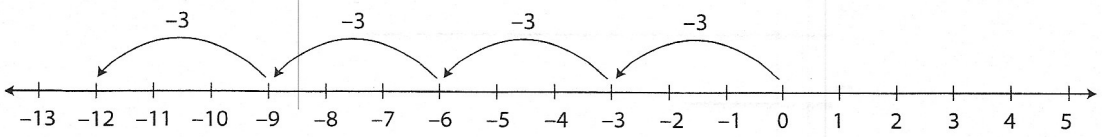
2.1 Using Models to Multiply Integers

Quick Review

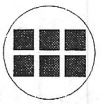
At Home At School

➤ You can think of multiplication as repeated addition.
$4 \times (-3)$ is the same as adding -3 four times.
As a sum: $(-3) + (-3) + (-3) + (-3) = -12$
As a product: $4 \times (-3) = -12$
On a number line:



➤ You can use tiles to multiply integers.
Let a circle represent the bank. The bank has zero value at the start.

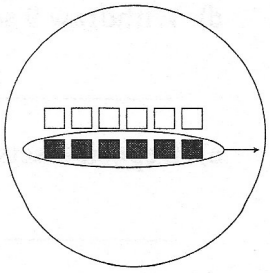
Multiply: $(+2) \times (-3)$
$+2$ is a positive integer.
-3 is modelled with 3 black tiles.
So, put 2 sets of 3 black tiles into the circle.



The 6 black tiles in the circle represent -6.
So, $(+2) \times (-3) = -6$

➤ Multiply: $(-2) \times (-3)$
-2 is a negative integer.
-3 is modelled with 3 black tiles.
So, we need to take 2 sets of 3 black tiles from the circle.

Add zero pairs until there are enough black tiles to remove.
Take out 2 sets of 3 black tiles.



There now are 6 white tiles left in the circle.
So, $(-2) \times (-3) = 6$

Practice

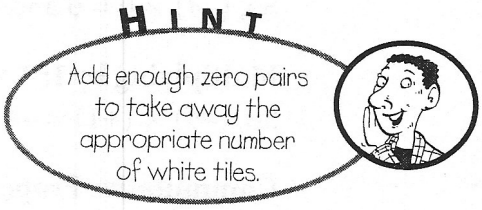
1. Write a multiplication expression for each repeated addition.

a) $(-2) + (-2) + (-2) + (-2) + (-2) = 5 \times$ _____

b) $(+11) + (+11) + (+11) =$ _____

c) $(-5) + (-5) + (-5) =$

c) $(+2) \times (-3) =$ _____ d) $(-4) \times (+5) =$ _____



5. Use a model to represent each product. Draw the model you used each time.

a) $(-3) \times (-4) =$ _____ b) $(+2) \times (-5) =$ _____

c) $(+7) \times (+2) =$ _____ d) $(-3) \times (+6) =$ _____

6. The temperature dropped 2°C each hour for 4 h. Use integers to find the total change in temperature.

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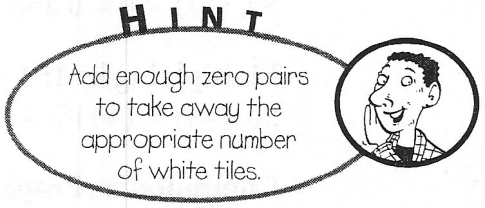

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