

EXAMPLE

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

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

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.

$\begin{aligned} -3 \times 3 &= -9 \\ -3 \times 2 &= -6 \\ -3 \times 1 &= -3 \\ -3 \times 0 &= 0 \\ -3 \times (-1) &= \underline{\quad} \\ -3 \times (-2) &= \underline{\quad} \end{aligned}$	→	$\begin{aligned} -3 \times 3 &= -9 \\ -3 \times 2 &= -6 \\ -3 \times 1 &= -3 \\ -3 \times 0 &= 0 \\ -3 \times (-1) &= \mathbf{3} \\ -3 \times (-2) &= \mathbf{6} \end{aligned}$
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PRACTICE

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

51.

$$\begin{aligned} -6 \times 2 &= \mathbf{-12} \\ -6 \times 1 &= \mathbf{-6} \\ -6 \times 0 &= \mathbf{0} \\ -6 \times (-1) &= \underline{\quad} \\ -6 \times (-2) &= \underline{\quad} \\ -6 \times (-3) &= \underline{\quad} \end{aligned}$$

52.

$$\begin{aligned} -4 \times 2 &= \underline{\quad} \\ -4 \times 1 &= \underline{\quad} \\ -4 \times 0 &= \underline{\quad} \\ -4 \times (-1) &= \underline{\quad} \\ -4 \times (-2) &= \underline{\quad} \\ -4 \times (-3) &= \underline{\quad} \end{aligned}$$

53.

$$\begin{aligned} -7 \times 2 &= \underline{\quad} \\ -7 \times 1 &= \underline{\quad} \\ -7 \times 0 &= \underline{\quad} \\ -7 \times (-1) &= \underline{\quad} \\ -7 \times (-2) &= \underline{\quad} \\ -7 \times (-3) &= \underline{\quad} \\ -7 \times (-4) &= \underline{\quad} \end{aligned}$$

54.

$$\begin{aligned} -9 \times 2 &= \underline{\quad} \\ -9 \times 1 &= \underline{\quad} \\ -9 \times 0 &= \underline{\quad} \\ -9 \times (-1) &= \underline{\quad} \\ -9 \times (-2) &= \underline{\quad} \\ -9 \times (-3) &= \underline{\quad} \\ -9 \times (-4) &= \underline{\quad} \end{aligned}$$

INTEGERS

Multiplication, Part 2

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

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

$$-5 \times (-6 + 6) = -5 \times 0 = 0.$$

Distributing the -5 gives us:

$$\begin{aligned} -5 \times (-6 + 6) &= 0 \\ (-5 \times (-6)) + (-5 \times 6) &= 0. \end{aligned}$$

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

Since $-5 \times 6 = -30$ and the opposite of -30 is 30 , we have $-5 \times (-6) = 30$.

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:

$$\begin{aligned} (+) \times (+) &= (+) \\ (-) \times (-) &= (+) \\ (+) \times (-) &= (-) \\ (-) \times (+) &= (-) \end{aligned}$$

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. $-2 \times (-6) = \underline{\hspace{2cm}}$

56. $-13 \times (-1) = \underline{\hspace{2cm}}$

57. $-4 \times 7 = \underline{\hspace{2cm}}$

58. $-6 \times (-3) = \underline{\hspace{2cm}}$

59. $7 \times (-5) = \underline{\hspace{2cm}}$

60. $-9 \times (-9) = \underline{\hspace{2cm}}$

61. $-60 \times (-8) = \underline{\hspace{2cm}}$

62. $4 \times 19 = \underline{\hspace{2cm}}$

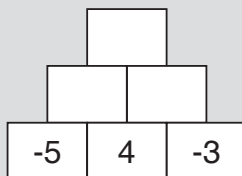
63. $-18 \times (-5) = \underline{\hspace{2cm}}$

64. $-130 \times (-30) = \underline{\hspace{2cm}}$

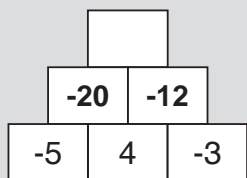
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In a **Block Mountain** puzzle, each block contains an integer. The number in each block is the product of the two numbers below it.

EXAMPLE | Complete the Block Mountain puzzle below.

