Mathletics
Inspiring Better Results

Directed Numbers

Student Book - Series H-1

+5 x -3 = _____

Mathletics Instant Workbooks

Directed numbers
Student Book - Series H

Contents

Topics

Practice Tests

Author of The Topics and Topic Tests: AS Kalra
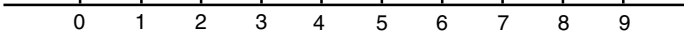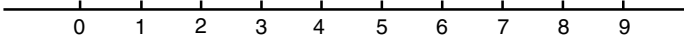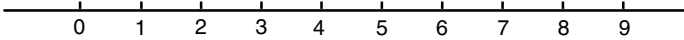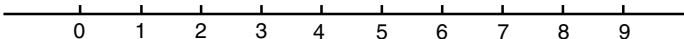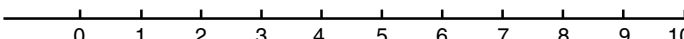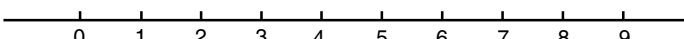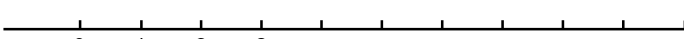
Directed numbers

Topic 1: Plotting on number lines

QUESTION **1**   Plot the following sets of points on the number line.

a   {0, 2, 3, 5}

0 1 2 3 4 5 6 7 8 9

b   {1, 3, 5, 7}

0 1 2 3 4 5 6 7 8 9

c   {2, 4, 6, 8}

0 1 2 3 4 5 6 7 8 9

d   {0, 3, 6, 9}

0 1 2 3 4 5 6 7 8 9

e   {2, 3, 4, 5, 6}

0 1 2 3 4 5 6 7 8 9

f   {1, 4, 5, 7, 8}

0 1 2 3 4 5 6 7 8 9

g   {0, 1, 2, 3, 6}

0 1 2 3 4 5 6 7 8 9

QUESTION **2**   Graph each set on a separate number line.

a   the odd numbers less than 6

0 1 2 3 4 5 6 7 8 9

b   the even numbers between 1 and 8

0 1 2 3 4 5 6 7 8 9

c   the numbers from 1 to 5

0 1 2 3 4 5 6 7 8 9

d   the numbers between and including 2 and 7

0 1 2 3 4 5 6 7 8 9

e   the numbers 2, 4, 5, 6, 8, 10

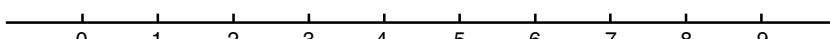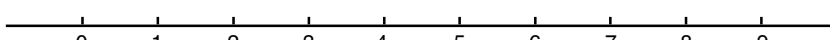0 1 2 3 4 5 6 7 8 9 10

f   the numbers 1, 3, 5, 7, 9

0 1 2 3 4 5 6 7 8 9

g   the numbers 0, 2, 4, 6, 8, 10

0 1 2 3 4 5 6 7 8 9 10

QUESTION **3**

M

0 1 2 3 4 5 6 7 8 ● 10 11 12 13 14 15 16 17 18 19 20 21 22
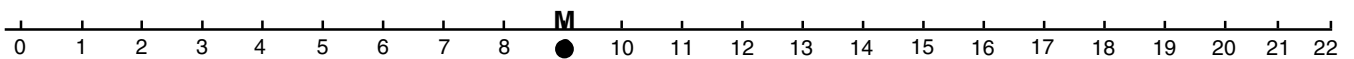
Find the position of **M** if it moves

a   3 places to the right _____

b   5 places to the right _____

c   10 places to the right _____

d   7 places to the left _____

e   8 places to the left _____

Directed numbers

Topic 2: Opposite directions — negative numbers

QUESTION **1**   What is the opposite of each of the following statements?

a   going up   _____   **b**   going east   _____

c   going north   _____   **d**   depositing money   _____

e   winning $10   _____   **f**   three floors up   _____

g   5° below zero   _____   **h**   increase of $30   _____

i   15 steps to the right   _____   **j**   80 metres above sea level_____

QUESTION **2**   In each of the following statements, write a directed number to show the size and direction of the number.

