

Key

Powers of Monomials

Example:

$$(4x^3)^2$$

- Step 1: Raise the coefficient to the outer exponent
- Step 2: Use the **POWER RULE** to simplify the exponents/variables

POWER RULE:

$$(ax^b)^c = a^c x^{bc}$$

Directions: Use the power rule to simplify the following monomials.

1. $(x^2)^5$

$$x^{10}$$

2. $(cd^2)^3$

$$c^3 d^6$$

3. $-4(mn^4)^3$

$$-4m^3 n^{12}$$

4. $(2x^2y)^5$

$$32x^{10} y^5$$

5. $(-3x^2)^3$

$$-27x^6$$

6. $\left(\frac{1}{2}a^3b^4c^5\right)^3$

$$\frac{1}{8}a^9 b^{12} c^{15}$$

7. $(-2a^4b^6)^2$

$$4a^8 b^{12}$$

8. $(-5x^3y^4)^2$

$$25x^6 y^8$$

9. $(x^3y^3)^3 \cdot xy^2$

$$x^9 y^9 \cdot xy^2 = x^{10} y^{11}$$

10. $a^3 \cdot (a^2b)^4$

$$a^3 \cdot a^8 b^4 = a^{11} b^4$$

11. $(-2ab^2)^2 \cdot (3a^2b)^2$

$$4a^2 b^4 \cdot 9a^4 b^4 = 36a^6 b^8$$

12. $(6a^2b)^3 \cdot \left(\frac{1}{3}abc\right)^2$

$$216a^6 b^3 \cdot \frac{1}{9}a^2 b^2 c^2 = 24a^8 b^5 c^2$$

13. $(2a^2)^3 + (a^4)(3a^2)$

$$8a^6 + 3a^6 = 11a^6$$

14. $(3x^3y)^4 - (7x^5y)^2 \cdot x^2y^2$

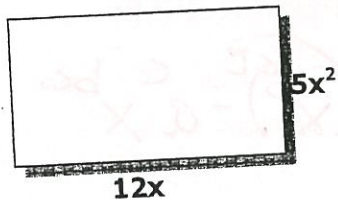
$$81x^{12} y^4 - 49x^{10} y^2 \cdot x^2 y^2$$

$$81x^{12} y^4 - 49x^{12} y^4$$

$$32x^{12} y^4$$

Geometric Applications

1. Find the perimeter and area:



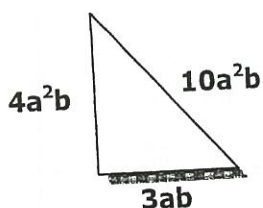
$$P = 2(12x) + 2(5x^2)$$

$$P = 24x + 10x^2$$

$$A = 12x(5x^2)$$

$$A = 60x^3$$

2. Find the perimeter and area:



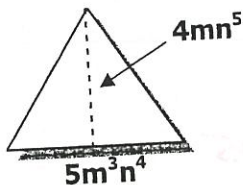
$$P = 4a^2b + 10a^2b + 3ab$$

$$P = 14a^2b + 3ab$$

$$A = \frac{1}{2}(4a^2b)(3ab)$$

$$A = 6a^3b^2$$

3. Find the perimeter and area:

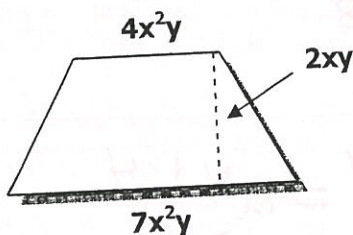


$$P = (5m^3n^4)3 = 15m^3n^4$$

$$A = \frac{1}{2}(5m^3n^4)(4mn^5)$$

$$A = 10m^4n^9$$

4. Find the area:

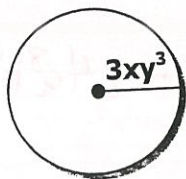


$$A = \frac{b_1 + b_2}{2} \cdot h$$

$$A = \frac{4x^2y + 7x^2y}{2} \cdot 2xy$$

$$A = \frac{11x^2y}{2} \cdot 2xy = \frac{22x^3y}{2} = 11x^3y$$

5. Find the area:



$$A = \pi (3xy^3)^2$$

$$A = \pi 9x^2y^6$$

$$A = 9\pi x^2y^6$$