THE ANSWER SERIES *Your Key to Exam Success*

3-in-1

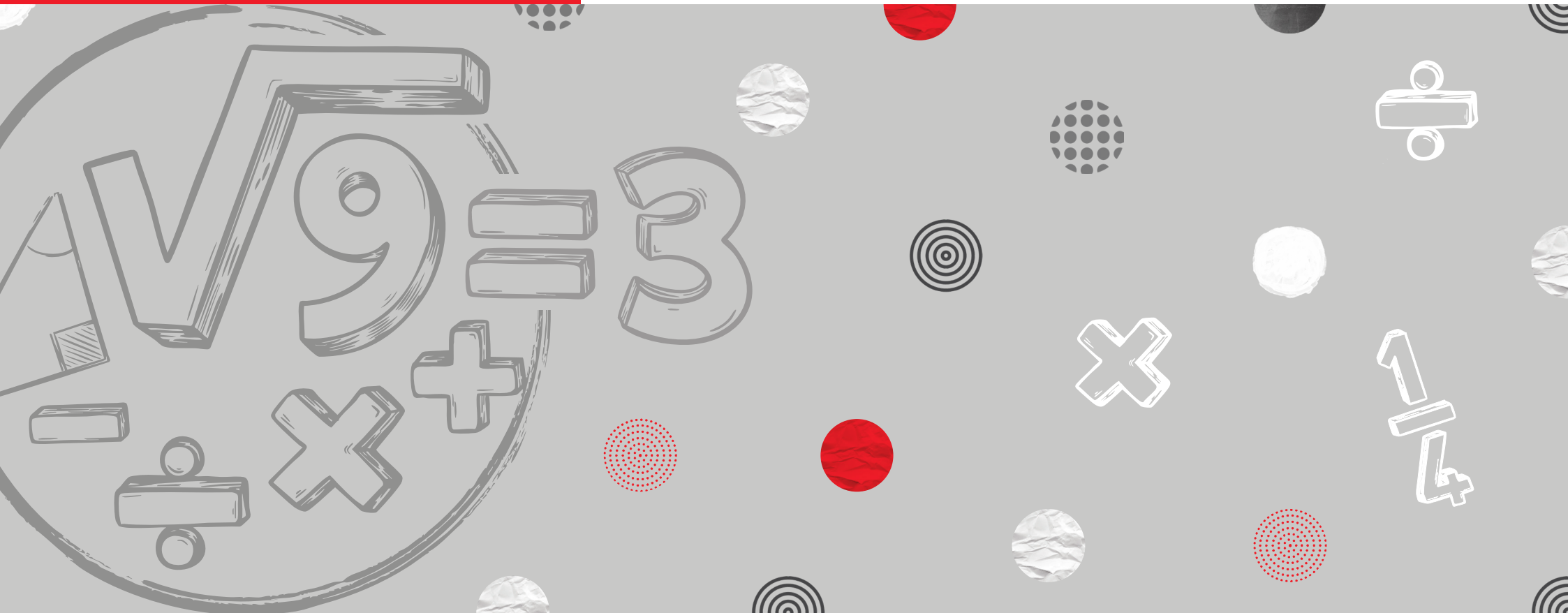
Mathematics
Part 1 & Part 2

ANSWER BOOK

Jenny Campbell & Gretel Lampe

GRADE 7

CAPS



Grade 7 Mathematics 3-in-1 (Answer Book)

ANSWERS TO PART 1 & PART 2 CLASS TEXT & STUDY GUIDES

This Class Text & Study Guide places a strong emphasis on concept development and deep understanding across all five CAPS modules, enabling learners to master essential and fundamental mathematical skills. It is designed to develop deep mathematical thinking, and is guaranteed to thoroughly prepare a learner for high school Mathematics.

The essence of its content is to provide learners with a solid foundation and grounding, together with extended thinking in this critical year as they enter the Senior Phase. This comprehensive and learner-friendly study guide will give a learner the best chance of continuing with Mathematics right through to Grade 12.

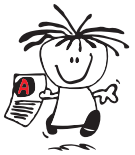
This publication aims to:

- Ensure mastery of fundamental knowledge and skills aligned to the Senior Phase curriculum
- Focus on critical concepts that underpin the year ahead
- Strengthen typical problem areas
- Encourage understanding over rote learning
- Prepare learners to enter high school Maths with clarity and confidence.

