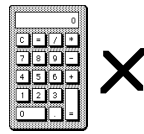


**Chapter 2**

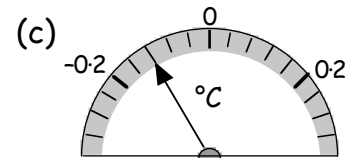
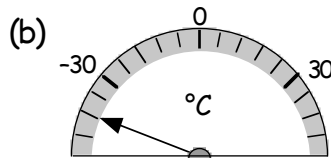
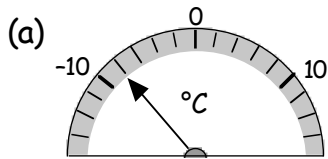


Calculators should **not** be used anywhere in this Chapter unless you are otherwise instructed.

**Integers**

**Exercise 1**

1. Write down the temperatures represented by the diagrams below :-




2. (a) Jack had £25 in his bank account and withdrew £40.  
What did his balance show on the computer ?

(b) Jill's bank balance showed (-£20).  
Jill deposits £30 into her account.  
What will her balance show now ?

(c) Bill is overdrawn by £40 and puts £30 into his account.  
What will his balance show now ?

(d) Last week my balance was (-£60).  
I cleared my overdraft and then signed a cheque for £35.  
After I put some money into my account my balance read +£20.  
How much had I put into my account **in total** since my (-£60) balance ?



3.  A Catfish swims 20 metres below the water.  
A bird flies 30 metres directly above the fish.  
How high above the water is the bird ?

4. Write down how old each person was when they died :-

- (a) Sillius Plonkus born 40 B.C. - died 25 A.D.
- (b) Smellius Stinkus born 33 B.C. - died 32 A.D.
- (c) Stupus Idious died 12 A.D. - was born 56 B.C.



5. Lazious Tyrus was born in 43 B.C.  
Activus Sporticus died at the age of 61 on Lazious' 23rd birthday.
- (a) What year was Activus born ?
- (b) Lazious died on what would have been Activus' 80th birthday.  
What year was this ?

## Exercise 2

1. What temperature is :-
- (a)  $5^{\circ}\text{C}$  up from  $10^{\circ}\text{C}$       (b)  $11^{\circ}\text{C}$  up from  $-1^{\circ}\text{C}$       (c)  $12^{\circ}\text{C}$  up from  $-4^{\circ}\text{C}$
- (d)  $10^{\circ}\text{C}$  down from  $13^{\circ}\text{C}$       (e)  $20^{\circ}\text{C}$  down from  $-10^{\circ}\text{C}$       (f)  $34^{\circ}\text{C}$  up from  $-21^{\circ}\text{C}$  ?
2. Complete the following, inserting "...  $^{\circ}\text{C}$  up" or "...  $^{\circ}\text{C}$  down" :-
- (a)  $10^{\circ}\text{C}$  is ..... from  $2^{\circ}\text{C}$       (b)  $8^{\circ}\text{C}$  is ..... from  $-1^{\circ}\text{C}$
- (c)  $2^{\circ}\text{C}$  is ..... from  $9^{\circ}\text{C}$       (d)  $23^{\circ}\text{C}$  is ..... from  $-7^{\circ}\text{C}$
- (e)  $-25^{\circ}\text{C}$  is ..... from  $18^{\circ}\text{C}$       (f)  $-82^{\circ}\text{C}$  is ..... from  $-26^{\circ}\text{C}$
3. (a) An ice making machine has its temperature set at  $-3^{\circ}\text{C}$ .  
The door is left opened and the temperature rose by  $5^{\circ}\text{C}$ .  
What is the new temperature in the machine ?



(b)



During a lab experiment a liquid's temperature is recorded at each stage of the experiment.

The temperature is raised by  $8^{\circ}\text{C}$  then dropped by  $15^{\circ}\text{C}$  then dropped by a further  $4^{\circ}\text{C}$ .

If the initial temperature was  $3^{\circ}\text{C}$ , what was the final temperature ?

4. At sea level, the hull of a submarine has a temperature of  $5^{\circ}\text{C}$ .  
For every 10 metres the submarine dives the temperature drops by  $2^{\circ}\text{C}$ .  
What would the hull temperature be after diving :-

- (a) 10 metres      (b) 30 metres
- (c) 50 metres      (d) 105 metres ?



