INTEGERS

Multiplication, Part 2

EXAMPLE Look for a pattern in the list of products below to fill in the blanks.

$$-3 \times 3 = -9$$
$$-3 \times 2 = -6$$
$$-3 \times 1 = -3$$
$$-3 \times 0 = 0$$
$$-3 \times (-1) = \underline{\quad}$$
$$-3 \times (-2) = \underline{\quad}$$

As we move down the list, the second factors decrease by 1 and the products increase by 3. We continue the pattern to complete the list of products as shown.

$$-3 \times 3 = -9 \;\Big\rangle{+3}$$
$$-3 \times 2 = -6 \;\Big\rangle{+3}$$
$$-3 \times 1 = -3 \;\Big\rangle{+3}$$
$$-3 \times 0 = 0$$
$$-3 \times (-1) = \underline{\quad}$$
$$-3 \times (-2) = \underline{\quad}$$

$$\longrightarrow$$

$$-3 \times 3 = -9$$
$$-3 \times 2 = -6$$
$$-3 \times 1 = -3$$
$$-3 \times 0 = 0 \;\Big\rangle{+3}$$
$$-3 \times (-1) = \mathbf{3} \;\Big\rangle{+3}$$
$$-3 \times (-2) = \mathbf{6}$$

PRACTICE Look for a pattern in the list of products below to fill in the blanks.

51.
$$-6 \times 2 = \mathbf{-12}$$
$$-6 \times 1 = \mathbf{-6}$$
$$-6 \times 0 = \mathbf{0}$$
$$-6 \times (-1) = \underline{\quad}$$
$$-6 \times (-2) = \underline{\quad}$$
$$-6 \times (-3) = \underline{\quad}$$

52.
$$-4 \times 2 = \underline{\quad}$$
$$-4 \times 1 = \underline{\quad}$$
$$-4 \times 0 = \underline{\quad}$$
$$-4 \times (-1) = \underline{\quad}$$
$$-4 \times (-2) = \underline{\quad}$$
$$-4 \times (-3) = \underline{\quad}$$

53.
$$-7 \times 2 = \underline{\quad}$$
$$-7 \times 1 = \underline{\quad}$$
$$-7 \times 0 = \underline{\quad}$$
$$-7 \times (-1) = \underline{\quad}$$
$$-7 \times (-2) = \underline{\quad}$$
$$-7 \times (-3) = \underline{\quad}$$
$$-7 \times (-4) = \underline{\quad}$$

54.
$$-9 \times 2 = \underline{\quad}$$
$$-9 \times 1 = \underline{\quad}$$
$$-9 \times 0 = \underline{\quad}$$
$$-9 \times (-1) = \underline{\quad}$$
$$-9 \times (-2) = \underline{\quad}$$
$$-9 \times (-3) = \underline{\quad}$$
$$-9 \times (-4) = \underline{\quad}$$

We can use the expression -5×(-6+6) to show that -5×(-6) = 30.

Since -6+6 = 0, and anything times zero is zero, we have

$$-5×(-6+6) = -5×0 = 0.$$

Distributing the -5 gives us:

$$-5×(-6+6) = 0$$
$$(-5×(-6))+(-5×6) = 0.$$

Two quantities that sum to zero are opposites. (-5×(-6))+(-5×6) = 0, so -5×(-6) is the *opposite* of 5×(-6).

Since -5×6 = -30 and the opposite of -30 is 30, we have -5×(-6) = **30**.

We can use a similar process to show that the product of any two negatives is always positive. So, we have the following rules for multiplying integers:

$$(+)×(+) = (+)$$
$$(−)×(−) = (+)$$
$$(+)×(−) = (−)$$
$$(−)×(+) = (−)$$

The product of two numbers with the **same** sign is always **positive**.
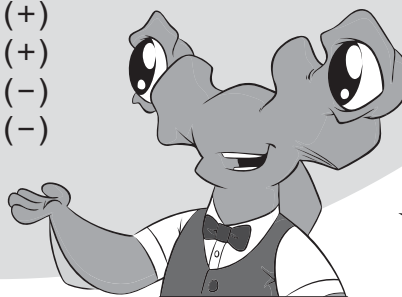
The product of two numbers with **opposite** signs is always **negative**.

PRACTICE | Compute each of the following products.

55. -2×(-6) = _____

56. -13×(-1) = _____

57. -4×7 = _____

58. -6×(-3) = _____

59. 7×(-5) = _____

60. -9×(-9) = _____

61. -60×(-8) = _____

62. 4×19 = _____

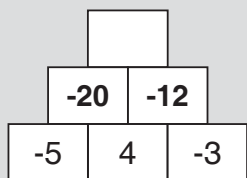**63.** -18×(-5) = _____

64. -130×(-30) = _____

Find more practice problems at BeastAcademy.com!

In a **Block Mountain** puzzle, each block contains an integer.
The number in each block is the product of the two numbers below it.

