Name & Surname: _____ Class: _____ Date: _____

Calculating with Negative Numbers



Add, subtract, multiply and divide in every form

About 50 minutes Level ★★★☆☆

Sign rules for directed numbers

Directed numbers are **positive**, **negative** and zero. Use column methods for decimals and convert fractions first. For multiplication and division, fix the **sign** at the end.

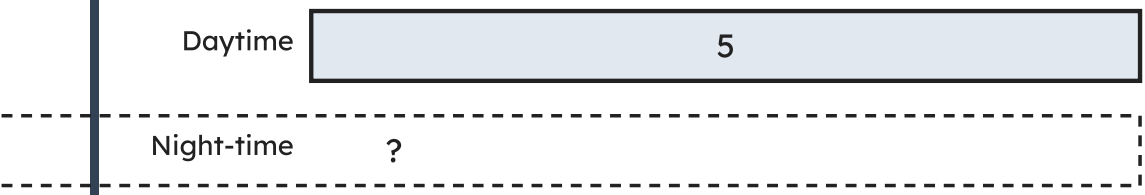
- Addition and subtraction: count forwards or backwards on a **number** line. For example, -6.4 - (-2.1) = -6.4 + 2.1 = -4.3.
- When multiplying and dividing, two same signs make a **positive**; two different signs make a **negative**. For example, -3 × 4 = -12 and -3 × -4 = 12.
- For fractions and **mixed** numbers, write as **improper** fractions first. For example, $-2\frac{1}{2} \div \frac{3}{4} = -\frac{5}{2} \times \frac{4}{3} = -3\frac{1}{3}$.

Task A

/4

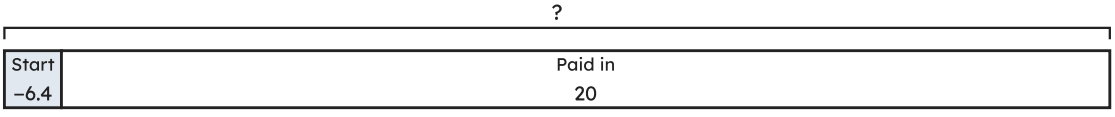
Use the bar model to find the missing number.

1. The daytime temperature was 5 °C. The night-time temperature was -4 °C. How many degrees did it **fall** overnight?



Answer: _____ **°C**

2. A student has -£6.40 in a bank account. The student pays in £20. What is the new **balance**?



Answer: _____ **£**

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Integers and Decimals

Practise the four operations with **integers** and **decimals**.

Key words

integer: a whole number, positive, negative or zero

decimal: a number with tenths, hundredths and so on

quotient: the answer to a division

negative: less than zero, with a minus sign

product: the answer to a multiplication

opposite: the same size but the other sign

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Fractions and Mixed Numbers

Practise the four operations with **fractions** and **mixed** numbers.

Task C /12

Practise the four operations with fractions and mixed numbers, positive and negative.

WARM UP

1 Work out $-\frac{3}{4} + \frac{1}{4}$. Watch the **sign**.

Answer: _____

2 Work out $-\frac{2}{5} - \frac{1}{5}$. Use a **common denominator**.

Answer: _____

3 Work out $-\frac{1}{2} \times 4$. Give the **product**.

Answer: _____

4 Work out $(-\frac{6}{7}) \div 2$. Give the **quotient**.

Answer: _____

PRACTISE

5 Work out $-2\frac{1}{2} + 1\frac{3}{4}$. Convert to **improper** fractions first.

Answer: _____

6 Work out $-1\frac{1}{3} - (-\frac{2}{3})$. Rewrite as **addition**.

Answer: _____

7 Work out $-\frac{7}{4} \times (-\frac{8}{3})$. Check the **positive sign**.

Answer: _____

8 Work out $\frac{5}{6} \div (-\frac{5}{3})$. Use the **reciprocal**.

Answer: _____

PROBLEM SOLVING

9 A store is short by $1\frac{1}{2}$ kg, so $-\frac{3}{2}$ kg. Another $2\frac{1}{4}$ kg is used. What is the total **shortage** in kg, as a **negative** number?

Answer: _____

10 A submarine is at $-12\frac{1}{2}$ m. It rises $5\frac{1}{4}$ m. What is the new **depth** in m?

Answer: _____

11 A student says $-\frac{1}{2} \times -\frac{1}{2} = -\frac{1}{4}$. Explain the **mistake** and the **correct** sign.

Answer: _____

12 Which is smaller: $-\frac{9}{4}$ or $-\frac{5}{2}$? Explain how you **know** using a **number** line.

Answer: _____

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Tables and Number Lines

Finish tables and read **negative** numbers on **number** lines.

Task D

/6

Complete the table. Work out each calculation carefully.

