

Strand: NUMBER

Unit: Negative Numbers

Text

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Exercises

- What temperature is:

(a) 3°C warmer than -1°C	(b) 6°C colder than -3°C
(c) 5°C warmer than -5°C	(d) 8°C warmer than -7°C
(e) 5°C colder than -2°C	(f) 3°C colder than 1°C
(g) 6°C colder than 2°C	(h) 8°C warmer than -12°C
(i) 10°C colder than -2°C	(j) 20°C warmer than -12°C ?
- What number is;

(a) 3 more than -2	(b) 6 less than 1
(c) 5 more than -7	(d) 6 more than -10
(e) 5 less than -4	(f) 16 less than 3
(g) 5 more than -20	(h) 6 more than 5
(i) 12 less than 10	(j) 20 more than -8 ?
- Write each set of numbers in order with the smallest first.

(a) 6, -7 , 8, -2 , -5 , -10 , 3	(b) 3, -2 , 8, 0, -1 , 1, -3
(c) 5, -7 , -20 , 100, -50 , -90 , 60	
- Put either a $<$ or $>$ sign between each pair of numbers to give a true statement.

(a) 4 2	(b) -6 -2
(c) -3 4	(d) 2 -4
(e) -6 -7	(f) -6 -5
(g) 0 1	(h) -1 0
- Is each statement below true or false?

(a) $6 > 7$	(b) $4 > 3$
(c) $8 > -1$	(d) $5 > -6$
(e) $-6 < -7$	(f) $-1 > 0$
(g) $-3 < 2$	(h) $-7 < 6$
(i) $-4 > -3$	(j) $-5 < -2$
- Write down any integer that could go in the boxes below.

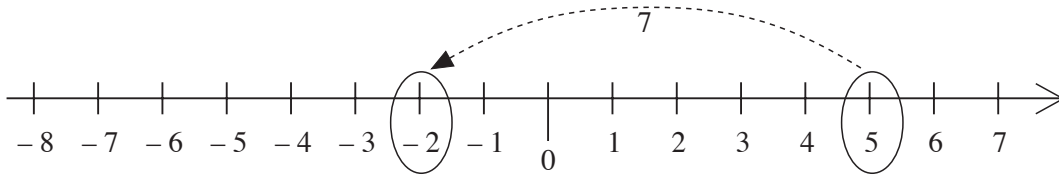
(a) $5 < \square < 7$	(b) $-5 < \square < -3$
(c) $-3 > \square > -7$	(d) $-6 < \square < 0$
(e) $-1 < \square < 2$	



Solution

(a) $5 - 7$

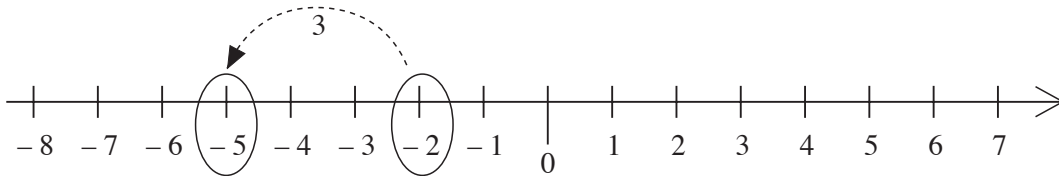
Start at 5 and move 7 to the left:



So, $5 - 7 = -2$.

(b) $-2 - 3$

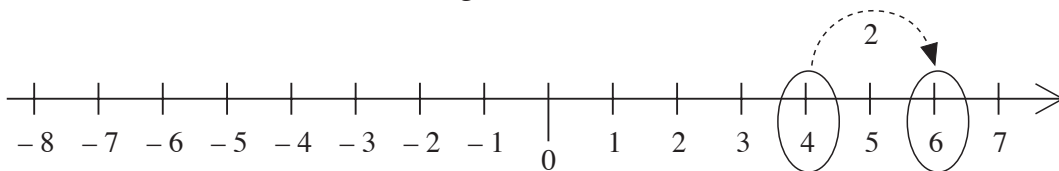
Start at -2 and move 3 to the left:



So, $-2 - 3 = -5$.

