

Student Name

Mathematics Stage 4

COMPUTATION WITH INTEGERS

Book 3 Multiply and divide positive and
negative integers.

Version: 260207

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OVERVIEW

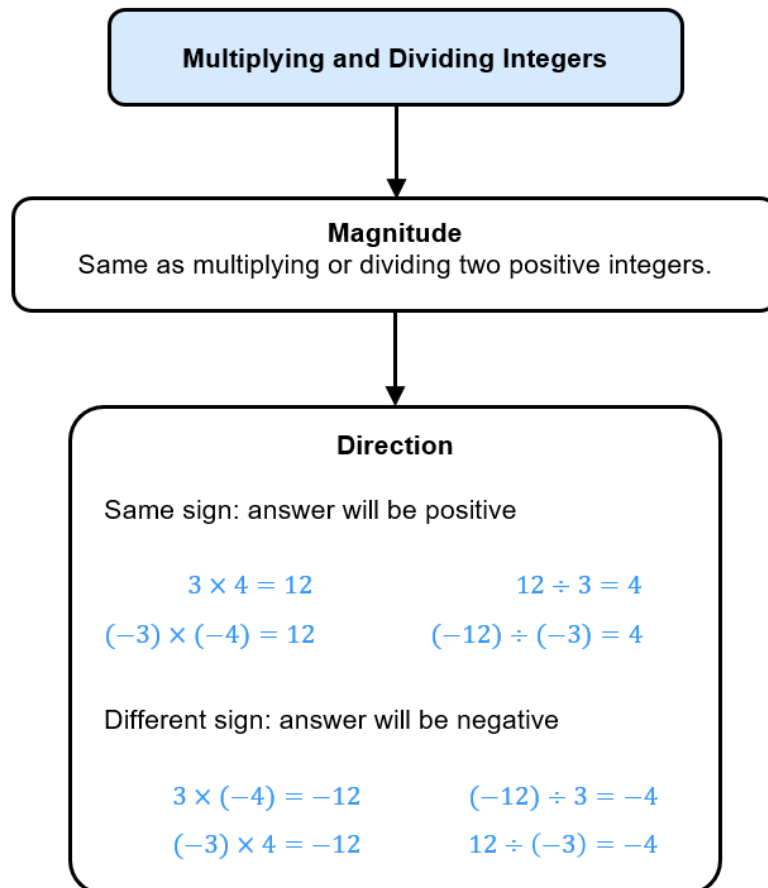
SYLLABUS CONTENT

MA4-INT-C-01 compares, orders and calculates with integers to solve problems

Multiply and divide positive and negative integers

- Represent multiples of negative integers as repeated addition
- Multiply and divide positive and negative integers with and without the use of digital tools

SUMMARY



REVIEW OF PRIOR KNOWLEDGE

1 Work out:

a 7×5

b 4×8

c 9×19

d $2 \times 13 \times 5$

e 36×25

f 17×21

2 Work out:

a $7 + (-3)$

b $-7 - (+2)$

c $11 - (-5)$

d $3 + (-18)$

e $-9 - (-8)$

f $-2 - (-12)$

3 Write the missing number in each equation.

a $3 + 3 + 3 + 3 + 3 = \dots \times 3$

b $12 + 12 + 12 + 12 + 12 + 12 + 12 = \dots \times \dots$

c $5 \times 8 = \dots + \dots + \dots + \dots + \dots$

4 Work out:

a $4 \times (-3) = (-3) + (-3) + (-3) + (-3) =$

b $3 \times (-4) = \dots + \dots + \dots =$

c $6 \times (-2) =$

MULTIPLYING AND DIVIDING INTEGERS

Investigation Multiplying integers.