a   Michelle deposited $30.   _____

b   John walked 10 km to the east.   _____

c   The price came down by $12.   _____

d   Michael took 80 steps backwards.   _____

e   The water level dropped by 1 metre. _____

f   I lost 15 points.   _____

QUESTION **3**   Showing distance and direction, state where you would be from your starting point if you travelled

a   8 km east then 3 km west   _____

b   10 km west the 6 km east   _____

c   3 km north then 5 km south   _____

d   18 km east then 13 km west   _____

e   6 km east, 8 km west and then 5 km east _____

QUESTION **4**   Write a number sentence for

a   a deposit of $10 and a deposit of $5 _____

b   a deposit of $14 and a withdrawal of $9 _____

c   a withdrawal of $12 and a deposit of $20 _____

d   a deposit of $6 and a deposit of $9 _____

Directed numbers

Topic 3: Extending the number line

Use the number line to answer the following questions.

$$\longleftarrow\ \overline{}_{-10}\quad_{-9}\quad_{-8}\quad_{-7}\quad_{-6}\quad_{-5}\quad_{-4}\quad_{-3}\quad_{-2}\quad_{-1}\quad_{0}\quad_{+1}\quad_{+2}\quad_{+3}\quad_{+4}\quad_{+5}\quad_{+6}\quad_{+7}\quad_{+8}\quad_{+9}\quad_{+10}\ \longrightarrow$$
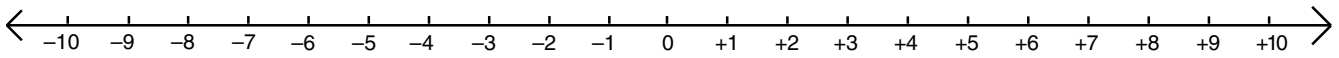
QUESTION **1**   Represent each of the following trips on the number line using a directed number (a positive or negative number).

a   from 0 to +3

b   from +2 to +6

c   from −3 to +2

d   from +3 to +7

e   from −1 to +6

f   from −2 to −8

QUESTION **2**   Circle the larger number.

a   +8 or +5

b   −9 or −3

c   −3 or +3

d   +2 or −7

e   −2 or +6

f   +8 or −8

QUESTION **3**   Use the number line to complete the following.

a   3 − 7 = _____

b   3 + 7 = _____

c   5 + 2 = _____

d   2 + 4 = _____

e   8 − 5 = _____

f   9 − 3 = _____

g   −1 + 8 = _____

h   6 − 3 = _____

i   6 − 8 = _____

j   5 − 9 = _____

k   7 − 10 = _____

l   −2 − 3 = _____

QUESTION **4**   Arrange in ascending order.

a   +1, +3, −2, −7, −1   _____

b   −3, −9, −2, 3, 2, 8   _____

c   5, 3, 2, −1, −7, −3   _____

d   2, −1, 5, −4, 8, 9, −8   _____

QUESTION **5**   Put > or < to make true sentences.

a   7 _____ −3

b   5 _____ −7

c   2 _____ −4

d   4 _____ 8

e   −6 _____ 6

f   3 _____ −5

g   −5 _____ 9

h   −3 _____ +3

i   7 _____ 9

j   8 _____ −2

k   −8 _____ +2

l   −6 _____ 7

Directed numbers

Topic 4: Addition of directed numbers

QUESTION **1**   Find the sum of the following (use the number line if necessary).

a   +6 + +9 = _____

b   +2 + +3 = _____

c   +1 + +3 = _____

d   +5 + +1 = _____

e   +2 + +4 = _____

f   +1 + +7 = _____

g   +6 + +5 = _____

h   +2 + +8 = _____

i   +1 + +10 = _____

QUESTION **2**   Find each sum.

a   +3 + −6 = _____

b   +2 + −6 = _____

c   +1 + −5 = _____

d   +1 + −4 = _____

e   +2 + −7 = _____

f   +3 + −8 = _____

g   +1 + −7 = _____

h   +2 + −11 = _____

i   +2 + −9 = _____

QUESTION **3**   Add the following.

a   −7 + +3 = _____

b   −8 + +2 = _____

c   −9 + +3 = _____

d   −6 + +1 = _____

e   −7 + +2 = _____

f   −8 + +3 = _____

g   −10 + +3 = _____

h   −12 + +4 = _____

i   −18 + +6 = _____

QUESTION **4**   Find the answers to these additions.

