

Integers – Lesson 4

In today's lesson we will learn about squaring and cubing negative numbers. As in all our lessons we will also practice some of the skills we learned earlier to help embed them in our long-term memory.

Let us start with some revision.

1) $2 - 9 =$

2) $-9 + 2$

3) $-9 + 19$

4) $-9 + 9$

5) $-9 + -9$

6) $-9 - -9$

7) $0 + -9$

8) $2 + -9$

9) -4×-7

10) -8×0

11) -5×6

12) 5×-6

13) -5×0

14) -5×-6

15) 0×-6

When squaring and cubing negative numbers we will always use brackets. Here's why:-

$(-6)^2$ means $-6 \times -6 = 36$

-6^2 means $6 \times 6 = 36$ with a negative sign in front which is -36

It is particularly important that we get this right from the start. It is also vital to remember to put the brackets in when using a calculator, otherwise you will get the wrong answer.

Take a look at these examples:-

$(-2)^2 = -2 \times -2 = 4$	$(-2)^3 = -2 \times -2 \times -2 = -8$
$(-4)^2 = -4 \times -4 = 16$	$(-4)^3 = -4 \times -4 \times -4 = -64$
$(-8)^2 = -8 \times -8 = 64$	$(-8)^3 = -8 \times -8 \times -8 = -512$

Did you notice that the squares are always positive but the cubes are always negative? This is because, when we multiply a negative number by a negative number the answer is positive. However when we multiply the positive answer by a negative number again to get the cube it is negative.

Now complete these examples:-

26) $(-3)^2$

27) $(-5)^2$

28) $(-3)^3$

29) $(-7)^2$

30) $(-9)^2$

31) $(-5)^3$

32) $(-1)^2$

33) $(-1)^3$

34) $(-10)^2$

35) $(-10)^3$

For each of these examples, write true or false.

36) $(-3)^2 = 9$

37) $(-3)^3 = 27$

38) $-3^2 = 9$

39) $-3^3 = -33$

40) $(-3)^3 = -27$

41) $(-5)^3 = 125$

42) $(-5)^2 = -25$

43) $-5^2 = -25$

44) $-5^3 = 125$

45) $(-10)^3 = 1\ 000$

Finally, draw axes from -5 to 5 and plot the following points, joining them with a ruler or straight edge as you plot them.

46) $(0, 2)$ $(-1, 1)$ $(2, -2)$ $(1, -3)$ $(-2, 0)$ $(-3, -1)$ $(-4, 0)$ $(-1, 3)$