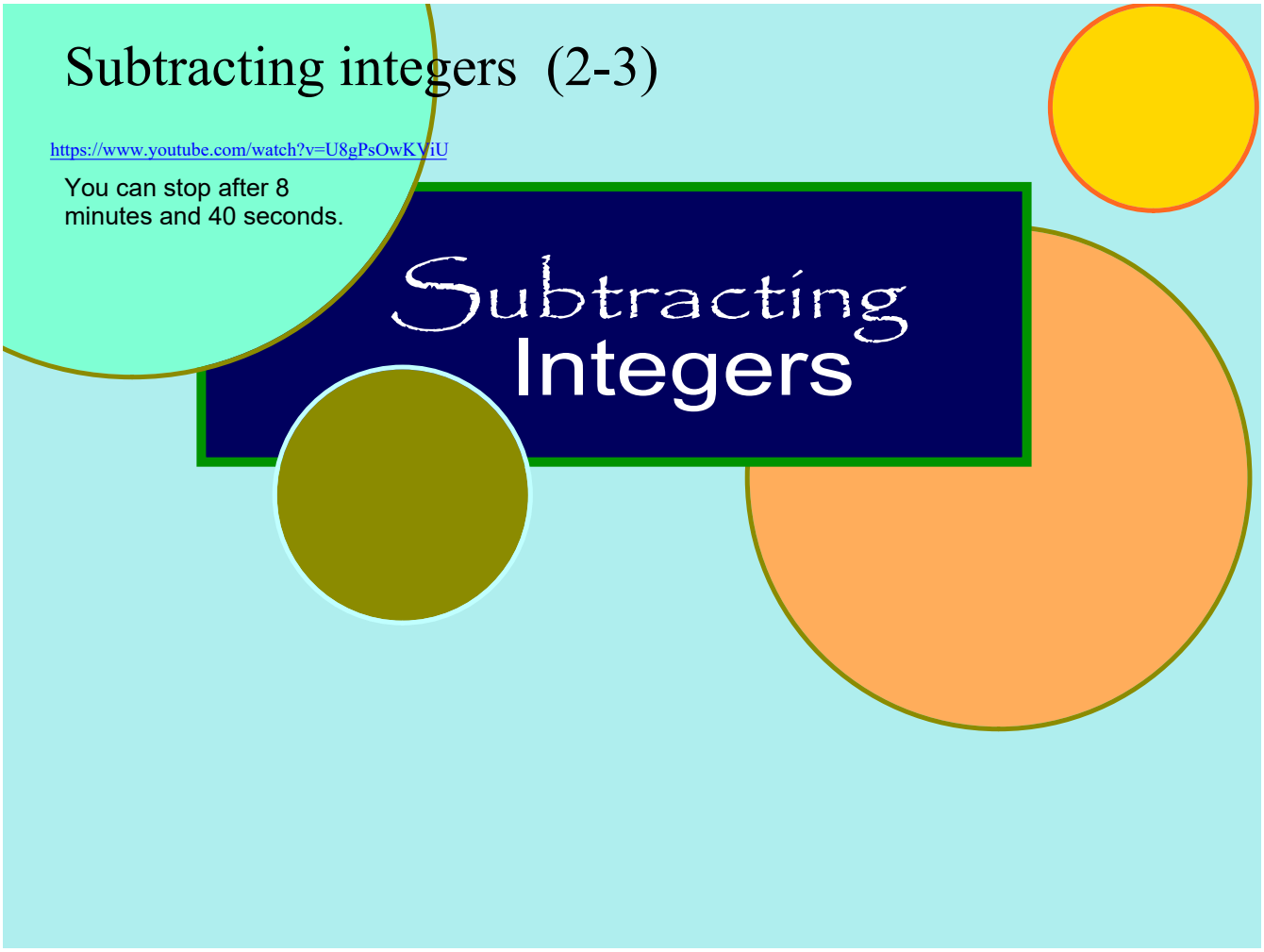
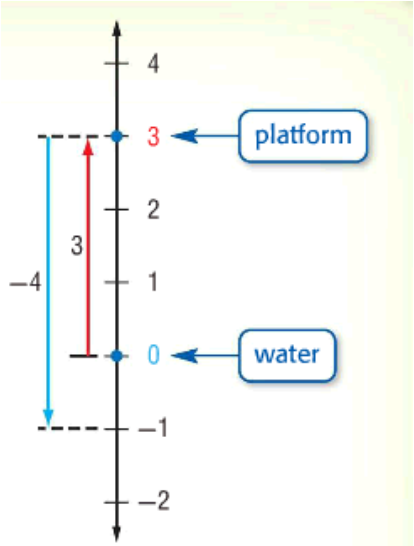

