



The National
Orthodox School
Shmaisani

Mathematics

Unit 1: Integers, powers and roots.

The student's book

Chapter 1

Check in

- 1 a -1 b -2 c -3 d -1
 e -6 f -3
- 2 a 16 b 125 c 1 d 27
- 3 a 25 b 13 c 25
- 4 a 2500 b 2460 c 2000

Exercise 1A

- 1 b 2, 0, -2
- 2 a 3 b 3 c -2 d 0 e -1 f 1
- 3 a -3 b -5 c -7 d -6 e -10 f
- 4 a -6 b -2 c -5 d -7 e -79 f -511
 g -675 h -682
- 5 a 0 b -1 c -7 d -7 e 3 f -1
- 6 a -2 b 2 c 1 d -2 e 8 f 0
- 7 a 7 b 12 c 13 d 4 e -5 f -5
 g 3 h 11
- 8 a 8 b 1 c 4 d 11 e 0 f -1
 g 6 h 5 i 7 j 11 k -1 l -13
- 9 \$110
- 10 -1°C

11

-1	-4	23
30	6	-18
11	16	13

- 12 a Wrong, that rule only applies when the signs are next to each other when adding and subtracting, the correct answer is -7
- b Wrong, he has subtracted the wrong way round $8 - 10 = -2$
- c correct
- d Wrong, $7 - -4 = 7 + 4 = 11$, he has subtracted 7 from 4
- e Wrong, he should have done $7 - 4 + 2 = 3 + 2 = 5$ as there are no brackets around the $4 + 2$

14 a

-	2	-1	other answers are possible
3	1	4	
4	2	5	

b

-	-1	0	other answers are possible
3	4	3	
4	5	4	

Investigation page 10

If you use algebra and call the numbers $n, n + 1, n + 2$ and $n + 3$ you can soon work out the formula relating all the answers to the starting number n .

e.g. $n - (n + 1) + (n + 2) - (n + 3) = n - n - 1 + n + 2 - n - 3 = -2$

$++ +$ is $4n + 6$

$++ -$ is $2n$

$+- +$ is $2n + 2$

$+- -$ is -4

$-+ +$ is $2n + 4$

$-+ -$ is -2

$-- +$ is 0

$-- -$ is $-2n - 6$

Exercise 1B

- 1 a -8 b -20 c -12
- 2 a -12 b -16 c -18 d -20 e -6 f -56
- 3 b -20 c -12 d -30 e -2
- 4 a -24 b -21 c -4 d -8 e -16 f -100
 g -28 h -18 i -27
- 5 a -54 b -32 c -40 d -24 e -24 f -33
 g -3 h -9 i -36
- 6 a 2 b 3 c 5 d -4 e -4 f -3
- 7 a 2 b 3 c 5 d -4 e -4 f -3
- 8 a $3 \times \square = 18$ b $2 \times \square = -8$ c $-3 \times \square = 12$
 d $-3 \times \square = 9$ e $-4 \times \square = 16$ f $-1 \times \square = -4$
- 9 a 6 b -4 c -4 d -3 e -4 f 4
- 10 a -60 b -36 c -4 d -14
- 11 multiple answers, e.g. $-735 = 15 \times -49$,
 $-735 \div -49 = 15$
- 12 a -2852 b -630 c 816 d -17 856 e -72 f 17
- 13 When you multiply or divide two negative numbers you get a positive answer.
- 14 No, because to get a negative answer when multiplying one value must be positive and one value must be negative so it won't be the same number multiplying by itself

Exercise 1C

- 1 a 240 b 1000 c 600 d 200
 e 3000 f -6
- 2 $2 \times 35 = 70$ km
- 3 no
- 4 5
- 5 -116, 134, 213, 32, -9408, 69, -53, 3811, 26.25