Key features:

- Rich, accessible explanations and teaching tips
- Continuous reinforcement of concepts across topics
- CAPS-aligned Exam Papers with detailed memos
- 'Take Note' boxes to highlight important insights
- Summaries, Reminders, and Hints
- Fun and engaging elements like Investigations, Fun Facts, Challenges and Crossword Puzzles.

This easy-to-use classroom and study companion empowers learners to take ownership of their Maths learning journey while building curiosity and confidence in a subject that is both essential and demanding.



THE ANSWER SERIES *Your Key to Exam Success*

CONTENTS

LEARNER BOOK PART 1

1 NUMBERS, OPERATIONS & RELATIONSHIPS

Thinking Steps & Explanations

Our step-by-step solutions include thinking steps where helpful, always in grey text, as well as extra explanations along the way.

4 MEASUREMENT

LEARNER BOOK PART 2

2 PATTERNS, FUNCTIONS & ALGEBRA

3 SPACE & SHAPE (GEOMETRY)

5 DATA HANDLING

EXAM MEMOS

Exercise 5 Solutions

Learner Book Part 1, p. 5

Take Note

Two methods are shown in these solutions, but more are possible. Use the method you find the easiest.

1.

$12 + 8 + 5$
$= 20 + 5$
$= 25$

or

$12 + 8 + 5$
$= 10 + 2 + 8 + 5$
$= 10 + 10 + 5$
$= 25$

2.

$14 + 16 + 8$
$= 30 + 8$
$= 38$

or

$14 + 16 + 8$
$= 10 + 4 + 10 + 6 + 8$
$= 10 + 10 + 4 + 6 + 8$
$= 20 + 18$
$= 38$

3.

$23 + 27 + 15$
$= 50 + 15$
$= 65$

or

$23 + 27 + 15$
$= 20 + 3 + 20 + 7 + 10 + 5$
$= 20 + 20 + 10 + 3 + 7 + 5$
$= 50 + 15$
$= 65$

4.

$37 + 63 + 41$
$= 100 + 41$
$= 141$

or

$37 + 63 + 41$
$= 30 + 7 + 60 + 3 + 40 + 1$
$= 30 + 60 + 40 + 7 + 3 + 1$
$= 130 + 11$
$= 141$

5.

$26 + 40 + 160$
$= 26 + 200$
$= 226$

or

$26 + 40 + 160$
$= 20 + 6 + 40 + 100 + 60$
$= 100 + 20 + 40 + 60 + 6$
$= 100 + 120 + 6$
$= 226$

6.

$130 + 370 + 5$
$= 500 + 5$
$= 505$

or

$130 + 370 + 5$
$= 100 + 30 + 300 + 70 + 5$
$= 100 + 300 + 30 + 70 + 5$
$= 400 + 100 + 5$
$= 505$

7.

$321 + 242 + 108$
$= 321 + 350$
$= 671$

or

$321 + 242 + 108$
$= 300 + 20 + 1 + 200 + 40 + 2 + 100 + 8$
$= 300 + 200 + 100 + 20 + 40 + 1 + 2 + 8$
$= 600 + 60 + 11$
$= 671$

8.

$623 + 125 + 27$
$= 623 + 27 + 125$
$= 650 + 125$
$= 775$

or

$623 + 125 + 27$
$= 600 + 20 + 3 + 100 + 20 + 5 + 20 + 7$
$= 600 + 100 + 20 + 20 + 20 + 3 + 5 + 7$
$= 700 + 60 + 15$
$= 775$

3. 92×31

Estimate: $100 \times 30 = 3\,000$

Actual value

Method 1

92×31

$= (90 + 2) \times (30 + 1)$

$= (90 \times 30) + (90 \times 1) + (2 \times 30) + (2 \times 1)$

$= 2\,700 + 90 + 60 + 2$

$= 2\,852$

Method 2

$$\begin{array}{r} 92 \\ \times\ 31 \\ \hline 92 \\ 2\,760 \\ \hline 2\,852 \end{array}$$

4. 74×63

Estimate: $80 \times 60 = 4\,800$

Actual value

Method 1

74×63

$= (70 + 4) \times (60 + 3)$

$= (70 \times 60) + (70 \times 3) + (4 \times 60) + (4 \times 3)$

$= 4\,200 + 210 + 240 + 12$

$= 4\,662$

Method 2

$$\begin{array}{r} 74 \\ \times\ 63 \\ \hline 222 \\ 4\,440 \\ \hline 4\,662 \end{array}$$