a   −2 + −1 = _____

b   −2 + −3 = _____

c   −2 + −4 = _____

d   −4 + −5 = _____

e   −4 + −9 = _____

f   −4 + −12 = _____

g   −3 + −3 = _____

h   −5 + −5 = _____

i   −8 + −8 = _____

QUESTION **5**   Find the values of the following.

a   +7 + +2 + +3 = _____

b   +19 + −3 = _____

c   +15 + −8 = _____

d   −16 + +9 = _____

e   −8 + −4 = _____

f   −10 + −5 = _____

g   +5 + −3 + −2 = _____

h   −12 + +2 + +5 = _____

i   −8 + +3 = _____

QUESTION **6**   Find the missing number.

a   +4 + _____ = +1

b   _____ + −7 = 0

c   −2 + −3 = _____

d   +5 + _____ = +7

e   +3 + −8 = _____

f   −2 + _____ = −8

g   −3 + _____ = −12

h   +8 + +3 = _____

i   +9 + −6 = _____

Directed numbers

Topic 5: Subtraction of directed numbers

QUESTION **1**   Find the answers for the following questions.

a $6 - 3 =$ _____

b $8 - 5 =$ _____

c $9 - 2 =$ _____

d $+7 - +5 =$ _____

e $+9 - +3 =$ _____

f $+7 - +5 =$ _____

g $+3 - (+2) =$ _____

h $+15 - +8 =$ _____

i $+10 - +7 =$ _____

QUESTION **2**   Complete these subtractions (use the number line if necessary).

a $+5 - -2 =$ _____

b $+8 - -3 =$ _____

c $9 - (-4) =$ _____

d $+6 - -3 =$ _____

e $+7 - -4 =$ _____

f $+10 - -5 =$ _____

g $+8 - -4 =$ _____

h $+4 - -2 =$ _____

i $+9 - -6 =$ _____

QUESTION **3**   Find each difference.

a $-17 - +3 =$ _____

b $-8 - +2 =$ _____

c $-10 - +4 =$ _____

d $-15 - +3 =$ _____

e $-6 - +4 =$ _____

f $-9 - +5 =$ _____

g $-10 - +5 =$ _____

h $-12 - +8 =$ _____

i $-7 - +4 =$ _____

QUESTION **4**   Find the answers for the following subtractions.

a $-4 - -3 =$ _____

b $-5 - -3 =$ _____

c $-5 - -2 =$ _____

d $-6 - -2 =$ _____

e $-7 - -6 =$ _____

f $-8 - -3 =$ _____

g $-8 - -4 =$ _____

h $-6 - -4 =$ _____

i $-10 - -5 =$ _____

QUESTION **5**   Find the values of the following.

a $-8 - -8 =$ _____

b $+20 - +10 =$ _____

c $+15 - -3 =$ _____

d $-17 - +8 =$ _____

e $-23 - -23 =$ _____

f $-15 - -12 =$ _____

g $-7 - -7 =$ _____

h $-16 - +3 =$ _____

i $-19 - +5 =$ _____

QUESTION **6**   Simplify the following.

a $8 - 12 =$ _____

b $-5 + 2 =$ _____

c $-5 - 7 =$ _____

d $8 - (-6) =$ _____

e $-5 - (-9) =$ _____

f $-5 - (+5) =$ _____

g $-9 - 9 =$ _____

h $-7 - 10 =$ _____

i $6 - 15 =$ _____

Directed numbers

Topic 6: Multiplication of directed numbers

QUESTION **1**   Multiply the following.

a   +3 × +2 = _____

b   +1 × +6 = _____

c   +7 × +3 = _____

d   +4 × +9 = _____

e   +7 × +6 = _____

f   +3 × +8 = _____

g   +1 × +9 = _____

h   +1 × +15 _____

i   +11 × +2 = _____

QUESTION **2**   Work out the following.

a   +3 × −2 = _____

b   +5 × −3 = _____

c   +4 × −9 = _____

d   +4 × −8 = _____

e   +7 × −4 = _____

f   +5 × −7 = _____

g   +6 × −3 = _____

h   +3 × −7 = _____

i   +8 × −9 = _____

QUESTION **3**   Find the answers to the following.

a   −3 × +4 = _____

b   −4 × +2 = _____

c   −5 × +11 = _____

d   −5 × +6 = _____

e   −6 × +4 = _____

f   −7 × +2 = _____

g   −3 × +11 = _____

h   −3 × +8 = _____

i   −4 × +6 = _____

QUESTION **4**   Simplify.