Exercise 1D

- 1 a 4 b 23 c 11 d 64 e 19
 f -5 g 3 h 0 i -5
- 2 a 25 b 10 c 17 d 6 e 17
 f 9 g 16 h 13 i -30
- 3 a $(6 + 4) \times 10 = 100$ b $3 + 12 \div (2 + 1) = 7$
 c $100 - 10 \times (6 - 4) = 80$
- 4 He has added the 2 to the 8 instead of to the 15, then subtracted 10. The correct answer is 9.
- 5 a 9 b -20 c 10 d 29
- 6 a -10 b -50 c 76 d 6 e -5
- 7 a 4 b 4 c 12 d 2 e 8 f 5
- 8 If you do not get the same answers check both methods again, then check with a friend. If you still are unsure ask your teacher.
- 9 No, he is incorrect because you have to work out the indices first so $10 - 2^2 = 10 - 4 = 6$
- 10 a $(6 + 2^2) \times 10 = 100$ b $3 + 12 \div (2 - -1) = 7$
 c $10^2 - 10 \times (6 - 4) = 80$
- 11 = $20 - 8 + 2$ Then Addition
 = $20 - 10$ Then Subtraction
- These shouldn't be two separate steps. Odaro has worked out $20 - (8 + 2)$ or $20 - 8 - 2$ by mistake.
- 12 a 25 b -14 c -54

Exercise 1E

- 1 a i 12: 1, 2, 3, 4, 6, 12 and 18: 1, 2, 3, 6, 9, 18
 ii 10: 1, 2, 5, 10 and 15: 1, 3, 5, 15
 iii 13: 1, 13 and 17: 1, 17
 iv 36: 1, 2, 3, 4, 6, 9, 12, 18, 36 and 48: 1, 2, 3, 4, 6, 8, 12, 16, 24, 48
 v 25: 1, 5, 25 and 30: 1, 2, 3, 5, 6, 10, 15, 30

- b i 1, 2, 3, 6 ii 1, 5 iii 1 iv 1, 2, 3, 4, 6, 12
 v 1, 5
 c i 6 ii 5 iii 1 iv 12 v 5
 2 a i

Multiples of 3	Multiples of 7
3	7
6	14
9	21
12	28
15	35
18	42
21	49
24	56
27	63
30	70

Multiples of 4	Multiples of 9
4	9
8	18
12	27
16	36
20	45
24	54
28	63
32	72
36	81
40	90

iii

Multiples of 6	Multiples of 8
6	8
12	16
18	24
24	32
30	40
36	48
42	56
48	64
54	72
60	80

iv

Multiples of 3	Multiples of 12
3	12
6	24
9	36
12	48
15	60
18	72
21	84
24	96
27	108
30	120

v

Multiples of 8	Multiples of 16
8	16
16	32
24	48
32	64
40	80
48	96
56	112
64	128
72	144
80	160

- b i 21 ii 36 iii 24 iv 12 v 16
 3 180 cm
 4 18 cm
 5 a 408 b 1260
 6 a 60 b 54
 7 a LCM b 39 more years c 52 years
 9 a 7 b 4 c 12
 10 a 20 b 36 c 8
 11 60
 12 30, 3150; 90, 1050; 150, 630; 210, 450

Exercise 1F

- 1 a yes b yes c yes d yes
 e yes f no g no h yes
 i yes j yes
 3 a no b yes c yes d no
 e no f yes
 4 a yes b no c yes
 5 a yes b yes c no
 6 02563, 46563 or 42163
 7 a no
 b There is a decimal answer when you divide 8484 by 24
 c 6 and 4 both have a common factor of 2 so it won't necessarily work when this is the case

Exercise 1G

- 1 a 7 b 9 c 11 d 13
 2 a 36, 6 b 49, 7 c 64, 8
 3 1, 4, 9, 16, 25, 36, 49, 64, 81, 100, 121, 144, 169, 196, 225, 256, 289, 324, 361
 4 a 8 b 1 c 10
 d 20 e 15 f 2
 5 a 17 b 14 c 40
 d 60 e 90 f 18
 g 19 h 80 i 30