5. 52×99

Estimate: $50 \times 100 = 5\,000$

Actual value

Method 1

52×99

$= (50 + 2) \times (90 + 9)$

$= (50 \times 90) + (50 \times 9) + (2 \times 90) + (2 \times 9)$

$= 4\,500 + 450 + 180 + 18$

$= 5\,148$

Method 2

$$\begin{array}{r} 99 \\ \times\ 52 \\ \hline 198 \\ 4\,950 \\ \hline 5\,148 \end{array}$$

Method 3

52×99

$= 52 \times (100 - 1)$

$= 52 \times 100 - 52 \times 1$

$= 5\,200 - 52$

$= 5\,148$

6. 99×99

Estimate: $99 \times 100 = 9\,900$

Actual value

Method 1

99×99

$= (90 + 9) \times (90 + 9)$

$= (90 \times 90) + (90 \times 9) + (9 \times 90) + (9 \times 9)$

$= 8\,100 + 810 + 810 + 81$

$= 9\,801$

Method 2

$$\begin{array}{r} 99 \\ \times\ 99 \\ \hline 891 \\ 8\,910 \\ \hline 9\,801 \end{array}$$

Method 3

99×99

$= 99 \times (100 - 1)$

$= 99 \times 100 - 99 \times 1$

$= 9\,900 - 99$

$= 9\,801$

Exercise 44 Solutions

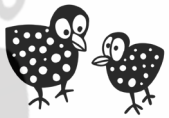
Learner Book Part 1, p. 42

1. The ratio of pizzas to cupcakes is **5** : **7** .
2. The ratio of cupcakes to pizzas is **7** : **5** .
3. Altogether, the total number of pizzas and cupcakes is **12** .
4. If you double both the number of pizzas and the number of cupcakes:
   - 4.1 The ratio of pizzas to cupcakes can be written as 10 : **14** **or** **5** : 7.
   - 4.2 **24** Grade 7s will be able to eat either a pizza or a cupcake. (Remember that you doubled the number of pizzas and the number of cupcakes.)

Exercise 45 Solutions

Learner Book Part 1, p. 42

1. There are **18** living things.
2. The ratio of the fish to the birds to the tortoises is 6 : **4** : **8** = 3 : **2** : **4**



3. The ratio of the tortoises to the fish to the birds is **8** : 6 : **4** = **4** : 3 : **2**

4.1 If half of each group dies, the ratio of fish to birds to tortoises can be written as **3** : 2 : **4** .

4.2 This is exactly the same as the simplified ratio. Half of each group died, so the ratio remained unchanged. If, for example, 2 of each group had died, then the ratio would have changed as follows:

fish : birds : tortoises
= 6 – 2 : 4 – 2 : 8 – 2
= 4 : 2 : 6
= 2 : 1 : 3 which is different from 3 : 2 : 4

Exercise 46 Solutions

Learner Book Part 1, p. 43

1. 12 : 20 = 3 : 5 (divide both numbers by 4)
2. 15 : 5 = 3 : 1 (divide both numbers by 5)
3. 8 : 12 = 2 : 3 (divide both numbers by 4)
4. 30 : 42 = 5 : 7 (divide both numbers by 6)
5. 44 : 77 = 4 : 7 (divide both numbers by 11)
6. 24 : 12 : 4 = 6 : 3 : 1 (divide all numbers by 4)
7. 36 : 27 : 18 = 4 : 3 : 2 (divide all numbers by 9)
8. 32 : 48 : 72 = 4 : 6 : 9 (divide all numbers by 8)

Exercise 47 Solutions

Learner Book Part 1, p. 44

1. 5 minutes to 40 minutes
   = 5 : 40 (remove minutes)
   = 1 : 8 (divide both numbers by 5)

2. 20 mm to 80 mm
   = 20 : 80 (remove mm)
   = 1 : 4 (divide both numbers by 20)

3. 14 cents to 63 cents
   = 14 : 63 (remove cents)
   = 2 : 9 (divide both numbers by 7)

4. 25 mℓ to 60 mℓ
   = 25 : 60 (remove mℓ)
   = 5 : 12 (divide both numbers by 5)

