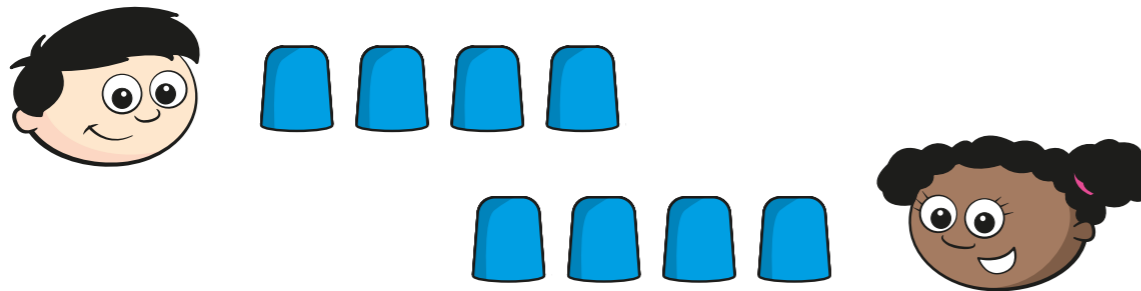


Multiplication of directed numbers

1 Dexter and Whitney each have 4 cups.



a) Each of Dexter's cups contains these counters.



What is the total value of Dexter's counters?

20

Complete the multiplication to represent this.

$$4 \times 5 = 20$$

b) Each of Whitney's cups contains these counters.



What is the total value of Whitney's counters?

-20

Complete the multiplication to represent this.

$$4 \times -5 = -20$$

c) What is the same and what is different?

Talk about it with a partner.

2 Ron has 7 cups.

Each cup contains these counters.



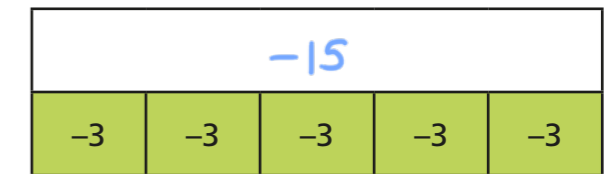
Complete the multiplication to work out the total value of Ron's counters.

$$7 \times -8 = -56$$

3 Use the bar models to help you fill in the missing numbers in the calculations.

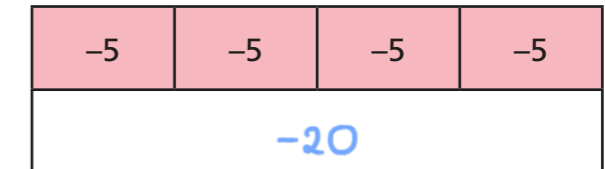
a) $-3 \times 5 = -15$

$5 \times -3 = -15$



b) $-5 \times 4 = -20$

$4 \times -5 = -20$



4 Complete the sequence of multiplications.

$-4 \times 4 = -16$

$-4 \times -1 = 4$

$-4 \times 3 = -12$

$-4 \times -2 = 8$

$-4 \times 2 = -8$

$-4 \times -3 = 12$

$-4 \times 1 = -4$

$-4 \times -4 = 16$

$-4 \times 0 = 0$

What do you notice?

5 Complete the multiplication grid.

x	3	2	1	0	-1	-2	-3
3	9	6	3	0	-3	-6	-9
2	6	4	2	0	-2	-4	-6
1	3	2	1	0	-1	-2	-3
0	0	0	0	0	0	0	0
-1	-3	-2	-1	0	1	2	3
-2	-6	-4	-2	0	2	4	6
-3	-9	-6	-3	0	3	6	9

Talk to a partner about how you completed the grid and what patterns you have noticed.

6 Work out the multiplications.

a) $5 \times 6 = 30$ $5 \times -6 = -30$
 $-5 \times 6 = -30$ $-5 \times -6 = 30$

b) $-3 \times 4 = -12$ $-4 \times -3 = 12$

c) $-5 \times -8 = 40$ $-5 \times 8 = -40$

7 Work out the calculations.

$-3 \times 5 \times 2 = -30$ $-5 \times -2 \times 3 = 30$
 $3 \times 2 \times -5 = -30$ $-3 \times -2 \times -5 = -30$

8 Fill in the missing numbers.

a) $-9 \times 4 = -36$ d) $9 \times 4 = 36$
b) $-12 \times -3 = 36$ e) $18 \times -2 = -36$
c) $36 = -6 \times -6$ f) $-36 \times -1 = 36$

9 Tick the correct calculations.

a) $-3 \times 4 = -4 \times 3$ c) $(-5)^2 = 5^2$
b) $8 \times 5 = -5 \times -8$ d) $-5^2 = (-5)^2$

10 The product of the three number cards is 48

All of the cards are integers and at least one of the cards is negative.

e.g. -8 -6 1

How many different solutions can you find?

Is it possible for all three numbers to be negative? Explain your answer.