



Mathematics Department

Practice Makes Perfect (1)

Unit (1): Integers

Learner's book P. 9 - 29

Name:

Form: Year 7 (N, E, S, Star)

## Adding and subtracting integers

### RULES FOR ADDING INTEGERS

| Signs of Integers   | Operation to Use | Answer Sign                                                          | Quick Example  |
|---------------------|------------------|----------------------------------------------------------------------|----------------|
| $\oplus + \oplus$   | Add              | Positive (+)                                                         | $4+3=7$        |
| $\ominus + \ominus$ | Add              | Negative (-)                                                         | $(-5)+(-3)=-8$ |
| $\oplus + \ominus$  | Subtract         | Use the <b>SIGN</b> of the integer with <b>BIGGER</b> absolute value | $6+(-2)=4$     |
| $\ominus + \oplus$  | Subtract         |                                                                      | $(-9)+(4)=-5$  |

## Subtracting Integers

### Keep

- Keep the 1<sup>st</sup> number

### Change

- Subtraction sign to Addition

### Opposite

- Write down the opposite of the 2<sup>nd</sup> number

*Then add the way you normally do.*

Example:

$$-9 - 14 =$$

$$\overset{\text{Keep}}{-9} \overset{\text{Change}}{+} \overset{\text{Opposite}}{-14} = -23$$

Now follow the adding integers rules.

**Question 1:** Find the sums of the integers

a.  $3 + -5 = \underline{-2}$

c.  $-3 + -3 = \underline{-6}$

b.  $-10 + 14 = \underline{4}$

d.  $15 + -7 = \underline{8}$

**Question 2:** Subtract to find the difference.

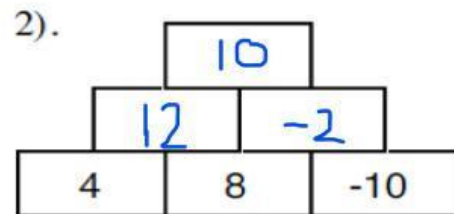
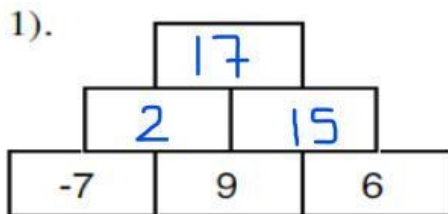
a.  $9 - -5 = \underline{14}$

c.  $13 - -6 = \underline{19}$

b.  $-6 - 4 = \underline{-10}$

d.  $-6 - -4 = \underline{-2}$

**Question 3:** To find the next number, add the two brick below it.



**Question 4:** Complete this addition table

|    |     |   |    |
|----|-----|---|----|
| +  | -5  | 7 | -3 |
| 2  | -3  | 9 | -1 |
| -6 | -11 | 1 | -9 |

**Question 5:** Work out:

a)  $-5 + 7 + -9 = \underline{-7}$

b)  $-8 + -6 + 3 = \underline{-11}$

# Cambridge Checkpoint past papers

Q1

Calculate.

$$-123 - (-72)$$

-51

Q2

Here is a function machine.



(a) Find the output when the input is 21

$$21 - 37$$

-16

(b) Find the input when the output is -20

$$-20 + 37$$

17

# Multiplying and dividing integers

## RULES FOR MULTIPLYING INTEGERS

| Signs of Integers                                                                                                                                                     | Operation to Use | Answer Sign  | Quick Example           |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|--------------|-------------------------|
|  ×  | Multiply         | Positive (+) | $5 \times 7 = 35$       |
|  ×  | Multiply         | Positive (+) | $(-6) \times (-4) = 24$ |
|  ×  | Multiply         | Negative (-) | $3 \times (-5) = -15$   |
|  ×  | Multiply         | Negative (-) | $(-4) \times (9) = -36$ |

## RULES FOR DIVIDING INTEGERS

| Signs of Integers                                                                                                                                                         | Operation to Use | Answer Sign  | Quick Example         |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|--------------|-----------------------|
|  ÷  | Divide           | Positive (+) | $24 \div 6 = 4$       |
|  ÷  | Divide           | Positive (+) | $(-15) \div (-3) = 5$ |
|  ÷  | Divide           | Negative (-) | $42 \div (-7) = -6$   |
|  ÷  | Divide           | Negative (-) | $(-10) \div (5) = -2$ |

