

NumberSense Assessment Portfolio – Grade 6

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Name: _____

Class: _____

- You should complete this assignment in class and work alone.
- Complete all answers on this question paper.
- You may use your NumberSense Workbook or any other Mathematics notes to help you, but you should not use a calculator.
- You should complete this assignment in no more than 80 minutes.
- This assignment is for 30 marks.

1. Calculate and show your thinking.

a. $3\,574 + 2\,089 + 7\,002$

(2)

b. $5\,406 - 2\,387$

(2)

c. 264×35

(2)

d. $5\,472 \div 25$

(2)

e. $2000 - 1999 + 1998 - 1997 + \dots + 2 - 1$

(2)

2. At a toy shop, the price of toys increases by 5% each year. One year, the shop attendant forgot to increase the prices so the next year, he increased the prices by 10%.



Increasing the price by 10% is the same as increasing it by 5% and then again by 5%.

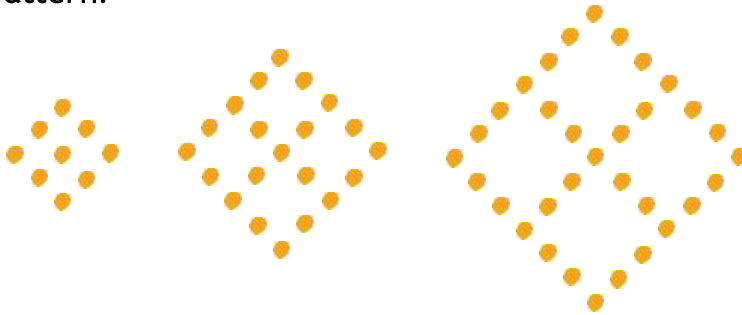
Is the shop attendant correct? Justify by showing your calculation.

(3)

3. In the equation: $\frac{1}{A} + \frac{1}{B} + \frac{1}{C} = \frac{6}{7}$, A, B and C are different whole numbers. Determine the value of $A + B + C$. Show your thinking.

(4)

4. Abdul makes pictures with dots. The first four pictures make a pattern.



Picture 1

Picture 2


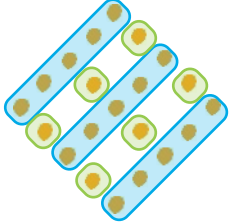
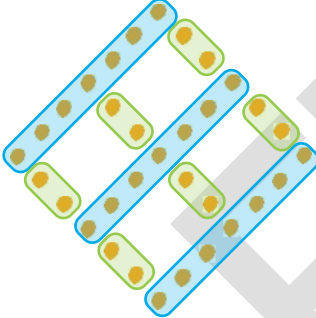



Picture 3



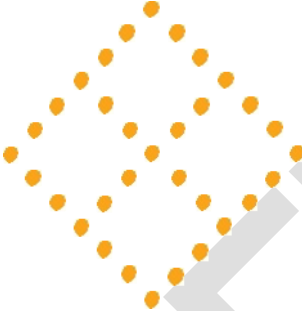



Picture 4

- Draw the fourth picture in the pattern. (1)
- Determine at least three different rules that you can use to work out the number of dots in any picture number. For each set of pictures in the table on the next page:
 - show your thinking,
 - write the calculation below each picture
 - write the rule
 - use the rule to calculate the number of dots in picture 50.

The first one is done for you as an example. You should do at least 3 more.

(12)

Picture 1	Picture 2	Picture 3	
			<p>Rule:</p> <p>No. of dots = $3 \times (2 \times \text{pic. no.} + 1) + 6 \times (\text{pic. no.} - 1)$</p>
$3 \times 3 + 6 \times 0 = 9$	$3 \times 5 + 6 \times 1 = 21$	$3 \times 7 + 6 \times 2 = 33$	<p>No. of dots in pic. 50 =</p> $3 \times (2 \times 50 + 1) + 6 \times (50 - 1)$ $= 3 \times 101 + 6 \times 49$ $= 303 + 294$ $= 597$
			<p>Rule:</p> <p>No. of dots =</p>
			<p>No. of dots in pic. 50 =</p>

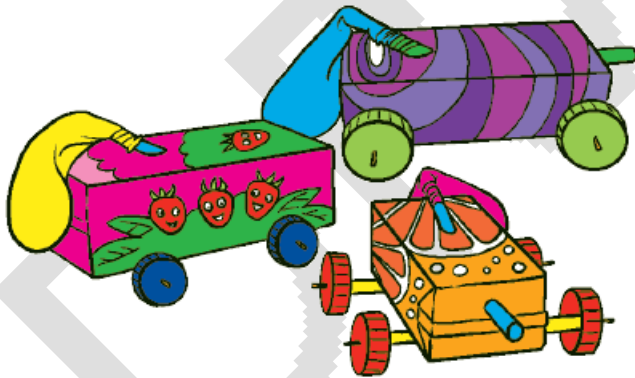
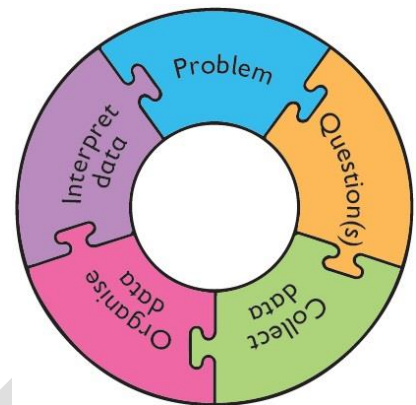
			<p>Rule:</p> <p>No. of dots =</p>
			<p>No. of dots in pic. 50 =</p>
			<p>Rule:</p> <p>No. of dots =</p>
			<p>No. of dots in pic. 50 =</p>

