You can use a number line to "add" integers. Start at zero. Move to the left for negative numbers and to the right for positive numbers.
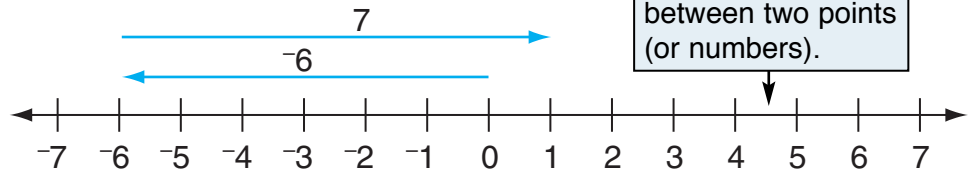
A robot moves 6 units to the left and then 7 units to the right.
Where is the robot now?

$^-6 + 7 =$ __?__
Move left 6, then right 7.
The robot is at 1.
$^-6 + 7 = 1$

A unit is the space between two points (or numbers).

7
$^-6$

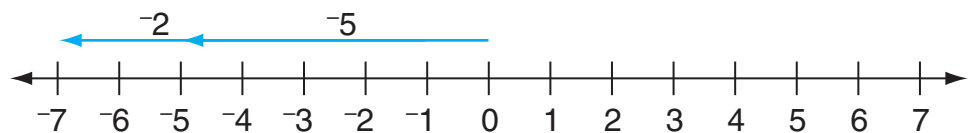| $^-7$ | $^-6$ | $^-5$ | $^-4$ | $^-3$ | $^-2$ | $^-1$ | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

A robot moves 5 units to the left and then 2 more units to the left.
Where is the robot now?

$^-5 + {^-2} =$ __?__
Move left 5, then left 2.
The robot is at $^-7$.
$^-5 + {^-2} = {^-7}$

$^-2$
$^-5$

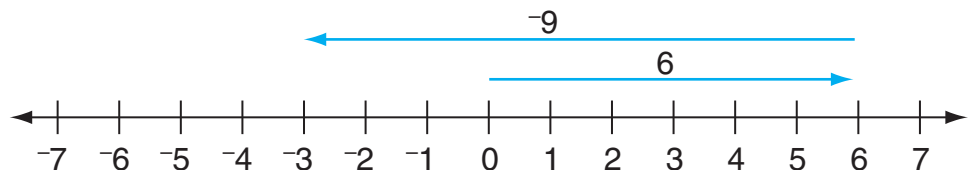| $^-7$ | $^-6$ | $^-5$ | $^-4$ | $^-3$ | $^-2$ | $^-1$ | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

A robot moves 6 units to the right and then 9 units to the left.
Where is the robot now?

$6 + {^-9} =$ __?__
Move right 6, then left 9.
The robot is at $^-3$.
$6 + {^-9} = {^-3}$

$^-9$
6

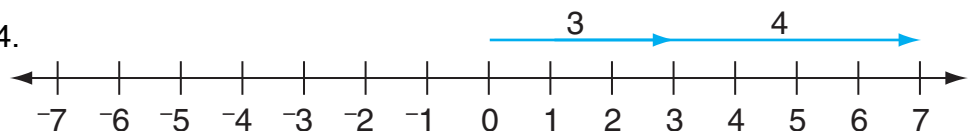| $^-7$ | $^-6$ | $^-5$ | $^-4$ | $^-3$ | $^-2$ | $^-1$ | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

A robot moves 3 units to the right and then 4 more units to the right.
Where is the robot now?

$3 + 4 =$ __?__
Move right 3, then right 4.
The robot is at 7.
$3 + 4 = 7$

3
4

| $^-7$ | $^-6$ | $^-5$ | $^-4$ | $^-3$ | $^-2$ | $^-1$ | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

Adding integers on a number line

The answer is:	Circle two that can be correct.		
1. -2	-12 ÷ 6 =	-12 ÷ -6 =	12 ÷ -6 =
2. 5	10 ÷ -2 =	-10 ÷ -2 =	10 ÷ 2 =
3. -6	-12 ÷ -2 =	-12 ÷ 2 =	12 ÷ -2 =
4. 2	-6 ÷ -3 =	6 ÷ 3 =	-6 ÷ 3 =
5. 4	12 ÷ 3 =	-12 ÷ -3 =	-12 ÷ 3 =
6. -1	8 ÷ -8 =	-8 ÷ -8 =	-8 ÷ 8 =

Using the same factors, write another exercise that has the same answer.