**Question 1:** Work out:

1.  $-3 \times 5 = \underline{-15}$     2.  $4 \times -2 = \underline{-8}$     3.  $7 \times 6 = \underline{42}$

4.  $10 \times 8 = \underline{80}$     5.  $-2 \times 8 = \underline{-16}$     6.  $-10 \times -5 = \underline{50}$

**Question 2:** Work out:

1.  $-9 \div 3 = \underline{-3}$     2.  $16 \div -4 = \underline{-4}$

3.  $-3 \div -3 = \underline{1}$     4.  $14 \div -2 = \underline{-7}$

**Question 3:** Work out the missing numbers:

1)  $\underline{-4} \times -8 = 32$

2)  $6 \times \underline{9} = 54$

3)  $\underline{-5} \times -10 = 50$

4)  $\underline{-10} \times 8 = -80$

**Question 4:** Complete this multiplication table.

| $\times$ | -5                | 7                 | -3               |
|----------|-------------------|-------------------|------------------|
| 2        | $\underline{-10}$ | $\underline{14}$  | $\underline{-6}$ |
| -6       | $\underline{30}$  | $\underline{-42}$ | $\underline{18}$ |

**Question 5:** Work out these calculations. Do the calculation in the brackets first.

a)  $4 \times (-5 + 2) = -12$   
                    -3

b)  $-7 \times (-8 + 3) = 35$   
                    -5

c)  $-3 \times (2 - -6) = -24$   
                    8



## Tests for divisibility

| Divisibility Rules       |                                            |
|--------------------------|--------------------------------------------|
| A number is divisible by |                                            |
| 2                        | If last digit is 0, 2, 4, 6, or 8          |
| 3                        | If the sum of the digits is divisible by 3 |
| 4                        | If the last two digits is divisible by 4   |
| 5                        | If the last digit is 0 or 5                |
| 6                        | If the number is divisible by 2 and 3      |
| 8                        | If last 3 digits is divisible by 8         |
| 9                        | If the sum of the digits is divisible by 9 |
| 10                       | If the last digit is 0                     |

**Question 1:** a) Show that the number 37 251 is divisible by 3 and 9.

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b) Change the final digit of 37 251 to make a number that is divisible by 3 but not by 9.

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**Question 2:** The number  $2*20$  is divisible by 9. Find the possible value of the digit \*.

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**Question 3:** Fill in the table below using  or  after applying the divisibility test for each number.

| Number | Divisible by |   |   |   |   |   |   |    |
|--------|--------------|---|---|---|---|---|---|----|
|        | 2            | 3 | 4 | 5 | 6 | 8 | 9 | 10 |
| 16341  |              |   |   |   |   |   |   |    |
| 45632  |              |   |   |   |   |   |   |    |

**Question 4:** Rearrange the digits 32571 to make a number

a) Divisible by 2 \_\_\_\_\_

b) Divisible by 4 \_\_\_\_\_

**Question 5:** Complete the table.

| Number | Divisible by ... |
|--------|------------------|
| 45261  |                  |
| 1768   |                  |
| 4500   |                  |

## Cambridge Checkpoint past papers

Q1

Eva says,

‘I know that 14 107 is not divisible by 3  
I do not need to do the calculation  $14\,107 \div 3$  to show this.’

Write down how Eva shows that 14 107 is **not** divisible by 3



## Lowest common multiples

**Common Multiples**  
multiples that  
numbers share

Multiples of 2

Multiples of 3

Common  
multiples  
of 2 and 3

|    |    |    |    |    |    |    |     |
|----|----|----|----|----|----|----|-----|
| 0  | 1  | 2  | 3  | 4  | 5  | 6  | 7   |
| 8  | 9  | 10 | 11 | 12 | 13 | 14 | 15  |
| 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23  |
| 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31  |
| 32 | 33 | 34 | 35 | 36 | 37 | 38 | ... |

**Question 1:** List the first four multiples of 12.

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**Question 2:** Find the multiples of 6 that are less than 54.

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**Question 3:** Find the common multiples of 6 and 8 that are less than 60.

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**Question 4:** Write down 3 common multiples between 3 and 7.