a   −3 × −4 = _____

b   −4 × −12 = _____

c   −8 × −9 = _____

d   −2 × −5 = _____

e   −3 × −5 = _____

f   −5 × −1 = _____

g   −6 × −7 = _____

h   −4 × −8 = _____

i   −6 × −8 = _____

QUESTION **5**   Find each product.

a   +3 × +9 = _____

b   −5 × +8 = _____

c   −6 × +1 = _____

d   +7 × −3 = _____

e   −8 × −7 = _____

f   +7 × −6 = _____

g   −5 × −12 = _____

h   +3 × + 12 = _____

i   +10 × +9 = _____

QUESTION **6**   Complete the following tables.

a

×	+9	−10	−5
+7			
−6			

b

×	−8	−7	−3
+6			
−5			

c

×	+6	−12	−9
−7			
+8			

Directed numbers

Topic 7: Division of directed numbers

QUESTION **1**   Divide the following.

a $+20 \div +4 =$ _____

b $+24 \div +6 =$ _____

c $+36 \div +9 =$ _____

d $+81 \div +9 =$ _____

e $+49 \div +7 =$ _____

f $+24 \div +3 =$ _____

g $+24 \div +8 =$ _____

h $+20 \div +5 =$ _____

i $+56 \div +8 =$ _____

QUESTION **2**   Work out the following divisions.

a $+12 \div -2 =$ _____

b $+9 \div -3 =$ _____

c $+15 \div -5 =$ _____

d $+15 \div -3 =$ _____

e $+18 \div -2 =$ _____

f $+12 \div -3 =$ _____

g $+18 \div -9 =$ _____

h $+12 \div -1 =$ _____

i $+21 \div -3 =$ _____

QUESTION **3**   Simplify the following.

a $-36 \div +4 =$ _____

b $-24 \div +6 =$ _____

c $-36 \div +12 =$ _____

d $-27 \div +9 =$ _____

e $-27 \div +27 =$ _____

f $-5 \div +5 =$ _____

g $-24 \div +8 =$ _____

h $-36 \div +3 =$ _____

i $-27 \div +3 =$ _____

QUESTION **4**   If $a = -4$, $b = 2$, $c = 4$ and $d = -8$, find the value of the following.

a $a \div b =$ _____

b $c^2 \div d =$ _____

c $ac \div d =$ _____

d $c \div d =$ _____

e $a^2 \div b^2 =$ _____

f $c^2 \div b^2 =$ _____

g $a^2 \div b =$ _____

h $d \div ab =$ _____

i $d \div c =$ _____

QUESTION **5**   Fill in the missing number.

a $-40 \div$ _____ $= -10$

b $-121 \div +11 =$ _____

c $-9 \div +3 =$ _____

d   _____ $\div -9 = +4$

e $+49 \div -7 =$ _____

f   _____ $\div -3 = -9$

g $-64 \div -8 =$ _____

h $+63 \div +9 =$ _____

i $-21 \div +7 =$ _____

QUESTION **6**   Simplify the following.

a $-45 \div -9 =$ _____

b $-60 \div +3 =$ _____

c $-20 \div +10 =$ _____

d $+35 \div -5 =$ _____

e $+120 \div -12 =$ _____

f $-60 \div +20 =$ _____

g $+52 \div +13 =$ _____

h $-33 \div -11 =$ _____

i $-80 \div -4 =$ _____

Directed numbers

Topic 8: The four operations with directed numbers

QUESTION **1**   Find answers to the following.

a $-7 + -8 =$ _____

b $+9 + +3 =$ _____

c $+11 + +23 =$ _____

d $-9 - +3 =$ _____

e $-16 - +4 =$ _____

f $-36 - +8 =$ _____

g $-7 - -3 =$ _____

h $-9 - -5 =$ _____

i $-19 - -18 =$ _____

QUESTION **2**   Find the value of the following.

a $-18 \div +3 =$ _____

b $-24 \div -12 =$ _____

c $+34 \div -2 =$ _____

d $-5 - -10 =$ _____

e $-6 + -13 =$ _____

f $8 - (-6) =$ _____

g $+19 + -3 =$ _____

h $+8 + -2 =$ _____

i $+16 + -5 =$ _____

QUESTION **3**   Work out the following.