$3 \times 4 =$

$(-3) \times 4 =$

$3 \times 3 =$

$(-3) \times 3 =$

$3 \times 2 =$

$(-3) \times 2 =$

$3 \times 1 =$

$(-3) \times 1 =$

$3 \times 0 =$

$(-3) \times 0 =$

$3 \times (-1) =$

$(-3) \times (-1) =$

$3 \times (-2) =$

$(-3) \times (-2) =$

$3 \times (-3) =$

$(-3) \times (-3) =$

$3 \times (-4) =$

$(-3) \times (-4) =$

$3 \times (-7) =$

$(-3) \times (-7) =$

$3 \times (-12) =$

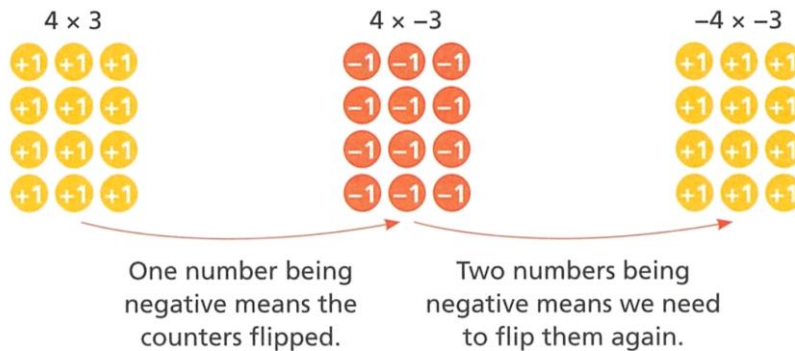
$(-3) \times (-12) =$

The product of two integers of the same sign is always

The product of two integers of different sign is always

MULTIPLYING AND DIVIDING INTEGERS

- When multiplying or dividing two integers:
 - The magnitude will be the same as multiplying or dividing two positive numbers.
 - For the direction:
 - Different signs, answer will be negative.**
 - Same signs, answer will be positive.**



🔗 Multiplication of Integers: <https://www.geogebra.org/m/ek8cwj5t>

Example Multiply and divide negative integers.

$5 \times (-6)$ $= -30$	How do you know the magnitude of a product/quotient of two integers?
$-3 \times (-7)$ $= 21$	<i>The magnitude is the same as when you multiply or divide the</i>
$-36 \div (-4)$ $= 9$	How do you know the direction of a product or quotient of two integers?
$-18 \div 9$ $= -2$	<i>When the signs are the same, the product/quotient is</i>
	<i>When the signs are different, the product/quotient is</i>

Evaluate the following:

a $3 \times (-5)$ -15	b $1 \times (-10)$ -10	c $-8 \div (-4)$ 2
d $-2 \times (-14)$ 28	e $14 \div (-7)$ -2	f $7 \times (-12)$ -84
g $6 \times (-11)$ -66	h $-5 \times (-9)$ 45	i $36 \div (-3)$ -12

Key ideas

- When multiplying two numbers with the same sign, the answer will be
- When multiplying two numbers with sign, the answer will be negative.

1 Fill in the missing numbers, using the pattern.

a

$$2 \times 3 = 6$$

$$2 \times 2 = 4$$

$$2 \times 1 = 2$$

$$2 \times 0 = 0$$

$$2 \times (-1) = \boxed{}$$

$$2 \times (-2) = \boxed{}$$

-2, -4

b

$$3 \times 3 = 9$$

$$2 \times 3 = 6$$

$$1 \times 3 = 3$$

$$0 \times 3 = \boxed{}$$

$$-1 \times 3 = \boxed{}$$

$$-2 \times 3 = \boxed{}$$

0, -3, -6

c

$$6 \div 3 = 2$$

$$6 \div 2 = 3$$

$$6 \div 1 = 6$$

$$6 \div (-1) = \boxed{}$$

$$6 \div (-2) = \boxed{}$$

-6, -3

d

$$-10 \times 3 = -30$$

$$-10 \times 2 = -20$$

$$-10 \times 1 = -10$$

$$-10 \times 0 = \boxed{}$$

$$-10 \times (-1) = \boxed{}$$

$$-10 \times (-2) = \boxed{}$$

0, 10, 20

2 Fill in the multiplication table.

What patterns do you notice?

.....
.....
.....
.....