Subtracting integers (2-3)
https://www.youtube.com/watch?v=U8gPsOwKViU
You can stop after 8 minutes and 40 seconds.
Subtracting
Integers

Real-World Link

Diving The platform on a diving board is 3 meters high. The actions of a diver climbing up to the diving board platform and diving 1 meter below the water's surface are shown on the number line at the right.

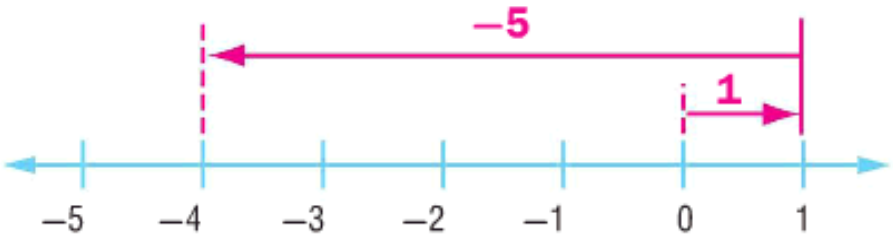


The diver's actions can be represented by the subtraction equation $3 - 4 = -1$.

1. Write a related addition sentence for the subtraction sentence.

$3 + -4 = -1$

2. Use a number line to find $1 - 5$. Then write a related addition sentence for the subtraction sentence.



Difference: -4

Additional sentence: $1 + -5 = -4$

Subtracting Integers, it is as easy as adding.... in fact you have to change it into an addition problem.

Steps to change a subtraction problem into an addition problem

Step 1: keep - the first number

Step 2: add - change the minus sign to addition

Step 3: opposite - change the number ***after*** the subtraction sign to its opposite.

For example: -80 - 20

(KEEP	ADD	OPPOSITE)
-80	+	-20

Now follow rules for addition!

Subtract Integers

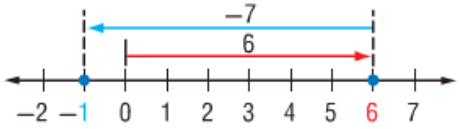
Words	To subtract an integer, add its additive inverse.
Symbols	$p - q = p + (-q)$
Examples	$4 - 9 = 4 + (-9) = -5$ $7 - (-10) = 7 + (10) = 17$

When you subtract 7, the result is the same as adding its additive inverse, −7.

additive inverse

$6 - 7 = -1$ $6 + (-7) = -1$

same result



Examples

keep add opposite

1. Find 8 − 13.

8 + -13 Follow rules for addition

-5

keep add opposite

2. Find −10 − 7.

-10 + -7 Follow rules for addition

-17

Got It? Do these problems to find out.

k a o

a. 6 − 12

6 + -12

-6

k a o

b. −20 − 15

-20 + -15

-35

k a o

c. −22 − 26

-22 + -26

-48

Examples

keep add opposite

3. Find $1 - (-2)$.

$1 + 2$ Follow rules for addition

$\boxed{3}$

keep add opposite

4. Find $-10 - (-7)$.

$-10 + 7$ Follow rules for addition

$\boxed{-3}$

Got It? Do these problems to find out.

keep add opposite

d. $4 - (-12)$

$4 + 12$ Follow rules for addition

$\boxed{16}$

keep add opposite

e. $-15 - (-5)$

$-15 + 5$ Follow rules for addition

$\boxed{-10}$

keep add opposite

f. $18 - (-6)$

$18 + 6$ Follow rules for addition

$\boxed{24}$

Now let's evaluate an expression...