4.11 $\sqrt{36} \times \sqrt[3]{27} - \sqrt{100} \div \sqrt{25}$

$= 6 \times 3 - 10 \div 5$

$= 18 - 2$

$= 16$

4.12 $\sqrt{1^3 + 2^3 + 3^3 + 4^3} \div 2 \times 12 - 6 \times \sqrt[3]{8}$

$= \sqrt{1 + 8 + 27 + 64} \div 2 \times 12 - 6 \times 2$

$= \sqrt{100} \div 2 \times 12 - 12$

$= 10 \div 2 \times 12 - 12$

$= 5 \times 12 - 12$

$= 60 - 12$

$= 48$

4.13 $\sqrt{49} + 11 \times 5 + 6 - \sqrt[3]{12^2 - 6 \times 3 - 1}$

$= 7 + 55 + 6 - \sqrt[3]{144 - 18 - 1}$

$= 7 + 55 + 6 - \sqrt[3]{125}$

$= 7 + 55 + 6 - 5$

$= 63$

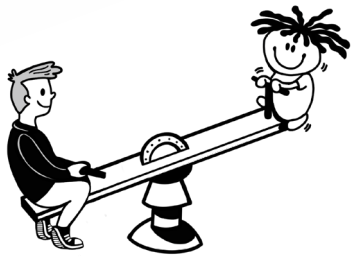
4.14 $\sqrt{3^2 + 4^2} - \sqrt{8 + 1} + 4 \times 3 - 3 \times 2$

$= \sqrt{9 + 16} - \sqrt{9} + 12 - 6$

$= \sqrt{25} - 3 + 12 - 6$

$= 5 - 3 + 12 - 6$

$= 8$



Exercise 13 Solutions

Learner Book Part 1, p. 86

1.

	2	784
2 ←	2	392
2 ←	2	196
	2	98
7 ←	7	49
	7	7
		1

$\therefore \sqrt{784} = 2 \times 2 \times 7 = 28$

2.

	2	1 764
2 ←	2	882
3 ←	3	441
	3	147
7 ←	7	49
	7	7
		1

$\therefore \sqrt{1\,764} = 2 \times 3 \times 7 = 42$

3.

	3	2 025
3 ←	3	675
3 ←	3	225
	3	75
5 ←	5	25
	5	5
		1

$\therefore \sqrt{2\,025} = 3 \times 3 \times 5 = 45$

4.

	3	27 225
3 ←	3	9 075
5 ←	5	3 025
	5	605
11 ←	11	121
	11	11
		1

$\therefore \sqrt{27\,225} = 3 \times 5 \times 11 = 165$

INTEGERS

Exercise 1 Solutions

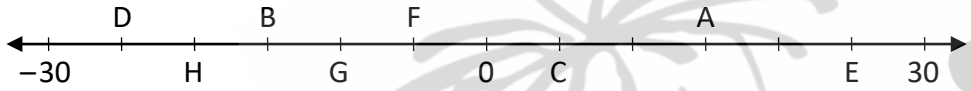
Learner Book Part 1, p. 93

1.1 3 is the integer with the largest value.

1.2 Descending order: 3 ; 2 ; −1 ; −5 ; −12 ; −19

2. Ascending order: −14 ; −8 ; −7 ; 2 ; 5 ; 10

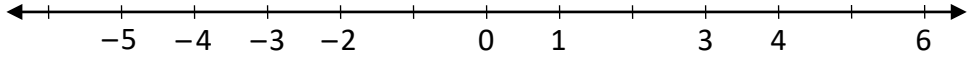
3.



3.1 B −15
C 5
D −25
E 25
F −5
G −10
H −20

3.2 Ascending order: −25 ; −20 ; −15 ; −10 ; −5 ; 5 ; 15 ; 25

4.