a $-30 \div -5 =$ _____

b $+63 \div -9 =$ _____

c $-68 \div -4 =$ _____

d $-16 \times -6 =$ _____

e $-64 \div +8 =$ _____

f $-88 \div -11 =$ _____

g $+8 \times -3 =$ _____

h $-81 \div +9 =$ _____

i $-36 \div -6 =$ _____

QUESTION **4**   Simplify the following.

a $(+3 \times +4) \times +2 =$ _____

b $+9 - +4 \times -4 =$ _____

c $-200 \div -100 \times 2 =$ _____

d $(-5 - 2) \times -3 =$ _____

e $-60 \div -10 \times 3 =$ _____

f $-3 + -7 + -9 =$ _____

g $12 \div (+2 \times -2) =$ _____

h $(-5 - 5) \times -2 =$ _____

i $8 \div (-4 + 8) =$ _____

QUESTION **5**   Fill in the missing number.

a $+54 \div -6 =$ _____

b   _____ $\div 3 = -12$

c $+12 -$ _____ $= +15$

d $+3 \times -7 =$ _____

e   _____ $\div +7 = -7$

f $-8 -$ _____ $= -6$

g $+8 \times -3 =$ _____

h $+8 \times -3 =$ _____

i $+6 \times$ _____ $= -54$

QUESTION **6**   Complete the following tables.

a

+	+4	−6	−8	+10	−3
−2					
+7					
−5					

b

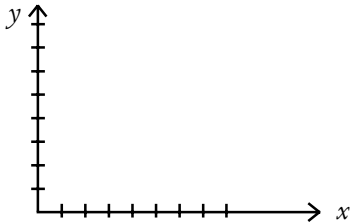| **×**	−3	+4	−2	+6	−5
+3					
−7					
−4					

Directed numbers

Topic 9: Graphing a table of values

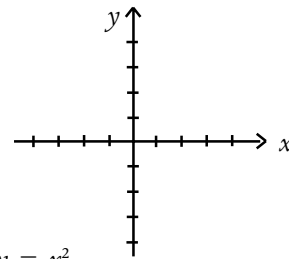QUESTION **1**   Complete each table using the given rule and then plot the ordered pairs on a number plane.
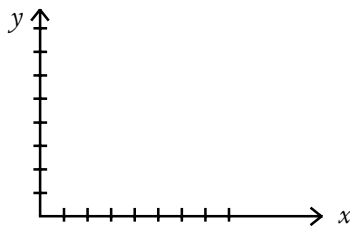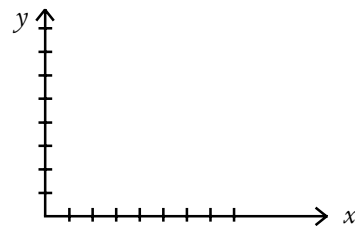
a $y = x + 3$

x	0	1	2	3
y				

b $y = 2x - 2$

x	0	1	2	3
y				

c $y = 2x$

x	0	1	2	3
y				

d $y = x^2$

x	0	1	2	3
y				

QUESTION **2**   Complete the table of values for each graph.

a

x					
y					

b
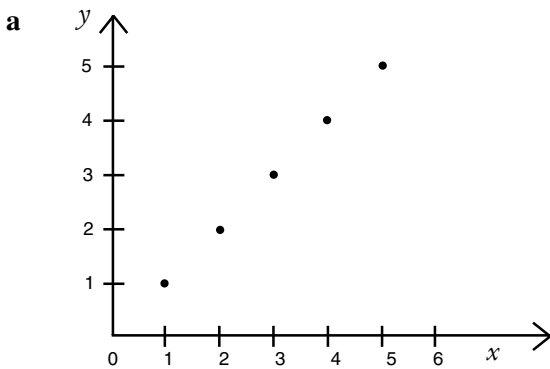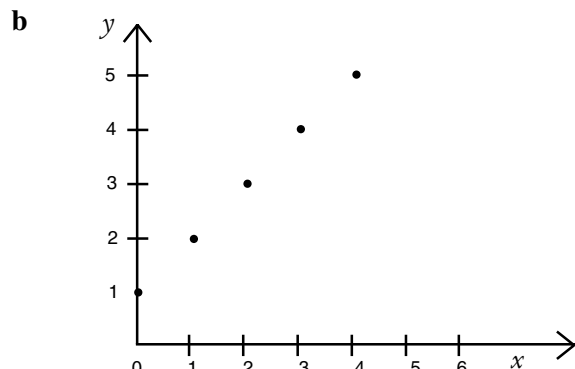
x					
y					

