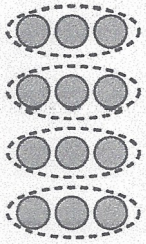
Dividing

- We already know how to divide two positive integers. For example, $(+12) \div (+4) = (+3)$, since division is the opposite of multiplication and $(+3) \times (+4) = (+12)$.
- In a similar way, $(-12) \div (+4) = (-3)$ since $(+4) \times (-3) = -12$.

  We model this calculation by thinking of dividing 12 dark counters into four equal groups and noticing that there are three dark counters (–3) in each group.



$(-12) \div (+4) = -3$

- $(-12) \div (-4) = (+3)$ since $(-4) \times (+3) = (-12)$.

  We model this calculation by thinking: *How many groups of four dark counters are there in 12 dark counters?* Since the answer is three groups, $(-12) \div (-4) = +3$.
- It is difficult to model $(+12) \div (-4)$, but it does make sense that the quotient is –3 since $(-4) \times (+3) = -12$. See Question 11 for another way to understand why $(+a) \div (-b) = -(a \div b)$.

  Notice that $(12) \div (3) = (-12) \div (-3)$ and $(-12) \div (+3) = (+12) \div (-3)$.

7. Model and solve at least three of these.

a) $(-49) \div 7$

b) $49 \div (-7)$

c) $36 \div (6)$

d) $(-81) \div 9$

e) $(-22) \div (-2)$

f) $(-40) \div (-8)$

8. Why does it make sense that $30 \div (-6)$ is negative?

9. Two other integers have the same quotient as $40 \div (-5)$. List three possible pairs of integers.

10. You divide two integers and the quotient is –12. List four possible pairs of integers.

11. a) Complete the pattern. What do you notice?

$(-12) \div (-4) =$

$(-8) \div (-4) =$

$(-4) \div (-4) =$

$0 \div (-4) =$

$4 \div (-4) =$

$8 \div (-4) =$

b) What pattern could you create to show why $(+9) \div (-3) = -3$?

12. Complete the statement to make it true.

a) If you divide a positive integer by a negative one, the result _____

b) If you divide a positive integer by a positive one, the result _____

c) If you divide a negative integer by a negative one, the result _____

d) If you divide a negative integer by a positive one, the result _____.