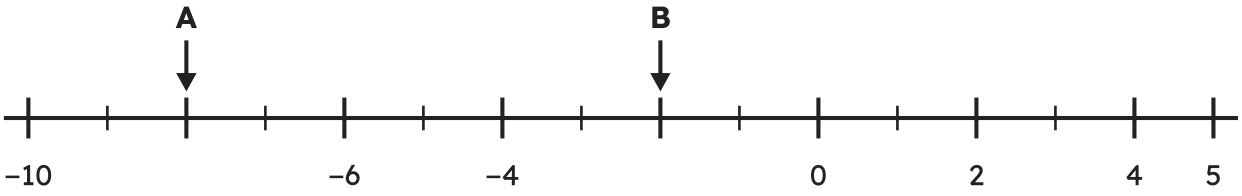
Calculation	Answer
-4 + 6	
-5 - 7	
-3 × -4	
12 ÷ (-3)	
-2.5 + 1.1	
$-1\frac{1}{2} + \frac{1}{2}$	

↑↓ Task E

/6

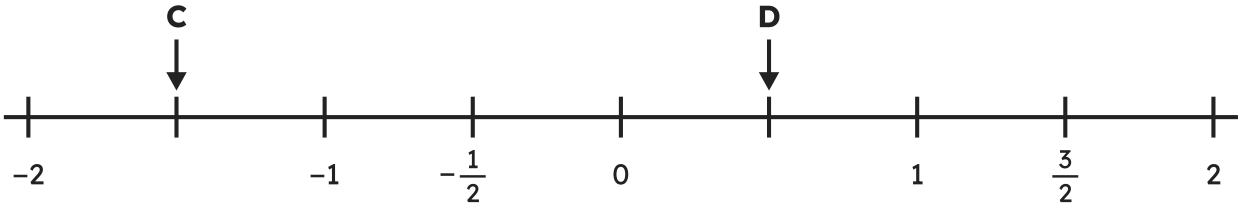
Read and mark negative numbers on each number line.

1



A = ☐ **B =** ☐ Draw an arrow to show: 4

2



C = ☐ **D =** ☐ Draw an arrow to show: $\frac{3}{2}$

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Written Methods in Action

Use **written** methods and compare **fraction** sizes.

Task F /2

Study each written method, then try the paired question the same way.

WORKED EXAMPLE

Work out -36 × 14 using a written method

1. Multiply 36 × 14 by column method: 360 + 144 = 504
2. A **negative** times a **positive** is **negative**, so give -504

Answer: -504

YOUR TURN

Work out -27 × 13 using the same written method

Answer: _____

WORKED EXAMPLE

Work out $-2\frac{1}{2} \div \frac{3}{4}$ using improper fractions

1. Write as **improper** fractions: $-\frac{5}{2} \div \frac{3}{4}$
2. Multiply by the **reciprocal**: $-\frac{5}{2} \times \frac{4}{3} = -\frac{20}{6} = -3\frac{1}{3}$

Answer: $-3\frac{1}{3}$

YOUR TURN

Work out $-3\frac{1}{3} \div \frac{5}{6}$ using improper fractions

Answer: _____

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Calculating with Negative Numbers

Task G /4

Shade and compare the fractions.

1



Fraction shaded: $\frac{\square}{\square}$

2

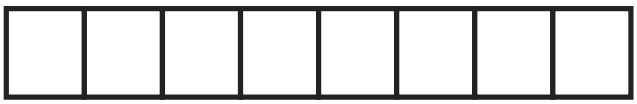
Shade $\frac{2}{3}$



3



$= \frac{1}{2}$



$= \frac{\square}{8}$

4



$\frac{3}{4}$



$\frac{2}{3}$

$\frac{3}{4}$ $\square$ $\frac{2}{3}$ Write <, > or =

How did I do?

Circle a face for each line.

I can add and subtract positive and negative numbers.

I can multiply and divide with decimals and fractions, including mixed numbers.

I can use written methods and check my signs.

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Answer sheet: Calculating with Negative Numbers

Task A

1. 9 °C
2. 13.6 £

Task B

1. 5
2. -10
3. -12
4. -5
5. -0.7
6. -4.3
7. 6.9
8. -5.2
9. -9
10. -7
11. Both numbers are negative, so the total is negative: -8, not 8.
12. -5

Task C

1. $-\frac{1}{2}$
2. $-\frac{3}{5}$
3. -2
4. $-\frac{3}{7}$
5. $-\frac{3}{4}$
6. $-\frac{2}{3}$
7. $4\frac{2}{3}$
8. $-\frac{1}{2}$
9. $-3\frac{3}{4}$
10. $-7\frac{1}{4}$
11. Two negatives multiply to make a positive, so the answer is $\frac{1}{4}$, not $-\frac{1}{4}$.
12. $-\frac{5}{2} = -2\frac{1}{2}$ is further left than $-\frac{9}{4} = -2\frac{1}{4}$, so $-\frac{5}{2}$ is smaller.

Task D

-4 + 6 | 2
-5 - 7 | -12
-3 × -4 | 12
12 ÷ (-3) | -4
-2.5 + 1.1 | -1.4
$-1\frac{1}{2} + \frac{1}{2}$ | -1

Task E

1. A = -8; B = -2; arrows at 4
2. C = $-\frac{3}{2}$; D = $\frac{1}{2}$; arrows at $\frac{3}{2}$

Task F

1. -351
2. -4

Task G

1. $\frac{3}{4}$
2. Shade 2 of the 3 equal parts ($\frac{2}{3}$).
3. $\frac{1}{2} = \frac{4}{8}$ (shade 4 parts)
4. $\frac{3}{4} > \frac{2}{3}$

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