Project: Can you develop a balloon-powered car to meet a challenge?

(NumberSense Workbook 23, pages 56 – 62)

Project description

- Your teacher will assign you to a group to complete this project.
- Working as a group you will complete the research activity described on pages 56 to 62.
- Your teacher will tell you whether you will complete the task in your workbooks or develop a poster as a group and submit that for marking. You must also hand in your balloon-powered cars on completion of the task.
- Your group will also make a presentation about your work. Each member of the group must contribute to the presentation.
- This project is for 25 marks and will be marked using the rubric provided.
- This project is due on _____



Names of group members: _____

Research question (pg. 56)	3 At least two other research questions are clearly stated with relevant criteria of what it could mean to meet a challenge.	2 One other research question is clearly stated with relevant criteria of what it could mean to meet a challenge.	1 0 The research questions are neither well stated nor relevant to what it means to meet a challenge.	[3]
Balloon-powered car construction (pgs. 57 – 59)	3 Instructions were clearly followed to build a structurally sound balloon-powered car and the groups cars demonstrate an awareness of how variables could vary the outcome.	2 Most instructions were followed and balloon-powered cars are mostly structurally sound.	1 0 Balloon-powered cars constructed, but not necessarily according to instructions. Some structural errors and/or no variation in design.	[3]
Data collection (pgs. 59 – 60)	4 All the required data has been collected and recorded, i.e. the distance driven by each of the four cars has been measured 3 times with no marbles, 6 marbles and 12 marbles for 1, 2 and 3 breaths.	3 2 More than half the required data has been collected.	1 0 Half or less than half the required data has been collected.	[4]
Data organisation 1 (pg. 60)	3 The median for each set of three data items has been correctly determined and summarized in a table.	2 The median for each set of data items has mostly been correctly determined and summarized in a table.	1 0 The median for each set of data items has been correctly determined and summarized in a table for half or less than half of the requirement	[3]

Data organisation (pg. 59)	<p>5 4</p> <p>Range of distances has correctly been used to calculate appropriate distance intervals.</p> <p>Graph clearly communicates the conditions of cars which travelled in those distance intervals.</p>	<p>3 2</p> <p>Range of distances has correctly been used to calculate appropriate distance intervals.</p> <p>Graph mostly communicates the conditions of cars which travelled in those distance intervals.</p>	<p>1 0</p> <p>Minor errors in calculating distance intervals creates an unclear picture in the graph and/or the conditions of the cars which travelled in those intervals is unclear.</p>	[5]
Data interpretation (pg. 62)	<p>5</p> <p>Interpretation shows evidence of a thoughtful analysis and explanation of the data presented in the graphs</p>	<p>4 3 2</p> <p>Interpretation shows some evidence of a thoughtful analysis but the link with what is presented in the graphs may lack some clarity.</p>	<p>1 0</p> <p>The interpretation is not supported by evidence in the data.</p>	[5]
Winning team (pg. 62)	<p>2</p> <p>These marks are awarded to the group members whose car travelled closest to the target set by the teacher.</p>			[2]
TOTAL				[25]

Teachers comments:

.....

.....

.....

.....

.....

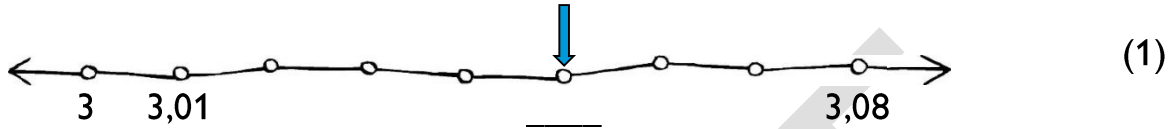
.....

Name: _____

Class: _____

- Complete all answers on this question paper.
- Calculators may not be used.