(c) $4 - (-2)$

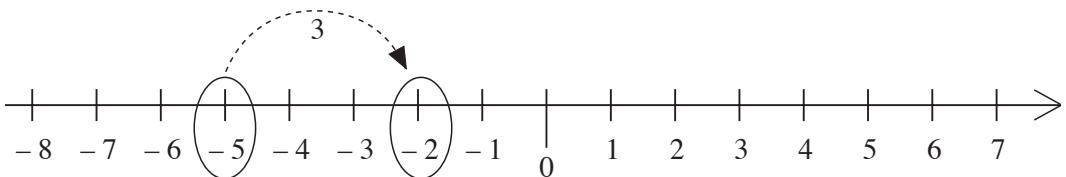
Start at 4 and move 2 to the right:



So, $4 - (-2) = 6$.

(d) $-5 - (-3)$

Start at -5 and move 3 to the right:



So, $-5 - (-3) = -2$.



Exercises

1. Use a number line to work out the following calculations:

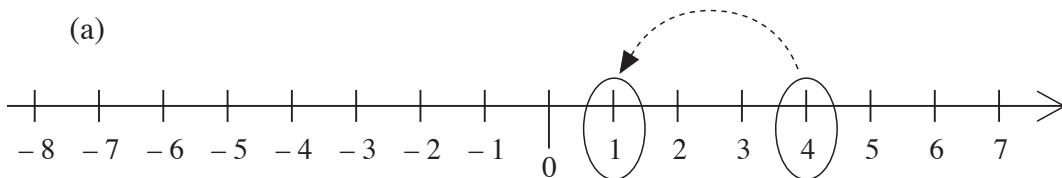
- | | | |
|-----------------|----------------|-----------------|
| (a) $-4 + 6$ | (b) $-5 + 8$ | (c) $-1 + 3$ |
| (d) $-4 + 7$ | (e) $2 + (-3)$ | (f) $-1 + (-4)$ |
| (g) $-2 + (-3)$ | (h) $-6 + 6$ | (i) $-7 + 4$ |
| (j) $-6 + 2$ | (k) $-7 + 2$ | (l) $5 + (-5)$ |

2. Use a number line to calculate:

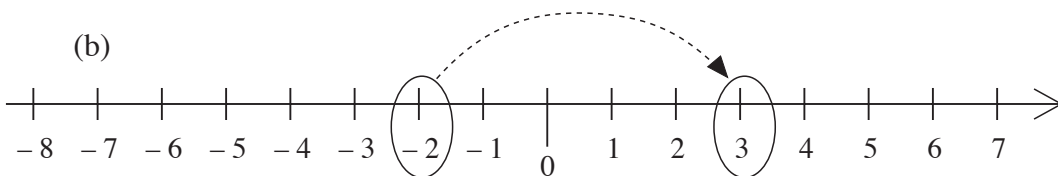
- | | | |
|-----------------|----------------|-----------------|
| (a) $4 - 6$ | (b) $5 - 7$ | (c) $2 - 4$ |
| (d) $-1 - 1$ | (e) $-3 - 2$ | (f) $-4 - (-1)$ |
| (g) $3 - (-4)$ | (h) $5 - (-6)$ | (i) $8 - 12$ |
| (j) $-5 - (-1)$ | (k) $4 - 9$ | (l) $-4 - (-4)$ |

3. Write down the two possible sums that could be shown by each number line below:

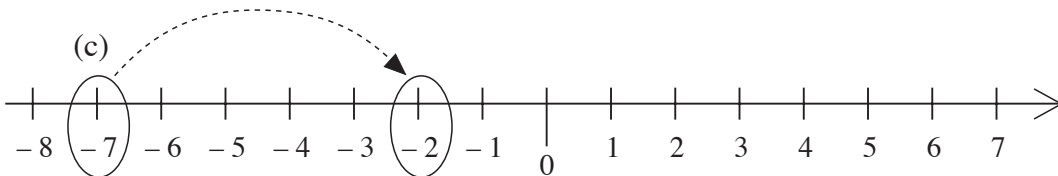
(a)



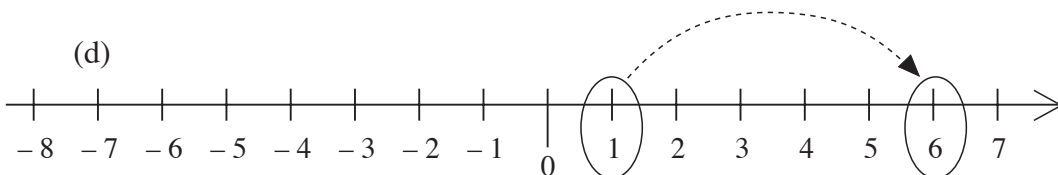
(b)



