


- $$\frac{37}{37}$$



Powers are a short form for *repeated multiplication*.

e.g. $4^6 = (4)(4)(4)(4)(4)(4) = 4096$, $\left(-\frac{2}{3}\right)^3 = \left(-\frac{2}{3}\right)\left(-\frac{2}{3}\right)\left(-\frac{2}{3}\right) = -\frac{8}{27}$

e.g. The mass of the sun is about 20000000000000000000000000000000 kg (2 nonillion kg). It is much easier to write this as 2×10^{30} kg.

<i>Symbol</i>	<i>English Equivalent</i>
+	sum , plus, added to, more than, increased by, gain of, total of, combined with
−	difference , minus, subtracted from, less than, fewer than, decreased by, loss of
×	product , times, multiplied by, of, factor of, double (×2), twice (×2), triple (×3)
÷	quotient , divided by, half of (÷2), one-third of (÷3), per, ratio of
=	is , are, was, were, will be, gives, yields

1. Complete the following table. (4 /4)

English	Algebraic Expression	English	Algebraic Equation
Six less than a number	$x - 6$	Double a number plus 5 is 1.	$2x + 5 = 1$
Two decreased by a number.	$2 - y$	When a number is decreased by 4 and the result is tripled, 7 is obtained.	$3(y - 4) = 7$

2. **Fully** simplify each of the following expressions. (8/8)

(a) $-5x + 4y - 3x - 6y$

$$= -5x - 3x + 4y - 6y$$
$$= -8x - 2y$$

(b) $(-xy + x^2y) + (13xy - 3x^2y) - (5x^2y + 14xy)$

$$\begin{aligned} &= -xy + x^2y + 13xy - 3x^2y + (-5x^2y - 14xy) \checkmark \\ &= -xy + x^2y + 13xy - 3x^2y - 5x^2y - 14xy \checkmark \\ &= -1xy + 13xy - 14xy + 1x^2y - 3x^2y - 5x^2y \checkmark \\ &= -2xy - 7x^2y \checkmark \end{aligned}$$

3. Write each expression as a power. (2 /2)

(a) $-6(6)(6)(6) = \underline{-6^4}$ ✓

(b) $\left(\frac{1}{4}\right)\left(\frac{1}{4}\right)\left(\frac{1}{4}\right) = \left(\frac{1}{4}\right)^3$ ✓

4. Write each power in **expanded form**, then **evaluate**. (4/4)

$$(a) -2^6 = -2(2)(2)(2)(2)(2) \\ = -64$$

$$(b) \left(\frac{2}{3}\right)^4 = \frac{2}{3}\left(\frac{2}{3}\right)\left(\frac{2}{3}\right)\left(\frac{2}{3}\right) \\ = \frac{16}{81}$$

5. **Evaluate** each expression for the given values of the variables. (8/8)

$$(a) -3xy - (x - y)^3, x = 9, y = 7$$

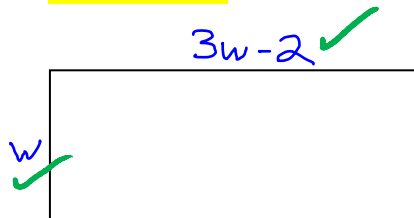
$$= -3(9)(7) - (9 - 7)^3 \\ = -189 - 2^3 \\ = -189 - 8 \\ = -197$$

$$(b) -3xy(x^3 - y^3), x = 9, y = 7$$

$$= -3(9)(7)(9^3 - 7^3) \\ = -189(729 - 343) \\ = -189(386) \\ = -72954$$

6. The length of a rectangle is **two less than triple its width**. (6/6)

- (a) Let w represent the width of the rectangle. Label the width and length with algebraic expressions that contain **ONLY** the variable w .



- (b) Write a **simplified expression** for the perimeter of the rectangle.

$$P = w + 3w - 2 + w + 3w - 2 \\ = w + w + 3w + 3w - 2 - 2 \\ = 8w - 4$$

- (c) Suppose that the perimeter of the rectangle is 72 cm. Find the value of w .

$$P = 72 \\ \therefore 8w - 4 = 72 \\ \therefore 8w - 4 + 4 = 72 + 4 \\ \therefore 8w = 76 \\ \therefore \frac{8w}{8} = \frac{76}{8} \div 4 \\ \therefore w = \frac{19}{2} = 9.5$$

7. Three musicians wrote songs for a new album. They each chose to be paid in a different way. (5/5)

Artist	Fixed Rate (\$)	Royalty (\$ per n albums sold)
Daniel	5000	$2n$
Fatima	—	$5n$
Ayesha	2000	$4n$

- (a) Write an expression for the **total** earnings for **each** artist.

Daniel: $2n + 5000$

Fatima: $5n$

Ayesha: $4n + 2000$

- (b) Write a simplified expression for the total amount paid to Daniel, Fatima and Ayesha.

$$2n + 5000 + 5n + 4n + 2000 \\ = 2n + 5n + 4n + 5000 + 2000 \\ = 11n + 7000$$