QUESTION **3**   Complete the table of values for the following rules.

a $y = 3x + 4$

x	1	4	6	7	9
y					

b $n = 2m + 6$

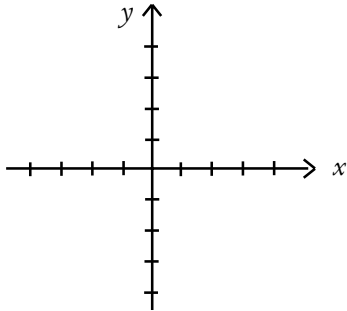| m	0	1	2	3	4
n					

Directed numbers

Topic 10: Table of values and the number plane

QUESTION **1** Complete each table of values and then plot each set of ordered pairs on a number plane
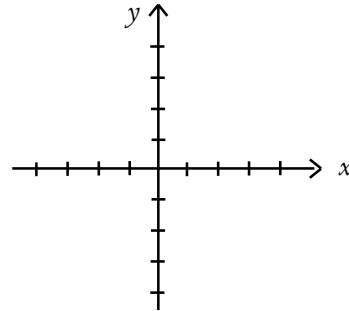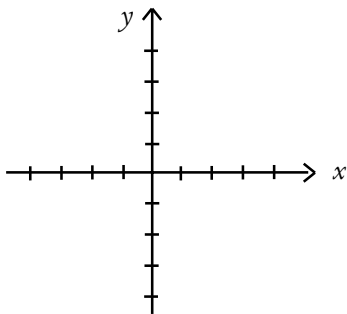
a $y = x$

x	−2	−1	0	1	2
y					

b $y = -x$

x	−2	−1	0	1	2
y					

c $y = x + 1$

x	−2	−1	0	1	2
y					

d $y = x - 1$

x	−2	−1	0	1	2
y					
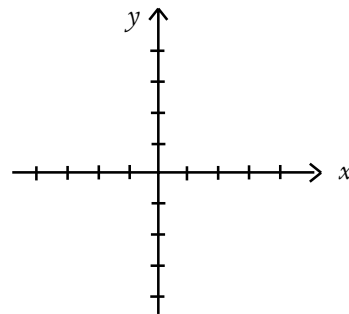
c $y = \dfrac{x}{2}$