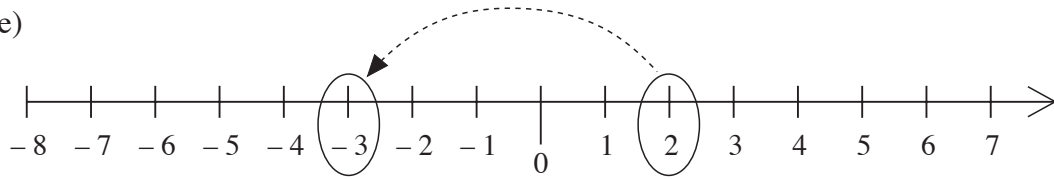
(c)



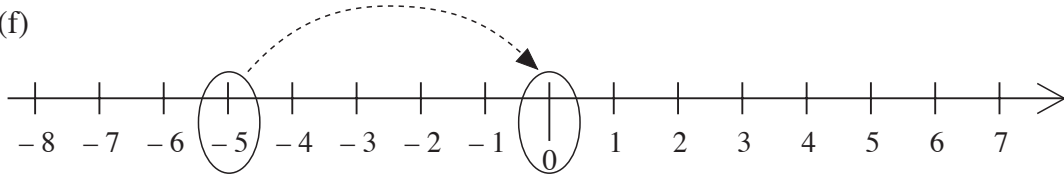
(d)



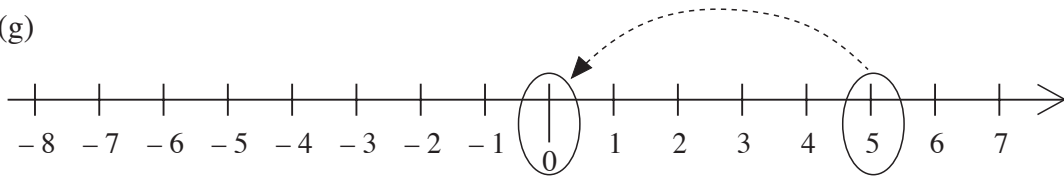
(e)



(f)



(g)



4. Copy and complete this addition table:

+	-4	-2	0	2	4
-3					
-1					
1					
3					

5. Fill in the missing numbers on a copy of this addition table:

+		1		3	
-5	-5				-1
		-3			
				0	
	-2		0		

6. Copy these equations and fill in the missing numbers:
- (a) $4 + \dots = 1$ (b) $3 - \dots = -6$
 (c) $-6 + \dots = -7$ (d) $\dots + 7 = 2$
 (e) $\dots - 7 = -8$ (f) $4 - \dots = 7$
7. Write down the next 5 terms in each sequence:
- (a) 10, 8, 6, 4, ...
 (b) -10, -7, -4, -1, ...
 (c) 19, 14, 9, 4, ...
 (d) -1, -3, -5, -7, ...
 (e) -20, -16, -12, -8, ...
 (f) -5, -10, -15, -20 ...
 (g) 18, 15, 12, 9, ...
 (h) -16, -12, -8, -4, ...
8. Overnight, the temperature dropped from 5°C to -14°C . By how many degrees did the temperature fall?
9. One day the level of the water in a river was 30 cm *above* its average level. One week later it was 12 cm *below* its average level. How far did the water level drop in the week?
10. A chest of treasure was hidden in the year 64 BC and found in 284 AD. For how long was the chest hidden?

3 Multiplication and Division

In this section we look at how to multiply and divide negative numbers.



Worked Example 1

- (a) Calculate

$$(-2) + (-2) + (-2) + (-2) + (-2).$$

- (b) Fill in the missing numbers:

$$(-2) + (-2) + (-2) + (-2) + (-2) = \dots \times (-2) = \dots$$



Solution

- (a) $(-2) + (-2) + (-2) + (-2) + (-2) = -10$
 (b) $(-2) + (-2) + (-2) + (-2) + (-2) = 5 \times (-2) = -10$

In Example 1 we see that

*a positive number multiplied by
a negative number gives a negative answer.*

This table shows what happens to the sign of the answer when positive and negative numbers are *multiplied*:

×	+	-
+	+	-
-	-	+

The same table can be used for *division* of positive and negative numbers.



Worked Example 2

Work out the following:

- (a) $5 \times (-7)$ (b) $(-8) \times (-10)$
 (c) $(-42) \div 6$ (d) $(-88) \div (-8)$



Solution

- (a) First calculate $5 \times 7 = 35$.