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**Question 5:** Find the LCM.

a. 4 and 12

LCM = \_\_\_\_\_

b. 5 and 7

LCM = \_\_\_\_\_

c. 4, 5, and 6

LCM = \_\_\_\_\_

# Cambridge Checkpoint past papers

**Q1**

Draw a ring around **each** number that is a common multiple of 3 **and** 4

120

342

998

384

**Q2**

Draw a ring around **each** number that is a multiple of 3

237

343

905

558

**Q3**

Find the lowest common multiple (LCM) of 25 and 40

.....

# Highest common factor

HCF of 18 and 27

Factors of 18 are:

1 2 3 6 9 18

Factors of 27 are:

1 3 9 27

Common Factors : 1, 3 and 9

HCF

**Question 1:** Find all the factors for each number. List them from least to greatest

a. 15 - \_\_\_\_\_

b. 25 - \_\_\_\_\_

c. 18 - \_\_\_\_\_

d. 27 - \_\_\_\_\_

## **Question 2:**

1. Find the HCF of 8 and 12.

List the factors of 8. \_\_\_\_\_

List the factors of 12. \_\_\_\_\_

List the common factors. \_\_\_\_\_

What is the HCF? \_\_\_\_\_

2. Find the HCF of 15 and 20.

List the factors of 15. \_\_\_\_\_

List the factors of 20. \_\_\_\_\_

List the common factors. \_\_\_\_\_

What is the HCF? \_\_\_\_\_

# Cambridge Checkpoint past papers

Q1

Draw a ring around **each** number that is a common factor of 30 and 75

5

15

25

75

Q2

Find the highest common factor of 36 **and** 63

.....

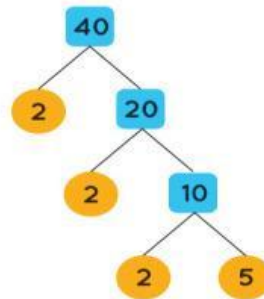
# Prime factorization

**Prime factorization** is a way of expressing a number as a product of its **prime factors**.

## Prime Factorization of 40

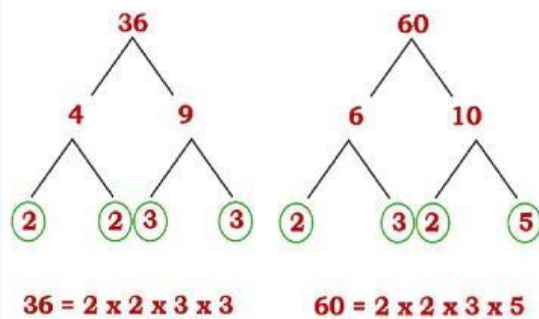
|   |    |
|---|----|
| 2 | 40 |
| 2 | 20 |
| 2 | 10 |
| 5 | 5  |
|   | 1  |

or



$$\begin{aligned}\text{Prime factorization of } 40 &= 2 \times 2 \times 2 \times 5 \\ &= 2^3 \times 5\end{aligned}$$

**Example 1:** Find the HCF of 36 and 60



We identify all the common factors that are **2, 3**.