	-3	-2	-1	0	1	2	3
3				0			
2				0			
1				0			
0	0	0	0	0	0	0	0
-1				0			
-2				0			
-3				0			

Negative $\times$ Positive = Negative; Negative $\times$ Negative = Positive; Positive $\times$ Positive = Positive

3 Show the direction of each result by placing a negative or positive sign in the empty boxes.

a $2 \times (-3) = \boxed{} 6$
-

b $-8 \div 2 = \boxed{} 4$
-

c $-5 \times (-3) = \boxed{} 15$
+

d $-12 \div (-6) = \boxed{} 2$
+

4 Write down the missing number.

a $3 \times 5 = \boxed{}$ so $15 \div 5 = \boxed{}$

15, 3

b $-3 \times 5 = \boxed{}$ so $-15 \div 5 = \boxed{}$

-15, -3

c $3 \times (-5) = \boxed{}$ so $15 \div (-5) = \boxed{}$

-15, -3

d $-3 \times (-5) = \boxed{}$ so $15 \div (-5) = \boxed{}$

15, -3

5 Sort these calculations into two groups.

-5×-4

-3×8

10×-5

11×17

$-8 \div 2$

-176×-32

$64 \div -2$

$-132 \div -10$

Calculations with a positive answer

Calculations with a negative answer

$-5 \times -4 \mid 11 \times 17 \mid -176 \times -32 \mid -132 \div -10$

$-3 \times 8 \mid 10 \times -5 \mid -8 \div 2 \mid 64 \div -2$

6 Calculate the answer to the following

a 2×10

20

b 10×2

20

c $(-10) \times 2$

-20

d $10 \times (-2)$

-20

e $(-10) \times (-2)$

20

f $(-10) \div (-2)$

g $(-10) \div (-2)$

h $10 \div (-2)$

i $(-10) \div 2$

j $10 \times 2 \times 2$

k $10 \times 2 \times (-2)$

l $10 \times (-2) \times (-2)$

m $(-10) \times (-2) \times (-2)$

n $(-10) \div (-2) \times (-2)$

o $10 \times (-2) \div (-2)$

7 Calculate the answer to the following.

a $1 \times (-10)$

-10

b -4×6

-24

c $-2 \times (-14)$

28

d -11×9

-99

e $-7 \times (-11)$

77

f $36 \div (-3)$

-12

g $5 \times (-9)$

-45

h $-36 \times (-2)$

72

i $-100 \div 25$

-4

j $-19 \div (-19)$

1

k $38 \div (-2)$

-19

l $-108 \div 9$

-12

m $78 \div (-6)$

-13

n $-12 \div (-12)$

1

o $3 \times (-5)$

-15

8 Fill in the missing numbers.

a i $48 \div -6 = \square$ -8	ii $48 \div -8 = \square$ -6	iii $-48 \div -4 = \square$ 12	iv $-48 \div 6 = \square$ -8
b i $32 \div -1 = \square$ -32	ii $-32 \div 1 = \square$ -32	iii $-32 \div -1 = \square$ 32	iv $\frac{-32}{-4} = \square$ 8

9 Fill in the missing numbers.

a i $12 \times \square = -48$ -4	ii $-12 \times \square = -48$ 4	iii $-12 \times \square = 48$ -4
b i $\square \div 7 = -4$ -28	ii $\square \div -4 = -7$ 28	iii $\square \div -4 = +7$ -28

10 Fill in the missing numbers.

a $-7 \times -3 = \square$ 21	b $-20 \div 2 = \square$ -10	c $20 \div -2 = \square$ -10	d $-20 \div -2 = \square$ 10
e $4 \times \square = -24$ -6	f $15 \div \square = -3$ -5	g $18 \div \square = 2$ 9	h $\square \div -5 = -6$ 30
i $\square \div 5 = -6$ -30	j $6 \times \square \times 3 = -18$ -1	k $-30 \div \square = 15$ -2	l $8 \times \square = -4$ -0.5

11 Complete these multiplication tables.

a

×		-1	
2			
	-2	2	
-3			-9

1 3
2 -2 6
-2 -6
-3 3

b

×	-2		
	10		
-2		6	
3			-12

-3 -4
-5 15 20
4 8
-6 -9

12 Use these numbers to complete these calculations.

-24
-6
-4
-2
-1
3
4
12

a $\times$ $= 12$

3×4

b $\times$ $= -12$

12×-1

c $\div$ $= -6$

$-24 \div 4$

d $\div$ $= 6$

$-24 \div -4$

Other answers possible.