**Exercise 3**

1. Write down the answers to each of the following :-

- |                   |                   |                                   |                                   |
|-------------------|-------------------|-----------------------------------|-----------------------------------|
| (a) $7 + 5$       | (b) $3 - 4$       | (c) $(-2) + 3$                    | (d) $-1 + 4$                      |
| (e) $(-5) + 7$    | (f) $(-11) + 5$   | (g) $3 + (-4)$                    | (h) $7 + (-8)$                    |
| (i) $15 + (-12)$  | (j) $11 + (-3)$   | (k) $(-14) + 7$                   | (l) $(-1) + (-1)$                 |
| (m) $3 - 5$       | (n) $4 - 9$       | (o) $(-3) - 6$                    | (p) $(-12) - 5$                   |
| (q) $(-10) - 3$   | (r) $(-7) - 7$    | (s) $(-3 \cdot 2) + 1 \cdot 6$    | (t) $5 \cdot 7 + (-8 \cdot 8)$    |
| (u) $(-3) + (-2)$ | (v) $(-4) + (-7)$ | (w) $(-3 \cdot 1) + (-6 \cdot 7)$ | (x) $(-7 \cdot 8) + (-6 \cdot 8)$ |

2. Find:-

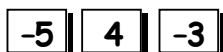
- |                       |                       |                          |   |
|-----------------------|-----------------------|--------------------------|---|
| (a) $2 + 3 - 9$       | (b) $4 - 5 + 2$       | (c) $8 - 9 - 3$          | (d) $4 - 8 - 7$                               |
| (e) $(-1)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

3. In a special card game, each set of 3 cards is added together and the smallest total wins.

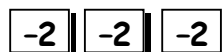
(a) Who wins the game shown ?



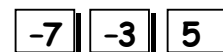
Bob



Bill



Ben



(b) By how much did the winner beat the third place ?

**Exercise 4**

1. Find :-

- |                  |                  |                                 |                                 |
|------------------|------------------|---------------------------------|---------------------------------|
| (a) $2 - (-3)$   | (b) $4 - (-5)$   | (c) $7 - (-7)$                  | (d) $14 - (-8)$                 |
| (e) $-1 - (-2)$  | (f) $-3 - (-7)$  | (g) $-5 - (-16)$                | (h) $-17 - (-18)$               |
| (i) $-3 - (-48)$ | (j) $-7 - (-25)$ | (k) $-1 \cdot 7 - (-2 \cdot 6)$ | (l) $-3 \cdot 8 - (-7 \cdot 7)$ |

2. Simplify :-

- |                  |                   |                  |                          |
|------------------|-------------------|------------------|--------------------------|
| (a) $6y - (-4y)$ | (b) $4w - (-3w)$  | (c) $7t + (-2t)$ | (d) $-6g + 5g$           |
| (e) $-p + (-p)$  | (f) $-8c + (-2c)$ | (g) $-h - (-2h)$ | (h) $42k + (-12k) - 13k$ |