Exercise 1H

- 1 a 9 b 12 c 13 d 16
 2 a 37 b 80 c 2 d 3
 3 a 7cm b 15cm c 16cm d 17cm
 4 a 9^2 is a short way of writing 'nine times nine'.
 b The small raised 2 is called the power or index.
 c The symbol $\sqrt{\quad}$ stands for the words 'the square root'.
 d The x^2 key on a calculator is pressed to find the square of a number.
 5 The answer must be less than 5 as 17.5 is less than 25
 6
- | |
|------------------------|
| between 5 and 6, 5.23 |
| between 8 and 9, 8.83 |
| between 6 and 7, 6.65 |
| between 9 and 10, 9.91 |

- 7 a $\frac{3}{5}$ b $\frac{7}{10}$ c 3
 8 a 0.9 b 0.4 c 0.2

Exercise 1I

- 1 a 27 b 2 c 1 d 5
 e 64 f 1
 2 a 0.216 b 1.1 c 79.507 d 2.8
 3 a 2.9 b 1.6 c 39.3 d 3.0
 4 a 531.441 mm^3 b 0.343 m^3 c 4.913 cm^3
 5 a 4.9 cm b 3.2 mm c 0.8 m
 6 a 27 b 93
 7 It must be smaller than 2 as the cube root of 8 is 2 and 7.8 is smaller than 8
 8
- | |
|-----------------------|
| between 2 and 3, 2.92 |
| between 1 and 2, 1.95 |
| between 3 and 4, 3.20 |
- 9 a $\frac{1}{4}$ b $\frac{2}{3}$ c $\frac{3}{10}$

Exercise 1

- 1 a -6 b 4 c -2 d -7 e -75 f -84
2 a 8 b -4 c 15 d -13 e -2 f 90
3 a 14 b 4 c 8
4 a -12 b -12 c -20 d -14 e -132
5 a -5 b -5 c -4 d -14
6 a 2 b -4 c -14
7 There are multiple answers. Check with your teacher or check on a calculator.
8 a 24 b 17 c -27 d 8 e 25
f -3 g 11 h 32 i 4
9 a 25 b -14 c 16 d 5 e 67
10 She has worked out $49 - 8 - 3$ instead of $49 - 8 + 3$. The correct answer is 44.
11 a 7 b 9 c 4 d 5 e 16.5 f 1
12 c i 4 ii 6 iii 12
iv 12 v 5 vi 36
13 b i 15 ii 14 iii 24
iv 36 v 36 vi 24
14 a after 15 min 10 s b 14
15 2, 3, 4, 6, 7, 8 and 9
16 a no b yes c no
d yes e no
17 a 25 b 6 c 100
d 13 e 1 f 121
18 12 cm
19 a 27 b 2 c 5 d 3
20 a 20 b 9

Check out

- 1 a -2 b -11 c 7 d 10
2 a -12 b -12 c 15
3 a -5 b -5 c -6 d -6 e -4
4 a 1 b 12 c 16 d 2
5 a 4, 80 b 9, 54 c 4, 360 d 5, 420
6 a no b yes c yes d no e yes
7 a 11 b 13 c 15 d 9
8 a 5 b 2 c 1 d 3

The homework book answers.

1A

- 1 a -3, -5, -7 b 2, -5, -12 c -16, -11, -6
 2 a 2 b 1 c 0 d -2
 e 6 f 6 g -2 h -7
 i -8 j -8 k -9 l -27
 m -13 n -17 o -13 p -12
 3 a 10 b 11 c 13 d 2
 e 2 f -6 g 0 h 3
 i -6 j -2 k 23 l -28
 4 a 1 b -5 c 10
 d -16 e 12 f 49
 g -6 h 0 i -5
 5 a 9 b -30 c -9
 d -5 e -26 f 24
 6 -1
 7 possible answer: -5, -2, -1, 1, 4
 8 a 1, -13, -5 b -12, -9, 5 c -1, 7, -4