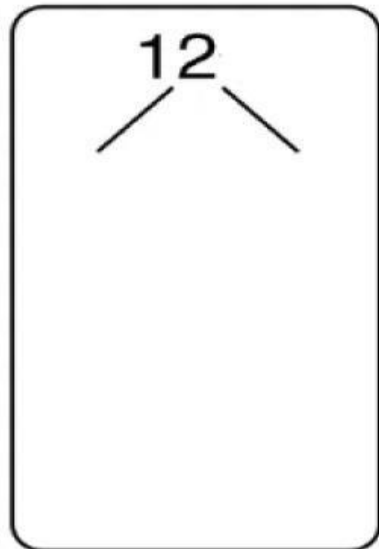
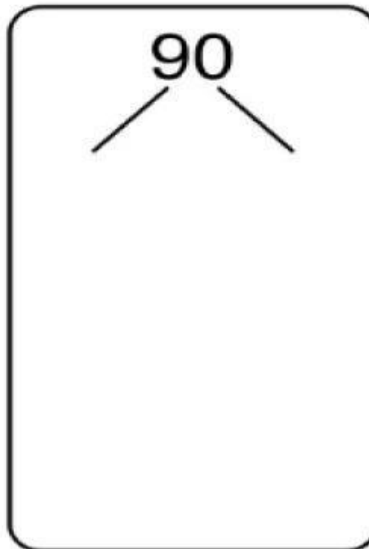
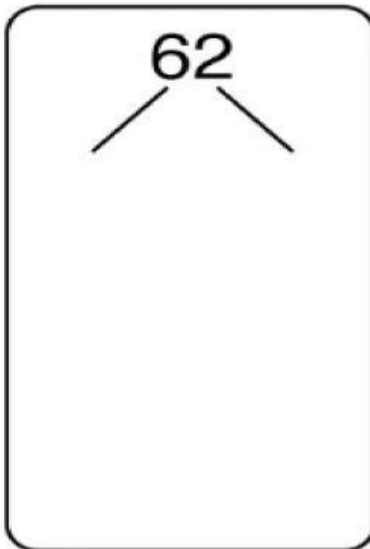
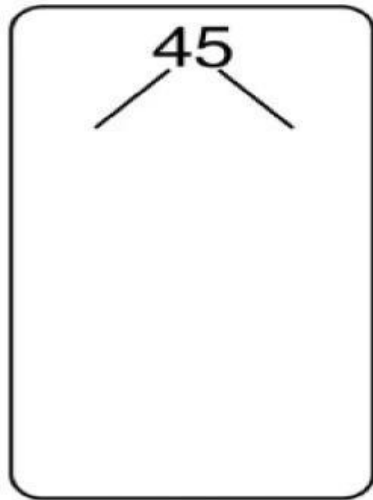
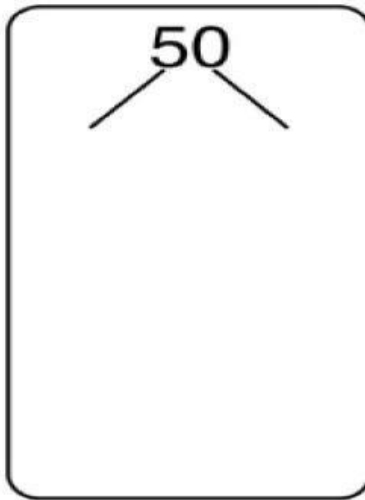
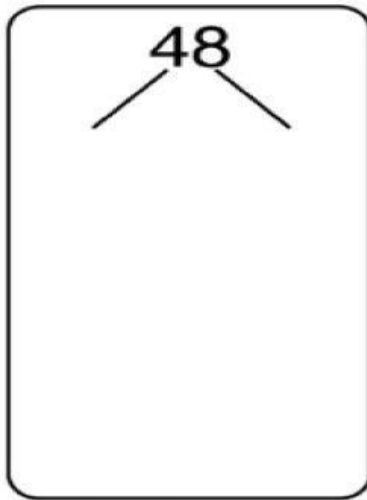
$$36 = 2 \times 2 \times 3 \times 3$$

$$60 = 2 \times 2 \times 3 \times 5$$

We multiply the factors and the product is the HCF of 36 and 60.

$$\text{HCF}(36, 60) = 2 \times 2 \times 3 = 12$$

**Question 1:** Use the number trees to find the prime factors of each number.



**Question 2:** Find the HCF of 24 and 60 using the prime factorization.

## Square roots and cube roots

### Perfect Squares and Square Roots

| Perfect Squares | Square Roots      | Squares      |
|-----------------|-------------------|--------------|
| 1               | $\sqrt{1} = 1$    | $1^2 = 1$    |
| 4               | $\sqrt{4} = 2$    | $2^2 = 4$    |
| 9               | $\sqrt{9} = 3$    | $3^2 = 9$    |
| 16              | $\sqrt{16} = 4$   | $4^2 = 16$   |
| 25              | $\sqrt{25} = 5$   | $5^2 = 25$   |
| 36              | $\sqrt{36} = 6$   | $6^2 = 36$   |
| 49              | $\sqrt{49} = 7$   | $7^2 = 49$   |
| 64              | $\sqrt{64} = 8$   | $8^2 = 64$   |
| 81              | $\sqrt{81} = 9$   | $9^2 = 81$   |
| 100             | $\sqrt{100} = 10$ | $10^2 = 100$ |
| 121             | $\sqrt{121} = 11$ | $11^2 = 121$ |
| 144             | $\sqrt{144} = 12$ | $12^2 = 144$ |
| 169             | $\sqrt{169} = 13$ | $13^2 = 169$ |
| 196             | $\sqrt{196} = 14$ | $14^2 = 196$ |
| 225             | $\sqrt{225} = 15$ | $15^2 = 225$ |