As a positive number is multiplied by a negative number, the answer will be negative:

$$5 \times (-7) = -35$$

- (b) First calculate $8 \times 10 = 80$.

Here a negative number is multiplied by a negative number, so the answer will be positive:

$$(-8) \times (-10) = 80$$

- (c) First calculate $42 \div 6 = 7$.

As a negative number is divided by a positive number, the answer will be negative:

$$(-42) \div 6 = -7$$

- (c) First calculate $88 \div 8 = 11$.

As a negative number is divided by a negative number, the answer will be positive:

$$(-88) \div (-8) = 11$$



Exercises

1. Calculate:

- (a) $(-7) \times 2$ (b) $(-4) \times 8$ (c) $(-2) \times (-5)$
 (d) $(-6) \times (-3)$ (e) $(-3) \times 7$ (f) $(-10) \times (-4)$
 (g) 8×4 (h) $3 \times (-6)$ (i) $(-7) \times (-2)$
 (j) $(-4) \times (-5)$ (k) $(-7) \times 0$ (l) $8 \times (-5)$

2. Calculate:

- (a) $(-10) \div (-2)$ (b) $(-15) \div 5$
 (c) $18 \div (-3)$ (d) $14 \div (-7)$
 (e) $(-21) \div (-3)$ (f) $(-45) \div 9$
 (g) $50 \div (-5)$ (h) $(-100) \div (-4)$
 (i) $80 \div (-2)$ (j) $26 \div (-13)$
 (k) $(-70) \div (-7)$ (l) $(-42) \div 7$

3. Copy and complete these multiplication tables:

(a)

\times	1	2	3	4
-1				
-2				
-3				
-4				

(b)

\times	1	0	-1	-2	-3
-4					
-2					
0					
1					

4. Copy and complete these multiplication tables:

(a)

×		-1	
2			
	-2	2	
-3			-9

(b)

×	-2		
	10		
-2		6	
3			-12

5. Copy these calculations, filling in the missing numbers:

(a) $\dots \times 5 = -20$

(b) $(-80) \div \dots = 4$

(c) $16 \times \dots = -32$

(d) $(-4) \times \dots = 32$

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

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

(g) $-8 \times \dots = 48$

(h) $-32 \div \dots = 4$

(i) $15 \times \dots = -60$

(j) $100 \div \dots = -25$

6. Write down the next 3 terms in each sequence:

(a) 1, -2, 4, -8, 16, ...

(b) -1, 2, -4, 8, -16, ...

(c) 1, -10, 100, -1000, ...

(d) 1, -3, 9, -27, ...

(e) -1, 5, -25, 125, ...

For each sequence, describe the rule that is used to calculate the next term.

7. Make 2 copies of this multiplication table and fill in the missing numbers in 2 different ways:

×				
	1			
		4		
			9	
				25

8. Calculate:

(a) $3 \times (-8) \times (-4)$

(b) $(-4) \times (-8) \times (-2)$

(c) $(-2) \times (-2) \times 2$

(d) $4 \times (-7) \times 2$

(e) $(-2) \times 8 \times (-4)$

(f) $(-6) \times (-2) \times (-1)$

9. Calculate:

(a) $\frac{(-3) \times (-4)}{(-2)}$

(b) $\frac{5 \times (-6)}{(-2)}$

(c) $\frac{(-7) \times (-5) \times (-2)}{5}$

(d) $\frac{8 \times (-9) \times 6}{(-2) \times (-3)}$

(e) $\frac{(-6) \times (-4)}{2}$

(f) $\frac{(-4) \times (-7) \times 3}{(-12)}$

10. Calculate:

(a) $(-6 + 10) \div (-2)$

(b) $(12 - 24) \div (-2)$

(c) $(6 + (-8)) \times (4 - 7)$

(d) $((-2) + 8) \times ((-4) + 2)$

(e) $((-4) \times 2) + (6 \times (-9))$

(f) $(8 \times (-2)) - ((-4) \times 8)$

11. Calculate:

(a) $(-6) \times (-3) + (-4)$

(b) $(-5) \times 4 - (-3)$

(c) $(-8) \times (-7) - 8 \times 7$

(d) $(-11) \times 4 + (-8) \times (-3)$

(0, 5), (1, 5), (1, 4), (2, 4), (2, 5), (3, 5), (3, 4), (4, 4), (4, 5), (5,