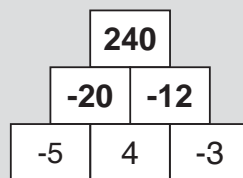


We compute the missing entries as shown below.



$$-5 \times 4 = \boxed{-20}$$

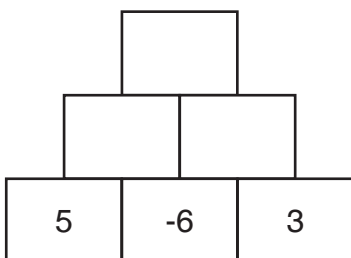
$$4 \times (-3) = \boxed{-12}$$



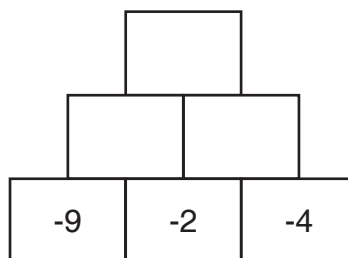
$$-20 \times (-12) = \boxed{240}$$

PRACTICE | Complete each Block Mountain puzzle below.

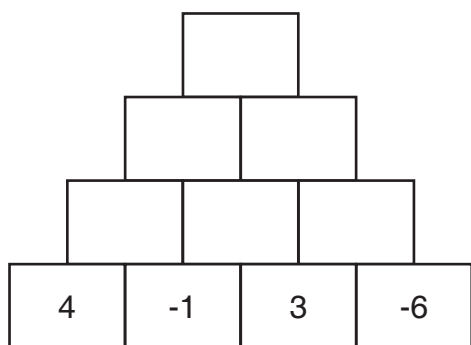
65.



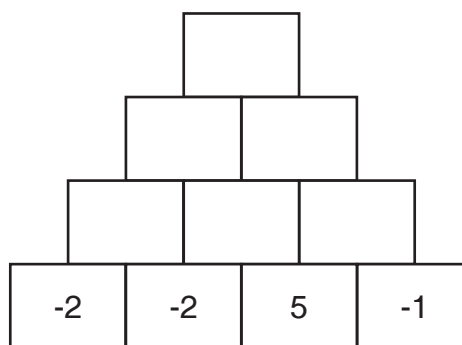
66.



67.

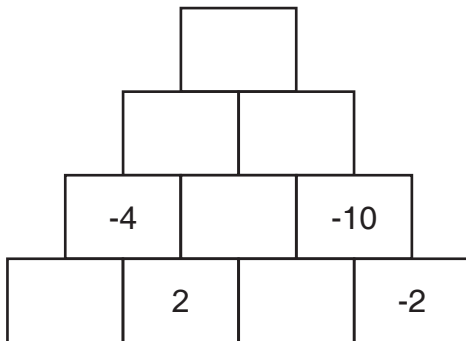


68.

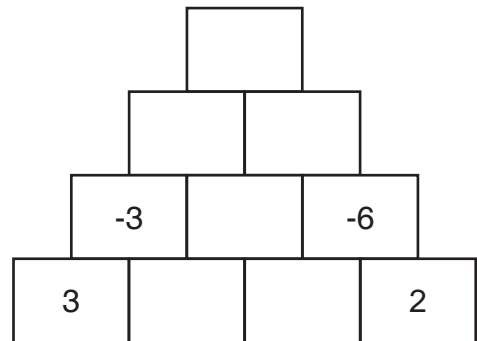


PRACTICE Complete each Block Mountain puzzle below.

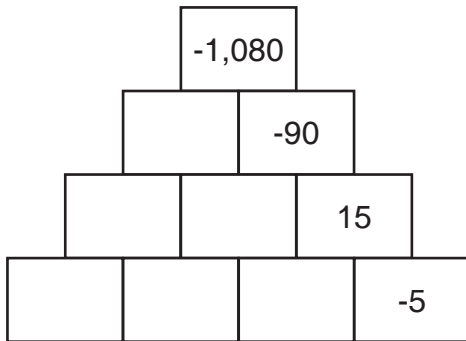
69.



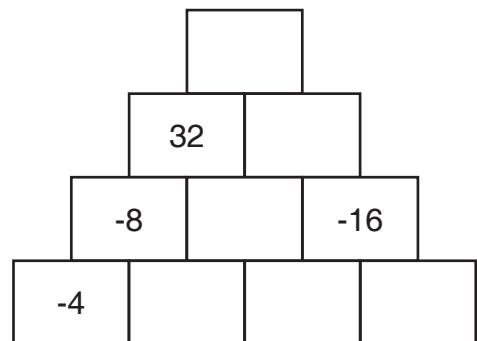
70.



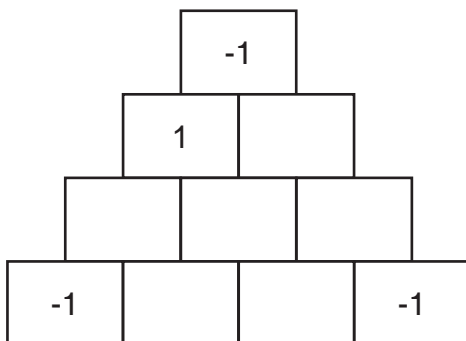
71.



72.



73.
★



74.
★