x	−4	−2	0	2	4
y					
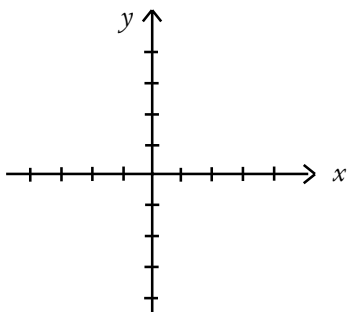
d $y = 2x$

x	−2	−1	0	1	2
y					
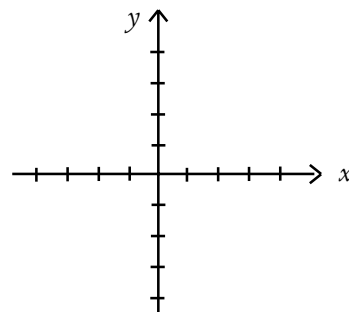
Directed numbers

Topic 11: The number plane

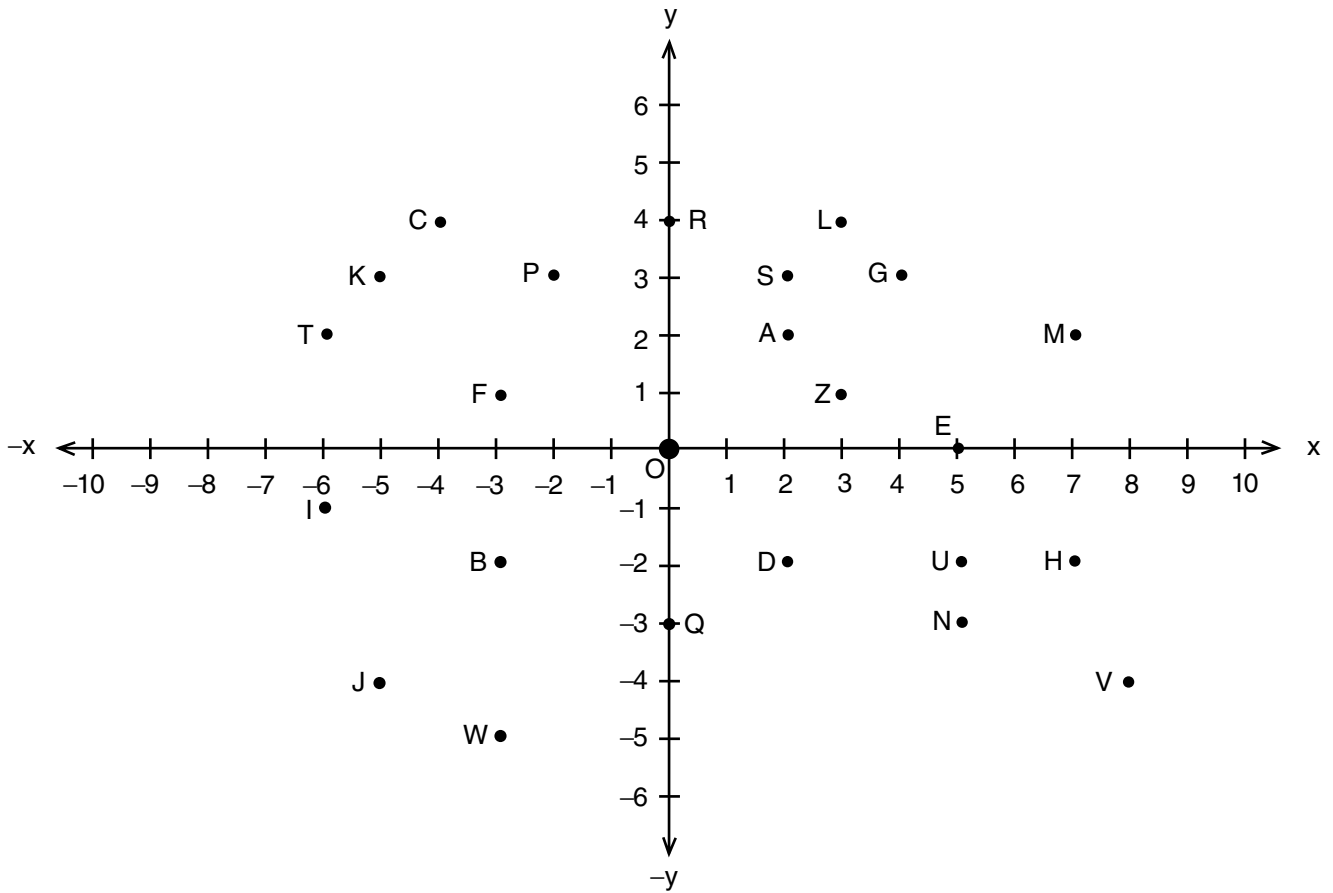QUESTION **1**   Write down the coordinates of the following points shown in the above number plane.

a	A _____	**b**	B _____	**c**	C _____	**d**	D _____
e	E _____	**f**	F _____	**g**	G _____	**h**	H _____
i	I _____	**j**	J _____	**k**	K _____	**l**	L _____
m	M _____	**n**	N _____	**o**	O _____	**p**	P _____
q	Q _____	**r**	R _____	**s**	S _____	**t**	T _____
u	U _____	**v**	V _____	**w**	W _____	**x**	Z _____

QUESTION **2**   Write down the letter used to name each of the following points.

a	(5, −2) _____	**b**	(0, −3) _____	**c**	(−3, 1) _____	**d**	(5, 0) _____
e	(2, 2) _____	**f**	(−3, −2) _____	**g**	(3, 4) _____	**h**	(0, 4) _____
i	(−5, −4) _____	**j**	(0, 0) _____	**k**	(−6, −1) _____	**l**	(2, −2) _____
m	(−6, 2) _____	**n**	(4, 3) _____	**o**	(7, 2) _____	**p**	(5, −3) _____
q	(−5, 3) _____	**r**	(−2, 3) _____	**s**	(−4, 4) _____	**t**	(2, 3) _____
u	(−3, −5) _____	**v**	(7, −2) _____	**w**	(8, −4) _____	**x**	(3, 1) _____

Directed numbers

Topic 12: Problem solving with directed numbers

1 Where would I be after a trip of 3 km south followed by a trip of 5 km north?

2 What will be the net result of a deposit of $500 in my account followed by a withdrawal of $700?

3 Two numbers have a product of 30 and their sum is −11. What are the numbers?

4 If the sum of two numbers is −1 and their product is −6, find the numbers.

5 I am a negative number divisible by 5 and greater than −7. What am I?

6 Find the sum of a profit of $8000 and a loss of $13 000.

7 The temperature fell 3 degrees during the day and fell another 6 degrees during the night. What was the total change in temperature?