Exercise 2 Solutions

Learner Book Part 1, p. 94

1.1 25 > −12

1.2 −7 < 3

1.3 22 > 10

1.4 −4 > −11

1.5 −29 < −16

1.6 7 > −1

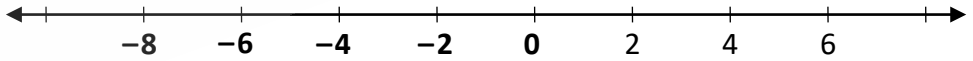
1.7 0 < 5

1.8 0 > −3

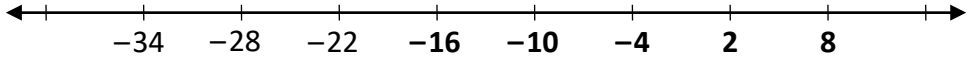
2. 25; 22; 10; 7; 5; 3; 0; −1; −3; −4; −7; −11; −12; −16; −29

3.1

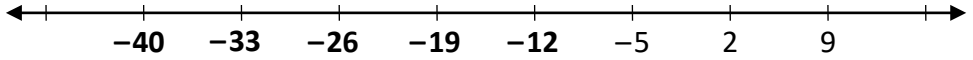
3.2



3.3



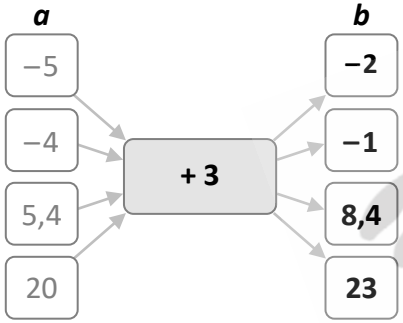
3.4



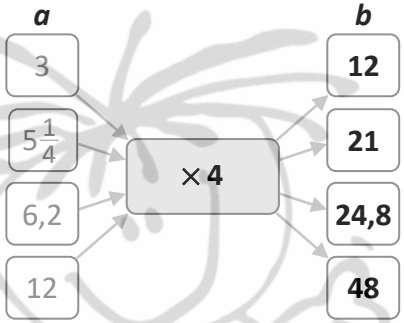
Exercise 1 Solutions

Learner Book Part 2, p. 18

E



F



1. $-5 + \mathbf{3} = -2$

   $-4 + \mathbf{3} = -1$

   $5{,}4 + \mathbf{3} = 8{,}4$

   $20 + \mathbf{3} = 23$

2. Add 3 to the input value.

3. $b = a + 3$

1. $3 \times \mathbf{4} = 12$

   $5\frac{1}{4} \times \mathbf{4} = \frac{21}{4} \times \mathbf{4} = 21$

   $6{,}2 \times \mathbf{4} = 24{,}8$

   $12 \times \mathbf{4} = 48$

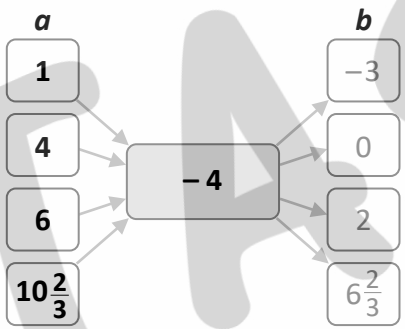
2. Multiply the input value by 4.

3. $b = 4a$ (we write $4 \times a$ as $4a$)

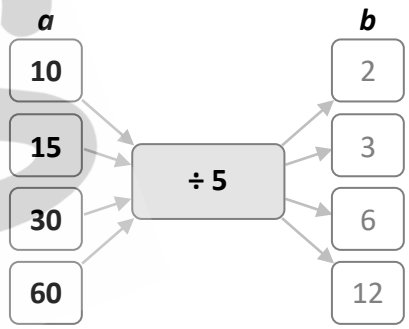
Exercise 2 Solutions

Learner Book Part 2, p. 19

J



K



1. $-3 + \mathbf{4} = 1$

   $0 + \mathbf{4} = 4$

   $2 + \mathbf{4} = 6$

   $6\frac{2}{3} + \mathbf{4} = 10\frac{2}{3}$

2. Add 4 to the output value.

3. $a = b + 4$

1. $2 \times \mathbf{5} = 10$

   $3 \times \mathbf{5} = 15$

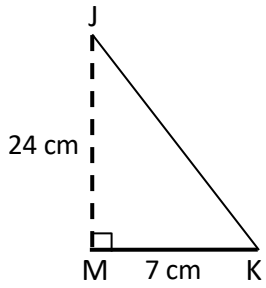
   $6 \times \mathbf{5} = 30$

   $12 \times \mathbf{5} = 60$

2. Multiply the output value by 5.

3. $a = 5b$ (we write $5 \times b$ as $5b$)