1B

- 1 a -24 b -56 c -25 d -80
 e -27 f -112 g -48 h -18
 i -32 j -55 k -27 l -80
 2 a -24 b -30 c -12
 d -54 e -56 f -110
 3 0
 4 a 4 b -12
 5 a -2 b -5 c -9 d -2
 e -3 f -5 g -8 h -3
 i -6 j -7 k -14 l -15
 6 a -4 b -8 c -4 d -5
 7 a -3 b -12 c -18 d -2
 e -2 f -5 g 3 h -15

1C

- 1 a 430 b 2500 c 400 d 4
 e 800 f 4200 g 2 h 270
 2 80 km
 3 \$60 000
 4 -300, -330
 -700, -725
 -40, -45.277...
 600, 596
 -49000, -48422
 5 0.01 cm

1D

- 1 a 3 b 26 c 2 d 13
 e 29 f 26 g -62 h -13
 i -11 j 11 k 14 l 9
 m 5 n 9 o 62 p 17
 q 17 r -3
 2 a 14 b 9 c 27 d 10
 e 24 f -27 g 280 h 6
 i 480
 3 a 17 b -1 c 56
 d 46 e -400 f 10
 g -10 h 0 i 50

- 4 a $5 \times (6 + 7) = 65$
 b $(20 - 12) + 4 = 2$
 c $12 \times (9 - 8) \times 2 = 24$
 d $(7 \times 2 - 10) + 2 = 2$
 e $(14 - 10) + 2 = 2$
 f $(9 + 6) \times (8 - 5) = 45$

1E

- 1 a 4, 8, 12, 16, 20 b 7, 14, 21, 28, 35
 c 10, 20, 30, 40, 50 d 12, 24, 36, 48, 60
 e 17, 34, 51, 68, 85 f 25, 50, 75, 100, 125
 2 a 12, 24, 36 b 28, 56, 84
 c 45, 90, 135 d 42, 84, 126
 3 a 30, 60, 90 b 60, 120, 180
 c 90, 180, 270
 4 a 1, 7
 b 1, 2, 5, 10
 c 1, 2, 4, 8, 16
 d 1, 2, 3, 4, 6, 8, 12, 24
 e 1, 2, 4, 7, 8, 14, 28, 56
 f 1, 2, 4, 5, 8, 10, 20, 40
 g 1, 2, 4, 8, 16, 32
 h 1, 41
 i 1, 3, 7, 9, 21, 63
 j 1, 3, 5, 15, 25, 75
 k 1, 2, 3, 4, 5, 6, 10, 12, 15, 20, 30, 60
 l 1, 2, 4, 8, 16, 32, 64
 5 a 4 b 4 c 6 d 8
 e 8 f 6 g 24 h 2
 i 15 j 12 k 25 l 12
 m 15 n 5 o 16 p 14
 6 a 5 b 3 c 4 d 3
 e 14 f 17
 7 a 6 b 10 c 12 d 18
 e 12 f 20 g 15 h 25
 i 30 j 56 k 28 l 30
 m 99 n 72 o 35 p 36
 8 a 12 b 120 c 210 d 30
 e 56 f 90
 9 10.24 am

1F

- 1 a, d, e and h
 2 b, e and h
 3 b, c, e and h
 4 a, b, d, f and h
 5 a, d and g
 6 a, b, c and g
 7 Work out **first digit + last digit - middle digit**. If the answer is 0 or 11 then the original number is divisible by 11.

1G-1I

- 1 a 5 b 9 c 4 d 17
 2 a 4 b 9 c 49 d 225
 e 4 f 9 g 49 h 225
 3 a 6 b 8 c 10 d 12
 e 11 f 3 g 6 h 5
 i 5 j 7 k 8 l 4
 m 10 n 10 o 3 p 3
 4 a 9 cm b 13 cm
 5 a 3 b 2 c -4 d -10
 6 a 1.728 b 15.625 c -226.981 d -0.027
 e 4.2 f 0.7 g 16 h 2.4
 7 a 19.683 b 3.1

Answers

8 a $\frac{3}{7}$

b $\frac{4}{5}$

c 0.6

d 0.3

e $\frac{2}{3}$

f $\frac{4}{5}$

g $\frac{1}{4}$

h 0.2