8 What is the combined effect of a gain in weight of 4 kg and then a loss of 6 kg.

9 Start with an integer, 3, subtract 9 from it and multiply the result by −2. What is the answer?

10 If 2 more than −5 is added to the product of 3 and 7, what is the result?

11 Multiply 5 and −3 and then add 6 to this result. What is the final answer?

12 Divide −30 by −3 and then multiply this result by −2. What is the answer?

13 Which of the integers, −8, −6, −2, 3, 9, is closest to zero on the number line?

14 From the integers, −6, −3, −1, 2, 8, find the three integers whose sum is −2.

15 Find the two numbers whose sum is −7 and product is 12.

Directed numbers

Unit Test

Instructions   This part consists of 12 multiple-choice questions

Each question is worth 1 mark

Fill in only ONE CIRCLE for each question

Calculators are NOT allowed

Time allowed: 15 minutes   **Total marks = 12**

Marks

1   −32 + +18 equals

Ⓐ   −12   Ⓑ   +50   Ⓒ   −14   Ⓓ   −50 | 1 |

2   −6 + −3 + −1 equals

Ⓐ   −8   Ⓑ   −10   Ⓒ   +10   Ⓓ   +8 | 1 |

3   +5 − −6 equals

Ⓐ   +11   Ⓑ   −11   Ⓒ   +1   Ⓓ   −1 | 1 |

4 $(-2)^3$ equals

Ⓐ   8   Ⓑ   −6   Ⓒ   +6   Ⓓ   −8 | 1 |

5   −9 − −9 equals

Ⓐ   18   Ⓑ   0   Ⓒ   1   Ⓓ   81 | 1 |

6 $(-6 \times 4) + 8$ equals

Ⓐ   −16   Ⓑ   +16   Ⓒ   32   Ⓓ   18 | 1 |

7   −5 − (6 − −1) equals

Ⓐ   −10   Ⓑ   12   Ⓒ   −12   Ⓓ   0 | 1 |

8   −8 + −2 × −3 equals

Ⓐ   14   Ⓑ   −14   Ⓒ   2   Ⓓ   −2 | 1 |

9   If $a = 3$ and $b = -2$ then $(a + b)^2$ equals

Ⓐ   25   Ⓑ   1   Ⓒ   9   Ⓓ   4 | 1 |

10   If $x = 2$ and $y = -5$ then $xy + 6$ equals

Ⓐ   −4   Ⓑ   16   Ⓒ   4   Ⓓ   −16 | 1 |

11   −6 × −5 ÷ −2 equals

Ⓐ   15   Ⓑ   30   Ⓒ   −15   Ⓓ   −30 | 1 |

12   +36 ÷ +4 ÷ −3 equals

Ⓐ   3   Ⓑ   −3   Ⓒ   12   Ⓓ   −12 | 1 |

Total marks achieved for PART A | /12 |

Directed numbers

Unit Test

PART B

Questions	Answers only	Marks
1 $-5 + 7 - 8 =$	_____	1
2 $(-8)^2 + 3 - 1 =$	_____	1
3 $-7 + -9 =$	_____	1
4 $-9 \times +7 =$	_____	1
5 $(-6)^2 + (-1)^2 + 9 =$	_____	1
6 $-3 \times -5 =$	_____	1
7 $-2 \times -3 \times -4 =$	_____	1
8 $-16 \div 8 =$	_____	1
9 $-35 \div -7 =$	_____	1
10 $60 \div -6 =$	_____	1
11 $-7 + 8 \div (-2) =$	_____	1
12 $(4 - 17) \times (-1 + 3) =$	_____	1
13 $8 + (-3) + 3 - 8 =$	_____	1
14 $-4 + (-4) - 4 =$	_____	1
15 $-2 \times [-27 \div (3 - 12)] =$	_____	1

Total marks achieved for PART B /15