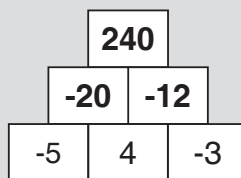**EXAMPLE** | Complete the Block Mountain puzzle below.

-5	4	-3
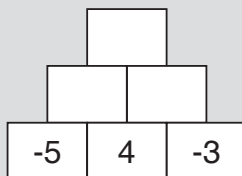
We compute the missing entries as shown below.

-20	**-12**	
-5	4	-3

$-5 \times 4 = \boxed{-20}$.
$4 \times (-3) = \boxed{-12}$.

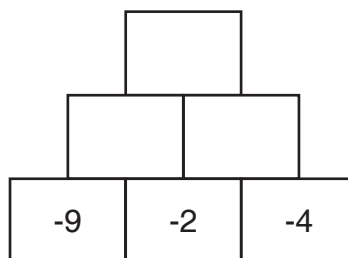|		
240		
-20	**-12**	
-5	4	-3

$-20 \times (-12) = \boxed{240}$.
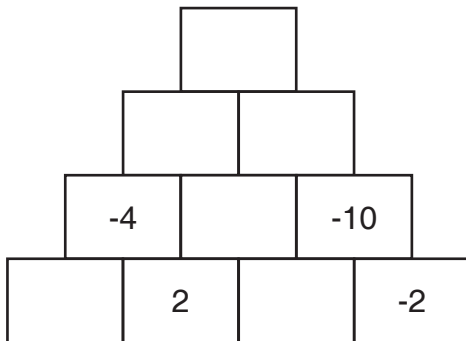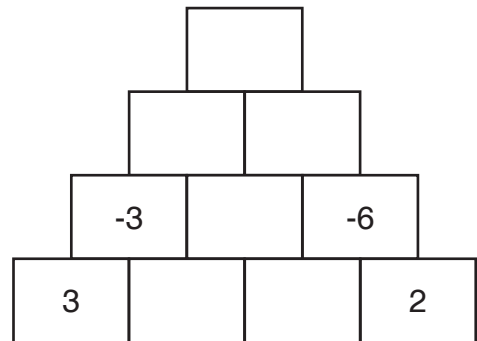
PRACTICE | Complete each Block Mountain puzzle below.

65.

5	-6	3

66.

-9	-2	-4

67.

4	-1	3	-6

68.

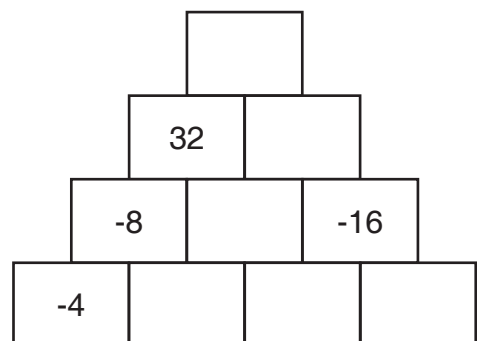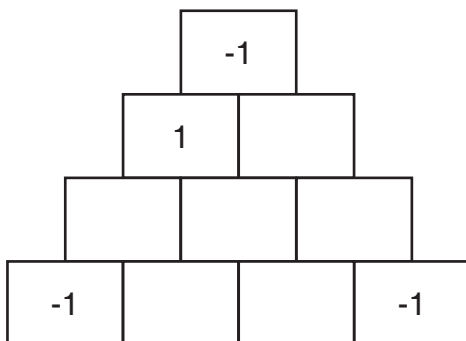|			
-2	-2	5	-1
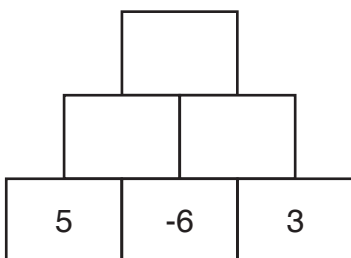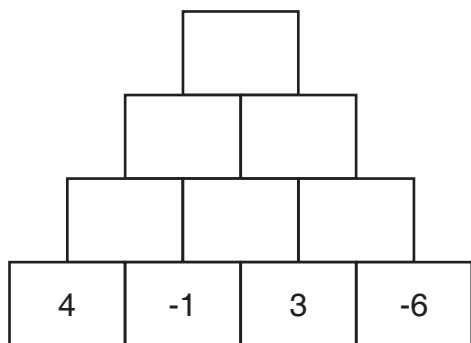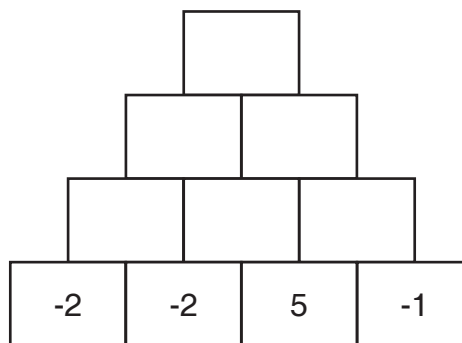
PRACTICE | Complete each Block Mountain puzzle below.

69.

70.

71.

72.

73. ★

74. ★