4.1



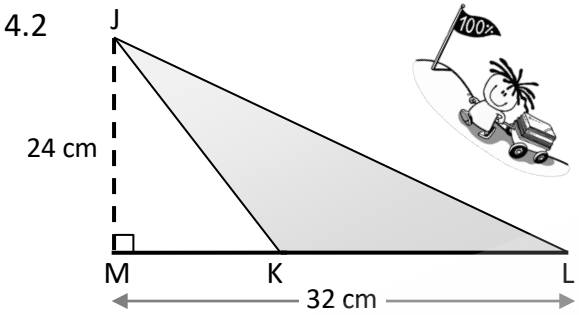
The area of ΔJMK

$= \frac{1}{2} \times \text{base} \times \perp \text{height}$

$= \frac{1}{2} \times 7 \times 24$

$= 84 \text{ cm}^2$

4.2



The area of ΔJML

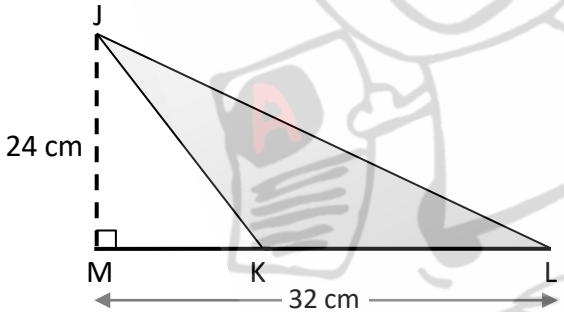
$= \frac{1}{2} \times \text{base} \times \perp \text{height}$

$= \frac{1}{2} \times ML \times JM$

$= \frac{1}{2} \times 32 \times 24$

$= 384 \text{ cm}^2$

4.3



Method 1 (using 4.1 & 4.2)

Area ΔJKL

= Area ΔJML – Area of ΔJMK

= 384 – 84

= 300 cm^2

Method 2 (using the formula)

Area ΔJKL

$= \frac{1}{2} \times \text{base} \times \perp \text{height}$

$= \frac{1}{2} \times 25 \times 24$

$= 300 \text{ cm}^2$

4.4 (h represents the $\perp$ height)

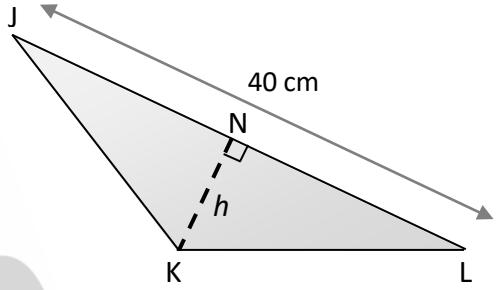
$\frac{1}{2} \times JL \times h = 300 \text{ cm}^2$

$\therefore \frac{1}{2} \times 40 \times h = 300$

$\therefore 20 \times h = 300$

$20 \times 15 = 300$

$\therefore h = 15 \text{ cm}$

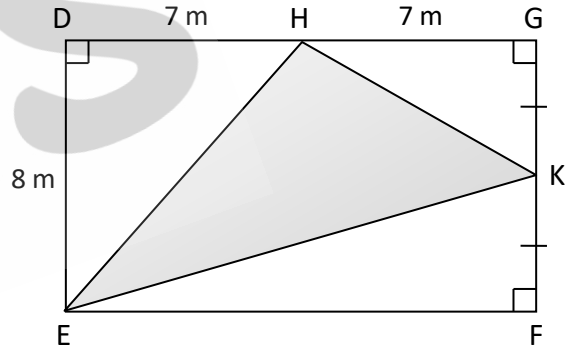


Exercise 13 Solutions

Learner Book Part 2, p. 147

1.1

DEFG is a rectangle because it has 4 right angles.



Area ΔHEK = Area DEFG – Area ΔEDH – Area ΔEFK – Area ΔGHK

Area DEFG $= 8 \times 14 = 112 \text{ m}^2$

Area ΔEDH

$= \frac{b \times h}{2}$

$= \frac{1}{2} \times DE \times DH$

$= \frac{1}{2} \times 8 \times 7$

$= 28 \text{ m}^2$

Area ΔEFK

$= \frac{b \times h}{2}$

$= \frac{1}{2} \times EF \times KF$

$= \frac{1}{2} \times 14 \times 4$

$= 28 \text{ m}^2$

Area ΔGHK

$= \frac{b \times h}{2}$

$= \frac{1}{2} \times GK \times HG$

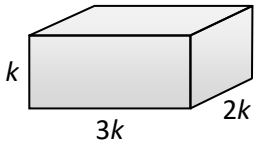
$= \frac{1}{2} \times 4 \times 7$

$= 14 \text{ m}^2$

$\therefore$ area $\Delta HEK = 112 - 28 - 28 - 14 = 42 \text{ m}^2$

2.1 $3 : 2 : 1 = 3k : 2k : k$

Volume of prism
= length $\times$ breadth $\times$ height
= $3k \times 2k \times k$
= $6k^3$



