

Examples 4 in Arithmetic 1

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Examples 4

This is for practice for metal math, too.

Math basics:

Adding together two numbers equal in magnitude but opposite in sign, we get 0.

For instance, what is the number equal to 9 in magnitude but opposite in sign?

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It's -9 . So 9 and -9 are *equal in magnitude* but are *opposite in sign*, and we have this:

$$9 + (-9) = 0.$$

In general, we have $A + (-A) = 0$ or $-A + A = 0$

$$7 + (-7) = 0, \quad -3 + 3 = 0, \quad -12 + 12 = 0$$

Every nonzero number has its negative, and the sum of a nonzero number and its negative is 0.

What if a nonzero number itself is negative?

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Math basics: *The negative of a negative number is positive.*

Negative of negative is positive.

So we have this: $-(-9) = 9$.

And in general, we have this: $-(-A) = A$

Math basics: *Subtracting a number, we can add its negative.*

So we have this: $5 - 3 = 5 + (-3)$

And in general, we have this: $A - B = A + (-B)$

What then about this: $2 - (-3)$?

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Subtracting a number, we can add its negative.

The negative of -3 is $-(-3)$, which is 3.

So we can have this, too:

$$2 - (-3) = 2 + (-(-3)) = 2 + 3$$

And in general, we have this: $A - (-B) = A + B$

Note that you don't have to do calculations the way presented in this book. There can be many ways to get the same. Do the addition as follows.

0. $10 + (-9)$

We have this:

$$9 + (-9) = (-9) + 9 = -9 + 9 = 0.$$

And we can have this: $10 = 1 + 9$, so we can do this: $10 + (-9) = 1 + 9 + (-9) = 1 + 0 = 1$.

And of course, we can do this, too:

$$10 + (-9) = 10 - 9 = 1.$$

What then about this: $-9 + 10$?

We know these: $10 = 9 + 1$ and $-9 + 9 = 0$

And addition is associative.

So we can do this:

$$\begin{aligned} -9 + 10 &= -9 + (9 + 1) = (-9 + 9) + 1 \\ &= 0 + 1 = 1 \end{aligned}$$

Also, addition is commutative, so we can do this, too: $-9 + 10 = 10 + (-9) = 10 - 9 = 1$

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1. $-7 + 14$

$$-7 + 14 = 14 + (-7) = 14 - 7 = 7$$

And in short, $-7 + 14 = 14 - 7 = 7$

Also, we have these:

$$-7 + 7 = 7 + (-7) = 0 \text{ and } 14 = 7 + 7$$

So we can get the same result this way, too:

$$-7 + 14 = -7 + 7 + 7 = 0 + 7 = 7$$

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2. $5 + (-8)$

We can have this: $-8 = -3 + (-5) = -3 - 5$

So we can get this:

$$5 + (-8)$$

$$= 5 + \{-3 + (-5)\}$$

$$= 5 + (-3 - 5)$$

$$= 5 - 3 - 5$$

$$= 0 - 3 = -3$$

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3. $-4 + 10$

$10 = 4 + 6$, so we get this:

$$-4 + 10 = -4 + 4 + 6 = 0 + 6 = 6$$

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4. $-8 + 3$

$-8 = -5 + (-3) = -5 - 3$, so we get this:

$$-8 + 3 = -5 - 3 + 3 = -5$$

5. $18 + (-12)$

$18 = 16 + 2$, so we can get this:

$$18 + (-12) = 6 + 12 + (-12) = 6 + 0 = 6$$

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6. $-15 + 19$

$19 = 15 + 4$, so we can get this:

$$-15 + 19 = -15 + 15 + 4 = 0 + 4 = 4$$

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7. $19 + (-7)$

$19 = 12 + 7$, so we can get this:

$$19 + (-7) = 12 + 7 + (-7) = 12.$$

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8. $47 + (-39)$

$47 = 39 + 8$, so we can get this:

$$47 + (-39) = 39 + (-39) + 8 = 8$$

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9. $-396 + 207$

We can have this:

$$-396 = -296 - 100 = -206 - 190$$

So we can get this:

$$-396 + 207 = -206 - 190 + 207$$

$$= -206 - 1 + 1 - 190 + 207$$

$$= -207 + 1 - 190 + 207 = 1 - 190$$

$$= 1 - (1 + 189) = 1 - 1 - 189 = -189$$

And we can get the same this way, too:

$$\begin{aligned} -396 + 207 &= -200 - 196 + 200 + 7 = -196 + 7 \\ &= -190 - 6 + 7 = -189 - 1 - 6 + 7 \\ &= -189 - 7 + 7 = -189 \end{aligned}$$

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A. $-967 + 189$

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$$-967 = -900 - 60 - 7, \text{ and } 189 = 100 + 80 + 9$$

$$-967 + 189 = -800 + 20 + 2$$

$$= -700 - 100 + 20 + 2 = -700 - 80 + 2$$

$$= -700 - 70 - 10 + 2 = -700 - 70 - 8 = -778$$

B. $628 + (-799)$

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$$-799 = -800 + 1$$

$$628 + (-799) = 628 - 800 + 1$$

$$= 600 + 28 - 600 - 200 + 1 = -200 + 29$$

$$= -100 - 100 + 20 + 9 = -100 - 80 + 9$$

$$= -100 - 70 - 10 + 9 = -171$$

And we can put it this way, too:

$$628 = 630 - 2$$

$$628 + (-799) = 630 - 2 - 799$$

$$= 630 - 1 - 1 - 799 = 630 - 1 - 800$$

$$= 600 + 30 - 1 - 600 - 200$$

$$= 30 - 1 - 200 = -170 - 1 = -171$$

C. $-1937 + 859$

$$-1937 + 859$$

$$= -1900 - 40 + 3 + 800 + 60 - 1$$

$$= -1100 + 20 + 2$$

$$= -1000 - 100 + 20 + 2$$

$$= -1000 - 80 + 2$$

$$= -1000 - 78$$

$$= -1078$$

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D. $9572 + (-40001)$

$$9572 = 9580 - 8 = 9600 - 20 - 8$$

$$= 10000 - 428 = 10000 - 430 + 2$$

$$= 10000 - 500 + 72 = 10000 - 500 + 80 - 8$$

$$-40001 = -40000 - 1$$

$$9572 + (-40001)$$

$$= 10000 - 500 + 80 - 8 - 40000 - 1$$

$$= -30000 - 500 + 80 - 9$$

$$= -30000 - 420 - 9 = -30429$$

Note again, you don't have to do calculations the way above. There can be many ways to get the same.