm(4xm - 3) = \underline{24x^2m^2 - 18xm}$$

$$10. 4x^2p(2x^3p + 5x^2p^2 + xp) = \underline{8x^5p^2 + 20x^4p^3 + 4x^3p^2}$$

$$11. 2m^4x(5m^8x^5 + 3m^6x^3 - 4mx + 1) = \underline{10m^{12}x^6 + 6m^{10}x^4 - 8m^5x^2 + 2m^4x}$$

$$12. -10x^5y^2(3x^3y - 2xy + 5x - 2y - 5) = \underline{-30x^8y^3 + 20x^6y^3 - 50x^6y^2 + 20x^5y^3 + 50x^5y^2}$$

Multiply and then name the answer:

13. $2x(6x^2 - 5x + 3) = \underline{12x^3 - 10x^2 + 6x}$ Name: Cubic Trinomial

14. $5x(2x + 6) = \underline{10x^2 + 30x}$ Name: Quadratic Binomial

15. $3x(4x^2 - 1) = \underline{12x^3 - 3x}$ Name: Cubic Binomial

Greatest Common Factor

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Example 2: The highest number that divides exactly into two or more numbers.

The common factor of a polynomial is the _____ and _____ that are _____ to each term.

Find the **variables** common factor of the terms of **number** common

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

$$\text{GCF} = \underline{\hspace{2cm}}$$

✓ Understanding Check:

Name the greatest common factor of each polynomial.

a. $5v^5 + 10v^3$

$(5) 1 \cdot v \cdot v \cdot v \cdot v \cdot v + 2 (5) v \cdot v \cdot v$

$(5) \text{GCF} = \underline{5v^3}$

b. $3t^2 - 18$

$(3) t \cdot t - (3) 6$

$\text{GCF} = \underline{3}$

c. $4b^3 - 2b^2 - 6b$

$(2) 2 \cdot b \cdot b \cdot b - (2) b \cdot b - (2) 3 \cdot b$

$\text{GCF} = \underline{2b}$

Page 136**Example 3: Factoring Out a Monomial**

Now you are ready to factor. To factor a polynomial, reverse the distributive property.

*****Factoring completely***** means factoring out the greatest common factor.

1. Factor: $\frac{18x^5}{6x^3} - \frac{12x^4}{6x^3} + \frac{24x^3}{6x^3}$

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

To reverse distribution...

Step 1: Find the GCF = $6x^3$

Step 2: Divide each term by the GCF. Write the GCF in front of the parentheses.

GCF =

2. Factor: $\frac{32x^2}{4} + \frac{48x}{11} + \frac{60}{4}$

$$4(8x^2 + 12x + 15)$$

$$GCF = 5xp$$

3. $15x^4p^3 - 20x^3p^2 + 35x^2p^3 - 5xp$

$3 \cdot 5 \cdot 1 \cdot 1 \cdot 1 \cdot 1 \cdot 1 \cdot 1 \cdot 1 \cdot 1$ $2 \cdot 2 \cdot 1 \cdot 1 \cdot 1 \cdot 1 \cdot 1 \cdot 1 \cdot 1 \cdot 1$ $5 \cdot 7 \cdot 1 \cdot 1 \cdot 1 \cdot 1 \cdot 1 \cdot 1 \cdot 1 \cdot 1$ $5 \cdot 1 \cdot 1 \cdot 1 \cdot 1 \cdot 1 \cdot 1 \cdot 1 \cdot 1 \cdot 1$

$$5xp(3x^3p^2 - 4x^2p + 7xp^2 - 1)$$

✓ Understanding Check:

Factor completely:

$$\begin{array}{c} \sim \sim \sim \\ \text{a. } 8x - 12 \end{array}$$

$$\text{b. } 5d^3 + 10d$$

$$\text{c. } 6m^3 - 12m^2 - 24m$$

$$4(\quad)$$

$$\text{d. } 5x^3 + 11x^2$$

$$\text{e. } 4x^5 + 6x^4 - 8x^3 - 2x$$

$$\text{f. } 60x^4m^3 + 40x^3m^2 - 50x^2m$$

$$x^2(\quad)$$

✓ Understanding Check:

Factor completely:

$$\begin{array}{c} \text{a. } \frac{8x}{4} - \frac{12}{4} \\ \downarrow \quad \downarrow \quad \downarrow \\ 4(2x - 3) \end{array}$$

$$\begin{array}{c} \text{b. } \frac{5d^3}{5d} + \frac{10d}{5d} \\ \downarrow \quad \downarrow \quad \downarrow \\ 5d(d^2 + 2) \end{array}$$

$$\begin{array}{c} \text{c. } \frac{6m^3}{6m} - \frac{12m^2}{6m} - \frac{24m}{6m} \\ \downarrow \quad \downarrow \quad \downarrow \\ 6m(m^2 - 2m - 4) \end{array}$$

$$\begin{array}{c} \text{d. } \frac{5x^3}{x^2} + \frac{11x^2}{x^2} \\ \downarrow \quad \downarrow \quad \downarrow \\ x^2(5x + 11) \end{array}$$

$$\begin{array}{c} \text{e. } \frac{4x^5}{2x} + \frac{6x^4}{2x} - \frac{8x^3}{2x} - \frac{2x}{2x} \\ \downarrow \quad \downarrow \quad \downarrow \quad \downarrow \\ 2x(2x^4 + 3x^3 - 4x^2 - 1) \end{array}$$

$$\begin{array}{c} \text{f. } \frac{60x^4m^3}{10x^2m} + \frac{40x^3m^2}{10x^2m} - \frac{50x^2m}{10x^2m} \\ \downarrow \quad \downarrow \quad \downarrow \\ 10x^2m(6x^2m^2 + 4xm - 5) \end{array}$$

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Homework

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