Mathematics
Grade 8

TOPIC:
Integers

Section A: Integers - Counting, Ordering and Comparing

1. Fill in the missing integers:

a) −15 ; −10 ; ___ ; 0 ; ___ ; 10

b) 8 ; 3 ; −2 ; ___ ; ___; −17

2. Arrange in ascending order:

a) −8 ; 15 ; −3 ; 0 ; −12 ; 7 ; −1

b) 2 ; 17 ; −17 ; −2 ; 3 ; −3 ; 5

3. Arrange in descending order:

a) −1 ; −8 ; −2 ; −5 ; −7 ; 0 ; −18

b) 10 ; −9 ; 8 ; −7 ; 6 ; −5 ; 4 ; −4

4. Use <, >, or = to compare:

a) −25 _____ −30

b) −7 _____ 3

c) −(−9) _____ 9

Section B: Calculations with Integers

1. Calculate:

a) $-15 + 23$

b) $18 - (-12)$

c) $-7 - 14$

d) $-8 + (-9)$

e) $35 - 48$

f) $(-9) - (-2) + (+8) - (3)$

g) $(-7) - 17 + (-8) - 10$

h) $(8) - (-7) + (3) + (-7)$

2. Multiply and divide:

a) -12×5

b) $8 \times (-7)$

c) $-6 \times (-9)$

d) $\frac{56}{-8}$

e) $-72 \div (-9)$

f) $\frac{-100}{4}$

g) $(-3) \times (+2) \times (-5)$

h) $(-5) \times (-2) \times (-7)$

i) $(3)\,(-2)\,(1)(4)(-3)$

j) $-11 \times \frac{-6}{3\times-1}$

k) $\frac{(-3)(-2)}{3} \times \frac{(-2)^3}{(-1)^2}$

l) $\frac{(-12)(3)}{(-2)(-3)} \times 2(-3)^2$

3. Mixed operations with integers:

a) $-15 + 8 \times (-3)$

b) $(-24 \div 6) + 13$

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

d) $(-2)^3 + 10$

e) $\sqrt{64} - (-5)$

f) $(-3)^2 \times (-2)$

g) $(-8)^3 + (3)^2$

h) $-6 + \sqrt{4} \times (4 - 9) - (-5)$

i) $\frac{(-3)^2}{9} - (-9) - \sqrt{121}$

j) $[(1 + 2) \times (-2)]^2 \div (3 - 3^2)$

k) $\sqrt[3]{\sqrt{25} - (-\sqrt{9})}$

l) $\frac{\sqrt{-(-5^2)} + \sqrt[3]{(-8)^2}}{-\sqrt{-1 \times -9}}$

Section C: Properties of Integers

1. State which property is illustrated:

a) $-7 + 12 = 12 + (-7)$

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

c) $-2 \times (8 + 5) = (-2 \times 8) + (-2 \times 5)$

2. Complete:

a) The additive inverse of 15 is

b) The additive inverse of −8 is

c) The multiplicative inverse of 4 is

d) 15 + (___) = 0

e) −9 × (___) = 1

Section D: Problem Solving with Integers

1. The temperature at dawn was −5°C. By midday, it had risen by 18°C. What was the midday temperature?
2. A submarine is at a depth of −350 meters. It rises 180 meters then descends 95 meters. What is its final depth?
3. A bank account has a balance of R1 250. After withdrawals of R800 and R1 600, what is the new balance?
4. Complete the number pattern and explain the rule:

   16, 8, 0, −8, _____, _____, _____
5. A business made a profit of R12 000 in January, a loss of R5 500 in February, and a profit of R8 200 in March. What was the total profit or loss for the three months?

Additional Integer Problem-Solving Questions

6. The temperature was −5°C in the morning. It dropped by 12 degrees by the evening. What is the temperature in the evening?
7. A submarine was at a depth of 120 meters below sea level. It descended another 45 meters. What is its new position relative to sea level?
8. Calculate: $-25 + 40 - 55 + 30$

9. The football team scored +3 goals in the first half, −2 in the second half due to own goals, and +1 in extra time. What was the final score?

10. A bank account had a balance of −R150. After depositing R500, then withdrawing R320, what is the new balance?

11. Multiply and simplify: $(-6) \times 7 - (-8) \times 3$

12. Two integers multiply to give −48. If one of the integers is −6, what is the other?

13. The temperature changed from −8°C to +13°C. By how many degrees did the temperature increase?

14. Simplify and solve: $(-3)2 + 2(-4) - 81$

15. A balloon rises 15 meters above the ground, then drops 25 meters below the starting point. What is the balloon's final position relative to the ground?

CAPS CLARIFICATION

WHOLE NUMBERS

Properties of whole numbers

- **Revise:**
  - The commutative; associative; distributive properties of whole numbers
  - 0 in terms of its additive property (identity element for addition)
  - 1 in terms of its multiplicative property (identify element for multiplication)
  - Recognise the division property of 0, whereby any number divided by 0 is undefined

Calculations using whole numbers

- **Revise:**
  - Calculations using all four operations on whole numbers, estimating and using calculators where appropriate

Calculation techniques

- Use a range of strategies to perform and check written and mental calculations with whole numbers including:
  - estimation
  - adding, subtracting and multiplying in columns
  - long division
  - rounding off and compensating
  - using a calculator

Multiples and factors

- **Revise:**
  - Prime factors of numbers to at least 3-digit whole numbers
  - LCM and HCF of numbers to at least 3-digit whole numbers, by inspection or factorisation

Solving problems

- Solve problems involving whole numbers, including:
  - Comparing two or more quantities of the same kind (ratio)
  - Comparing two quantities of different kinds (rate)
  - Sharing in a given ratio where the whole is given
  - Increasing or decreasing of a number in a given ratio
- Solve problems that involve whole numbers, percentages and decimal fractions in financial contexts such as:
  - Profit, loss, discount and VAT
  - Budgets
  - Accounts
  - Loans
  - Simple interest
  - Hire Purchase
  - Exchange rates

INTEGERS

Counting, ordering and comparing integers

- **Revise:**
  - counting forwards and backwards in integers for any interval
  - recognising, ordering and comparing integers

Calculations with integers

- **Revise** addition and subtraction with integers
- Multiply and divide with integers
- Perform calculations involving all four operations with integers
- Perform calculations involving all four operations with numbers that involve the squares, cubes, square roots and cube roots of integers

Properties of integers

- Recognize and use commutative, associative and distributive properties of addition and multiplication for integers
- Recognize and use additive and multiplicative inverses for integers

Solving problems

- Solve problems in contexts involving multiple operations with integers