7. 72 ÷ 9 _____

8. -49 ÷ 7 _____

9. -35 ÷ -5 _____

10. 81 ÷ 9 _____

1**1.** -28 ÷ 4 _____

12. -80 ÷ -10 _____

13. 48 ÷ 8 _____

14. 36 ÷ -6 _____

15. 56 ÷ -7 _____

16. 21 ÷ -3 _____

17. -24 ÷ 4 _____

18. -63 ÷ -7 _____

19. Work with a partner. Take turns—one writes a division exercise and the other uses the same factors to write another exercise that has same answer. Show at least three exercises here.

A rational number is a number that can be written as a ratio, $\frac{a}{b}$, where a and b are integers and $b \neq 0$.

The following are all examples of rational numbers.

$\frac{3}{4}$ ← $\frac{a}{b}$ $^-\frac{2}{3}$ 0.3 or $\frac{3}{10}$ $^-2.7$ or $^-2\frac{7}{10}$ or $\frac{27}{10}$ $3\frac{1}{4}$ or $\frac{13}{4}$ $^-5$ or $\frac{^-5}{1}$

You can compare and order rational numbers the same way as integers. The rational number to the left on a number line is the lesser integer.
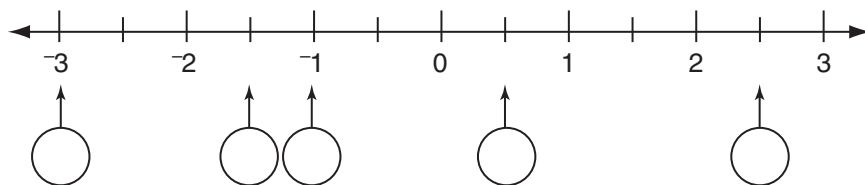

$^-0.5$ is to the right of $^-2.5$
$^-0.5 > ^-2.5$
↑
| is greater than |

$1\frac{1}{2}$ is to the left of $3\frac{1}{4}$
$1\frac{1}{2} < 3\frac{1}{4}$
↑
| is less than |
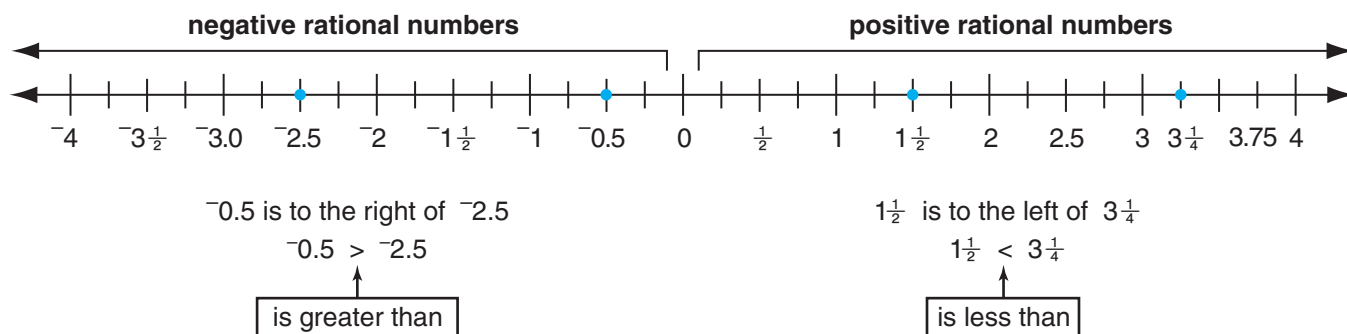
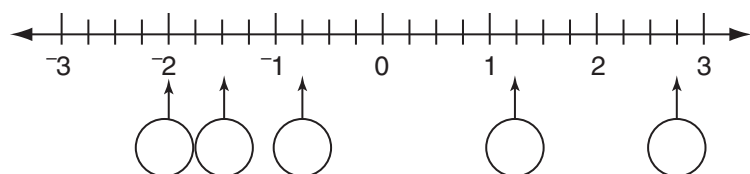Compare. Write >, <, or =. Use the number line if you need to.

