Multiplying Integers 16/09/24.

$+2 \times +4 = 8$

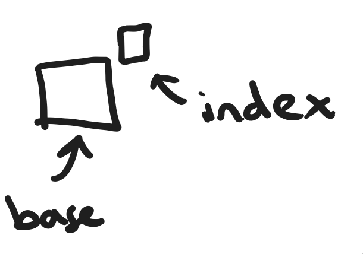
$2 \times 4 = 8$ ✓

$3 \times -6 = -18$

$-4 \times -4 = 16$

$-9 \times 2 = -18$

Index notation



$3^2 = 9$ ✓ (not 6)

$9^2 = 81$

-4^2

? ?

-4×4 OK -4×-4

$-(4)^2 = -16$ ✓

$-4^2 = -16$ ✓

$(-4)^2 = -4 \times -4 = 16$ ✓✓✓

anything that is inside the brackets is SQUARED!!!

$2^2 = 4$ ✓

$-3^2 = -9$ ✓

$(-4)^2 = 16$ ✓

$-(5)^2 = -25$ ✓

$2 \times 2 \times 2 = 2^3$

$-3^3 = -27 = -3 \times \underbrace{3 \times 3}$

$(-3)^3 = -3 \times \underbrace{-3 \times -3} = -27$

$-(3)^3 = -27$

$-3^4 = -3 \times 3 \times 3 \times 3 = -81$

$(-3)^4 = -3 \times -3 \times -3 \times -3 = 81$

$-(3)^4 = -3 \times 3 \times 3 \times 3 = -81$

SQUARE ROOT

$\sqrt{81} = 9$, $\sqrt{49} = 7$ . . .

+ + − − − −

−2 × −4 × +3 × −6 × +4 × +3 ✓

$(-a)^n$ n ? odd / even
1,3,5 2,4,6

$(-2)^{1,3,5}$ a ? + / −

Ans = negative.

$(-1)^n \times (-1)^{n+1}$

a) n is even

$n = 2$

$\underbrace{(-1)^2} \times (-1)^{2+1}$

↓

$(-1)^2 = 1$

$(-1)^3 = -1$

$1 \times -1 = -1$ ✓

$n = 4$

$(-1)^4 \times (-1)^{4+1}$

$(-1)^4 \times (-1)^5$

$= 1 \times -1 = -1$ ✓

b) n is odd (n = 1)

$2^1 = 2$

$(-1)^1 \times (-1)^{1+1}$

$= -1 \times 1 = -1$ ✓

8 0s

11 1s

11 2s

Can $\sqrt{-81} = 9$ ✗ or -9 ✗ ?

$\sqrt{81} = 9$ ✓ and -9? (± 9)

→ $9^2 = 9 \times 9 = 81$ = −81 ✗

→ $(-9)^2 = -9 \times -9 = 81$

$\sqrt[3]{27} = 3$

$\sqrt[3]{-27} = -3$ ✓

$(-3)^3 = -3 \times -3 \times -3 = -27$ ✓

$\sqrt[3]{1} = 1$ ✓

$\sqrt[3]{-81}$ = tricky $4^3 = 64$ $5^3 = 125$

$\sqrt[3]{729} = 9$ ✓

$\sqrt[3]{-1} = -1$ ✓

Understanding

9. For each of the following, write three possible sets of integers that can be placed in the boxes to make the equation a true statement.

a. ☐ × ☐ × ☐ = −12 **b.** ☐ × ☐ × ☐ = 36 **c.** ☐ × ☐ × ☐ × = −36

10. For each of the following, determine whether the result is a positive or negative value. You do not have to work out the value.

a. −25 × 54 × −47 **b.** −56 × −120 × −145 **c.** $-a \times -b \times -c \times -d \times -e$

11. What happens when a number is multiplied by −1? Use some examples to illustrate your answer.

12. The notation −(−3) is a short way of writing −1 × −3.
Write the expression represented by each of the following and then use an appropriate method to determine the answer.

a. −(−2) **b.** −(+3) **c.** −(−5)
d. −(−(+5)) **e.** −(−(−7)) **f.** −(−(+4))

$\frac{+}{+} = +$	$\frac{+}{-} = -$
$\frac{-}{-} = +$	$\frac{-}{+} = -$

Write a couple of different problems that divide different + and - numbers.