Steps:

1. Write the expression
2. Substitute the value of the variables into the expression
3. Solve

5. **Evaluate $x - y$ if $x = -6$ and $y = -5$.**

$x - y$

$-6 - (-5)$ keep add opposite

$-6 + 5$ Follow rules for addition

-1

6. **Evaluate $m - n$ if $m = -15$ and $n = 8$.**

$m - n$

$-15 - 8$ keep add opposite

$-15 + -8$ Follow rules for addition

-23

Got It? Do these problems to find out.

Evaluate each expression if $a = 5$, $b = -8$, and $c = -9$.

g. $b - 10$

$-8 - 10$ keep add opposite

$-8 + -10$ Follow rules for addition

-18

h. $a - b$

$5 - -8$ keep add opposite

$5 + 8$ Follow rules for addition

13

i. $c - a$

$-9 - 5$ keep add opposite

$-9 + -5$ Follow rules for addition

-14

Example

Tutor

smaller number — larger number

7. **The temperatures on the Moon vary from −173°C to 127°C. Find the difference between the maximum and minimum temperatures.**

Note: DIFFERENCE means to subtract the smaller number from the bigger number. All negative numbers and smaller than positive numbers

$127 - -173$ keep add opposite

$127 + 173$ Follow rules for addition

300

TB

$173 + 127 = 300$

What does this mean: The difference between the maximum and minimum temperatures is 300 degrees.

Got It? Do this problem to find out.

Brenda had a balance of −$52 in her account. The bank charged her a fee of $10 for having a negative balance. What is her new balance?

Expression: $-52 - 10$ keep add opposite

$-52 + -10$ Follow rules for addition

-62

What does this mean: Brenda will have a negative balance of $62.

Try these:

Watch your signs!

1. - 6 - 7 keep add opposite

$-6 + -7$ Follow rules for addition

-13

2. 7 - 15 keep add opposite

$7 + -15$ Follow rules for addition

-8

3. -8 - (-3) keep add opposite

$-8 + 3$ Follow rules for addition

-5

4. 10 - (-18) keep add opposite

$10 + 18$ Follow rules for addition

28

Show your work

Try these:

5. -8 - (-9) keep add opposite

-8 + 9 Follow rules for addition

1

6. 6 - (-3) keep add opposite

6 + 3 Follow rules for addition

9

7. -4 - 2 keep add opposite

-4 + -2 Follow rules for addition

-6

8. 2 - (-1) keep add opposite

2 + 1 Follow rules for addition

3

Guided Practice

Subtract. (Examples 1–4)

1. $14 - 17 =$ keep add opposite

$14 + -17$ Follow rules for addition

-3

2. $14 - (-10) =$ keep add opposite

$14 + 10$ Follow rules for addition

24

3. $12 - 26 =$ keep add opposite

$12 + -26$ Follow rules for addition

-14

4. Evaluate $q - r$ if $q = -14$ and $r = -6$. (Examples 5 and 6)

$q - r$

$-14 - -6$ keep add opposite $= -8$

$-14 + 6$ Follow rules for addition

5. STEM The sea surface temperatures range from $-2°C$ to $31°C$. Find the difference between the maximum and minimum temperatures. (Example 7)

Expression: $31 - -2$ keep add opposite

$31 + 2$ Follow rules for addition

$33°$

What does this mean: The difference is 33 degrees.

6. **Building on the Essential Question** If x and y are positive integers, is $x - y$ always positive? Explain.

$x - y$

$1 - 7$ keep add opposite

$1 + -7$ Follow rules for addition

-6

$x = 1$

$y = 7$

Plug in any values for x and y. Make sure it works every time!

No. If the absolute value of y is bigger than x, you will not get a positive answer.
Also, if x = y, the answer is zero.
Only when x > y will you get a positive result.

Rate Yourself!

How well do you understand subtracting integers? Circle the image that applies.

Clear | Somewhat Clear | Not So Clear

For more help, go online to access a Personal Tutor. Tutor

FOLDABLES Time to update your Foldable!