1. $^-3\frac{1}{2} \square 2\frac{1}{2}$ **2.** $4 \square ^-3$ **3.** $2 \square \frac{2}{1}$ **4.** $3.75 \square 2.5$

5. $^-\frac{14}{5} \square \frac{8}{5}$ **6.** $3\frac{1}{4} \square \frac{9}{4}$ **7.** $^-0.75 \square ^-0.5$ **8.** $\frac{^-1}{2} \square \frac{^-3}{4}$

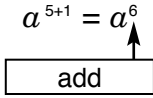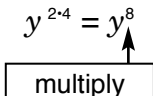Label the given numbers on the number line. Then write the numbers in order from least to greatest.
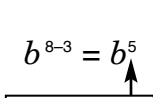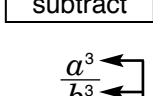
9. $\frac{5}{2}$, $\frac{1}{2}$, $^-\frac{3}{3}$, $^-\frac{3}{1}$, $^-\frac{3}{2}$

_____

10. 2.75, $^-0.75$, $^-1.5$, 1.25, $^-2.0$

_____

You have just learned properties or rules that will help you work with exponents. If you forget these rules, you can think about what the exponent means and write out the factors to simplify expressions.

	Use property	What the exponent tells
$a^5 \cdot a$	$a^{5+1} = a^6$ add	$a \cdot a \cdot a \cdot a \cdot a \cdot a = a^6$
$(y^2)^4$	$y^{2 \cdot 4} = y^8$ multiply	$(y^2)(y^2)(y^2)(y^2) = y \cdot y \cdot y \cdot y \cdot y \cdot y \cdot y \cdot y = y^8$
$(r \bullet s)^3$	$r^3 s^3$ distribute	$(r \bullet s)(r \bullet s)(r \bullet s) = r \cdot r \cdot r \cdot s \cdot s \cdot s = r^3 s^3$
$\dfrac{b^8}{b^3}$	$b^{8-3} = b^5$ subtract	$\dfrac{b \cdot b \cdot b \cdot b \cdot b \cdot b \cdot b \cdot b}{b \cdot b \cdot b} = b \cdot b \cdot b \cdot b \cdot b = b^5$
$\left(\dfrac{a}{b}\right)^3$	$\dfrac{a^3}{b^3}$ distribute	$\dfrac{a \cdot a \cdot a}{b \cdot b \cdot b} = \dfrac{a^3}{b^3}$

Decide whether you will add, subtract, multiply, or distribute the exponent. Then simplify.

1. $(x^3)(3x^2)$ _____

2. $2^2 \cdot 2^3$ _____

3. $(4^2)^3$ _____

4. $(d^3)^2$ _____

5. $(4c)(3c^2)$ $= 4 \bullet 3 \bullet c \bullet c \bullet c =$ _____

6. $(a \bullet b)^3$ _____

7. $y^3 y^4$ _____

8. $(m \bullet n)^4$ _____

9. $\dfrac{r^5}{r^4}$ _____

10. $(5t)^2$ _____

11. $(y^4)^3$ _____

12. $(3r^2 s)(2s^5 \, 2r^2)$ _____

13. $s^5 s^3$ _____

14. $\left(\dfrac{x}{y}\right)^4$ _____

15. $\dfrac{6^9}{6^7}$ _____

16. $(^{-}2x^4)(x^3)(3x^2)$ _____

17. $a^4 a^2$ _____

18. $\left(\dfrac{c}{d}\right)^3$ _____