3. Simplify :-

(a)  $21 + 13 - 11$

(b)  $-4 - 5 + 2$

(c)  $-8 - (-9) - 3$

(d)  $3j - 2j - j$

(e)  $-4 + 4 - 4$

(f)  $-5 + (-5) + 1$

(g)  $-15 - 7 + (-24)$

(h)  $-7x + (-3x) + 9x$

(i)  $17 + (-12) - 5$

(j)  $3e - (-e) + (5e)$

(k)  $1.7 - (-3.4) + (-2)$

(l)  $11h - (-5h) - (-6h)$

(m)  $(-1) + (-1) + (-1) + (-1) + (-1) + (-1) + (-1)$

**Exercise 5**

1. Find :-

(a)  $5(-3)$

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

(c)  $(-7) \times 5$

(d)  $(-5) \times 11$

(e)  $15 \times (-3)$

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

(g)  $(-8) \times 8$

(h)  $10 \times (-10)$

(i)  $(-15) \div 3$

(j)  $(-28) \div 7$

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

(l)  $(-169) \div 13$

(m)  $10 \times (-15)$

(n)  $(-1) \div 1$

(o)  $(-99) \times 8$

(p)  $(-1000) \div 1000$



2. Calculate :-

(a)  $(3 \times 6) \div 9$

(b)  $(12 \times 6) \div 8$

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

(d)  $(-5) \times 15 \div 25$

(e)  $20 \times (-20) \div 40$

(f)  $((-6) + 8) \times 3$

(g)  $(4 - (-2)) \times 5$

(h)  $((-7) - (-3)) \div 2$

3. Find :-

(a)  $30 \div (-3)$

(b)  $54 \div (-6)$

(c)  $80 \div (-4)$

(d)  $36 \div (-6)$

(e)  $84 \div (-3)$

(f)  $225 \div (-25)$

(g)  $74 \div (-37)$

(h)  $30 \div (-4)$

4. Calculate :-

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

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

(c)  $(-7) \times (-2)$

(d)  $(-7) \times (-12)$

(e)  $(-15) \times (-4)$

(f)  $(-8) \times (-12)$

(g)  $(-50) \times (-20)$

(h)  $(-100) \times (-30)$

(i)  $(-6) \div (-2)$

(j)  $(-9) \div (-3)$

(k)  $(-16) \div (-4)$

(l)  $(-1000) \div (-50)$

(m)  $(-64) \div (-16)$

(n)  $(-600) \div (-50)$

(o)  $(-22) \div (-4)$

(p)  $(-41) \div (-4)$

5. Find :-

(a)  $(3 \times (-6)) \div 2$

(b)  $((-3) \times (-4)) \div 6$

(c)  $((-6) \times (-4)) \div 12$

(d)  $((-4) + (-6)) \div 2$

(e)  $(5 - (-5)) \times 4$

(f)  $((-6) + (-6)) \div 4$

(g)  $(-8) \times (4 - 6)$

(h)  $((-3) - (-9)) \div (-2)$

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

(j)  $6 \times (-2) \times (-4)$

(k)  $8 \times (-2) \div (-1)$

(l)  $(-2)^3$

(m)  $(-4)^3$

(n)  $(-2)^2 + (-1)^2$

(o)  $(-5)^3 - (-3)^4$

(p)  $(-2)^5 - (-2)^3$

## Revision Exercise

1. (a) Isa has £42 in her bank account. She withdraws £60. What will her balance be ?  
 (b) Billy has a balance of (-£44). He withdraws £28. How much is Billy now overdrawn ?  
 (c) Carol has a balance of (-£123). She deposits £65.  
 How much will she now have to deposit to clear her overdraft ?

2. (a) Jamus III was born in 12 B.C. and died in 33 A.D.  
 How old was Jamus III when he died ?  
 (b) Emperor Hirto-Sito died at the age of sixty seven in 45 A.D.  
 What year was he born ?

3. The afternoon temperature on a mountain top is recorded at  $4^{\circ}\text{C}$ .  
 The temperature drops by  $16^{\circ}\text{C}$  at night.  
 What is the night-time temperature ?

4. A liquid is at a temperature of  $25^{\circ}\text{C}$ . Its freezing point is  $-18^{\circ}\text{C}$ .  
 How many degrees will the temperature have to drop to freeze the liquid ?

5. Find :-

- |                     |                        |                          |                         |
|---------------------|------------------------|--------------------------|-------------------------|
| (a) $4 + (-2)$      | (b) $6 + (-8)$         | (c) $11 + (-20)$         | (d) $-3 + (-2)$         |
| (e) $-1 + 7$        | (f) $-45 + (-33)$      | (g) $16 + (-19)$         | (h) $4 - (-2)$          |
| (i) $5 - (-11)$     | (j) $-6 - (-5)$        | (k) $3 \times (-2)$      | (l) $5 \times (-5)$     |
| (m) $(-8) \times 4$ | (n) $(-6) \times (-5)$ | (o) $(-12) \times (-10)$ | (p) $(-14) \div 2$      |
| (q) $(-36) \div 4$  | (r) $8 \div (-2)$      | (s) $(-60) \div (-12)$   | (t) $(-150) \div (-25)$ |

6. Calculate :-

- |                            |                             |                                  |
|----------------------------|-----------------------------|----------------------------------|
| (a) $(12 + (-3)) \times 2$ | (b) $((-14) - (-6)) \div 2$ | (c) $8 \times (4 - (-5)) \div 3$ |
|----------------------------|-----------------------------|----------------------------------|

7. Simplify :-

- |                              |                              |                                  |
|------------------------------|------------------------------|----------------------------------|
| (a) $4a + (-2a)$             | (b) $32g - (-12g)$           | (c) $-5z - (-5z)$                |
| (d) $6b + 2c + (-5b) - (-c)$ | (e) $7h + (-3k) - 2k - (-h)$ | (f) $x + (-1)^2 + (-x) + (-1)^7$ |