$\therefore\ 6k^3 = 750$

$6k^3 \div 6 = 750 \div 6$ $(6 \times 125 = 750)$

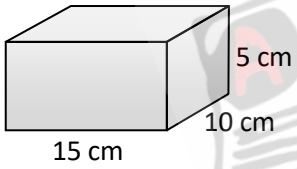
$\therefore\ k^3 = 125$

$\therefore\ k = 5$ cm $(\sqrt[3]{125} = \sqrt[3]{5^3} = 5)$

$2k = 2 \times 5 = 10$ cm
$3k = 3 \times 5 = 15$ cm

$\therefore$ the dimensions are 15 cm $\times$ 10 cm $\times$ 5 cm.

2.2



The total surface area of the prism
= $(2 \times 15 \times 5) + (2 \times 10 \times 5) + (2 \times 15 \times 10)$
= $150 + 100 + 300$
= 550 cm^2

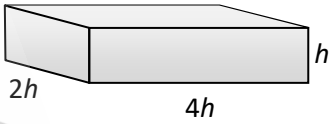
Exercise 8 Solutions

Learner Book Part 2, p. 158

1.1 Let the height be h.

$\therefore$ the breadth = $2h$ and the length = $4h$.

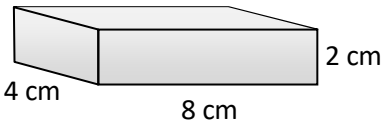
The total surface area
= $(2 \times 4h \times h) + (2 \times 2h \times h) + (2 \times 2h \times 4h)$
= $8h^2 + 4h^2 + 16h^2$
= $28h^2$



$\therefore\ 28h^2 = 112$
$28 \times 4 = 112$
$\therefore\ h^2 = 4$
$\therefore\ h = 2$ cm
$2h = 2 \times 2 = 4$ cm
$4h = 4 \times 2 = 8$ cm

$\therefore$ the dimensions are 2 cm $\times$ 4 cm $\times$ 8 cm.

1.2 The volume of the prism
= length $\times$ breadth $\times$ height
= $8 \times 4 \times 2$
= 64 cm^3



1.3 The capacity of the prism
= 64 mℓ
= $0{,}064$ litres

Exercise 9 Solutions

Learner Book Part 2, p. 174

1.1 Thabiso's combined total for three tests is $3 \times 68 = 204$.

She needs a combined total of $4 \times 70 = 280$.

$\therefore$ she needs to get $280 - 204 = 76\%$ for her fourth test.

1.2 It is possible for Thabiso to achieve her goal.

2.1 **Option 1** (work in minutes)

20 seconds $= \frac{20}{60} = \frac{1}{3}$ of a minute

Adam's combined time for 9 parkruns

$= 9 \times \left(20 + \frac{1}{3}\right)$

$= 9 \times 20 + 9 \times \frac{1}{3}$

$= 180 + 3$

$= 183$ minutes

Adam needs a combined time of $10 \times 20 = 200$ minutes.

$\therefore$ Adam must run his tenth parkrun in $200 - 183 = 17$ minutes.

Option 2 (work in seconds)

20 minutes and 20 seconds

$= 20 \times 60$ seconds + 20 seconds

$= 1\,200 + 20$

$= 1\,220$

Adam's combined time for 9 parkruns

$= 9 \times 1\,220$

$= 10\,980$ seconds

Adam needs a combined time of $10 \times 1\,200$ seconds $= 12\,000$ s

$12\,000 - 10\,980 = 1\,020$ seconds $= \frac{1\,020}{60} = 17$ minutes

$\therefore$ Adam must run his tenth parkrun in 17 minutes.

2.2 It is unlikely that Adam will be able to achieve his goal.

(It is possible to run 5 km in 17 minutes, but Adam's average time of 20 minutes and 20 seconds indicates that he will struggle to run fast enough to achieve his goal.)