13 Write down the missing number in these calculations.

a $\square \times (-2) = -8$

b $-32 \div \square = -4$

c $\square \div 7 = -20$

d $-87 \times \square = 261$

e $50 \div \square = -50$

f $-800 \div \square = -20$

14 Here are some number cards



Choose cards to make these statements correct. Find at least two different ways.

$\square \times \square = 24$ $\square \div \square = -6$ $\square \times \square < 100$ $\square \div \square < 1$

$\square \times \square = 24$ $\square \div \square = -6$ $\square \times \square < 100$ $\square \div \square < 1$

15 Calculate the following. Since multiplication and division have equal priority, perform operations from left to right.

a $2 \times (-3) \times (-4)$

b $-10 \div 5 \times 2$

c $-15 \div (-3) \times 1$

d $-2 \times 7 \div (-14)$

e $48 \div (-2) \times (-3)$

f $-36 \times 2 \div (-4)$

g $-8 \div (-8) \div (-1)$

h $46 \div (-2) \times (-3) \times (-1)$

i $-108 \div (-12) \div (-3)$

16 Fractions mean to divide. $\frac{9}{3} = 9 \div 3$. Evaluate the following:

a $\frac{-12}{4}$

b $\frac{12}{-4}$

c $-\frac{12}{4}$

d $\frac{-12}{-4}$

e $\frac{21}{-7}$

f $\frac{-40}{-5}$

g $\frac{-124}{4}$

h $\frac{-100}{20}$

17 Fill in the multiplication table.

×				
		-77		88
4			-36	32
	39	21		
-2				

-13 - 7 - 9 8
11 -143 -99
-52 - 28
-3 27 - 24
26 14 18 - 16

18 Squaring a number means to multiply it by itself: $3^2 = 3 \times 3$ and $(-3)^2 = -3 \times (-3)$. Calculate each of these and make a conclusion.

- a $(-2)^2 =$

c $(-10)^2 =$
- b $(-9)^2 =$

d $(-1.1)^2 =$

4 81
100 1.21

When you square a number, the answer is always p.....

positive

19 2^4 means repeated multiplication: $2 \times 2 \times 2 \times 2$, and $(-2)^4$ means $(-2) \times (-2) \times (-2) \times (-2)$. Calculate:

- a $(-2)^3$

b $(-2)^6$

c $(-3)^3$

d $(-3)^4$

-8 64 -27 81

When you multiply a negative number an even number of times, the answer is

positive

When you multiply a negative number an odd number of times, the answer is

negative

Determine whether the answer to these questions will be positive or negative.

- a $(-65)^{13}$

b $(52)^7$

c $(-43)^{300}$

d $(-2413)^{14}$

negative positive positive positive

20 Find the two integers that:

- a Have a product of -30 and a sum of -1.
- b Have a product of 20 and a sum of -12.
- c Have a product of 18 and a sum of -11.
- d Have a product of -84 and a sum of -5.
- e Have a product of -44 and a sum of 7.

-6, 5
-10, -2
-2, -9
7, -12
-4, 11

CHECK YOUR UNDERSTANDING

Multiplying and dividing integers

1	$-12 \div 2 =$	a	-6	b	6	c	14	d	-8
2	$-3 \times (-5) =$	a	15	b	-8	c	8	d	-15
3	$3 \times (-6) =$	a	-18	b		c	18	d	9
4	$(-4)^2 =$	a	-8	b	8	c	16	d	-16
5	$-10 \div -5$	a	-2	b	2	c	0.5	d	-15
6	Find the missing number. $-5 + (-7) = \dots \times 2$	a	6	b	1	c	-1	d	-6
7	Find the missing number. $-40 \div 2 = -12 - \dots$	a	-8	b	8	c	-32	d	32
8	The product of two numbers is -30, what could the two numbers be?	a	-15 and -2	b	-20 and -10	c	-6 and 5	d	-30 and 0
9	Which calculation is incorrect?	a	$-7 \times 2 = -14$	b	$-7 \times -2 = -14$	c	$7 \times 2 = 14$	d	$7 \times -2 = -14$