1. Determine the value indicated by the arrow.



2. a. Write $\frac{16}{100}$ as an equivalent decimal fraction. _____ (1)

b. Write 13% as an equivalent common fraction. _____ (1)

3. Write each set of numbers from the smallest number to the largest number.

a. $\frac{1}{2}$; $\frac{3}{4}$; $\frac{1}{8}$ _____ ; _____ ; _____ (1)

b. 1,03 ; 10,3 ; 1,13 _____ ; _____ ; _____ (1)

4. Complete. Fill in the answer only.

a. $2\ 500\ 999 + \underline{\hspace{2cm}} = 2\ 501\ 000$ (1)

b. $1\frac{2}{5} + \frac{4}{5} = \underline{\hspace{2cm}}$ (1)

c. $299 \times 7 = \underline{\hspace{2cm}}$ (1)

d. $2,3 \times 5 = \underline{\hspace{2cm}}$ (1)

e. $\frac{1}{4} \times 852 = \underline{\hspace{2cm}}$ (1)

f. $1 \div 0,25 = \underline{\hspace{2cm}}$ (1)

g. $18 \div 9 + 3 \times 5 = \underline{\hspace{2cm}}$ (1)

h. 1% of R4 500 = R_____ (1)

5. Calculate. *Show your thinking.*

a. $2\,431 - 845$

(2)

b. $5\frac{1}{6} - \frac{2}{3}$

(2)

c. 42×78

(2)

6. Mrs Brown buys a cake for R50. She sells the cake at a cake sale for R45.

a. Did Mrs Brown make a profit or loss when she sold the cake?
Select one.

☐

profit

☐

loss

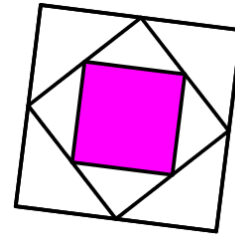
(1)

b. Calculate the percentage profit/loss that Mrs Brown made.
Show your thinking.

_____%

(2)

7. The figure is formed by successively joining the midpoints of sides of a square. What fraction of the whole figure is shaded? Explain your thinking.



(2)

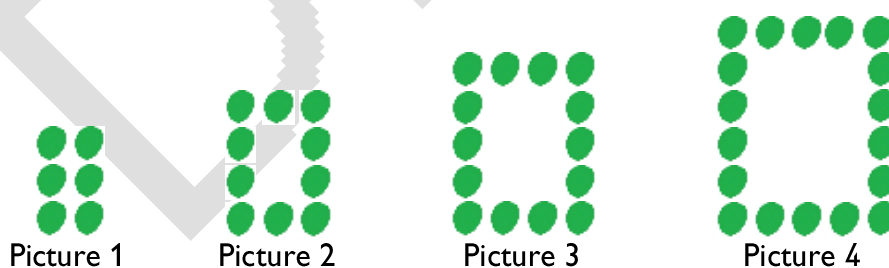
8. A represents a number. Determine the value of A that makes this sentence correct: $A \div 2 = 32 \div A$

A = _____ (1)

9. In a chess competition players get 1 point for winning a game, $\frac{1}{2}$ a point for drawing and no points for losing. Ferial played 7 games in a tournament and only lost one game. Her final score was 5 points. How many games did she win? Show your thinking.

_____ wins (2)

10. Nomsa draws pictures with dots like this and completes a table to calculate the number of dots in pictures 1 to 6.



Picture 1

Picture 2

Picture 3

Picture 4

- a. How many dots will there be in picture 5? _____ dots (1)

- b. Zoliswa looked for patterns in the picture.



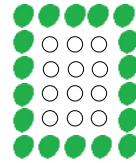
I fill up the rectangle and compensate.



Picture 2



Picture 3



Picture 4

$$P2: 3 \times 4 - 1 \times 2$$

$$P3: 4 \times 5 - 2 \times 3$$

$$P4: 5 \times 6 - 3 \times 4 \text{ etc.}$$

Use Zoliswa's method to determine the number of dots in picture 20. Be sure to show your thinking.

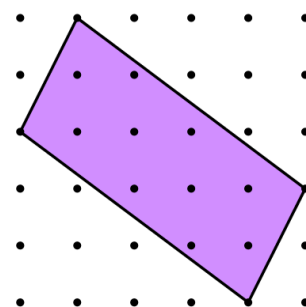
_____ dots (2)

- c. Determine the number of dots in picture 100 using any method. Show your thinking.

_____ dots (2)

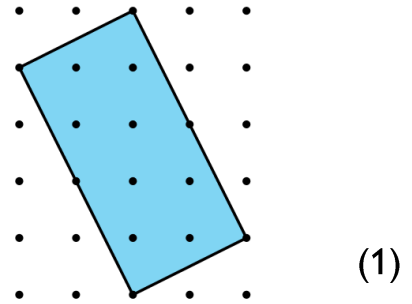
11. What type of quadrilateral is shown on each grid? Select the best option for each one.

- a. ☒ rectangle
☐ square
☐ parallelogram
☐ none of the above



(1)

- b. ☐ rectangle
☐ square
☐ parallelogram
☐ none of the above



(1)

12. For each statement, select whether the statement is true or false. If it is false, write the correct statement alongside.

- a. The opposite sides of a parallelogram are parallel and equal.

☐ True ☐ False

Correction (if required):

(1)

- b. The diagonals of a square are parallel.

☐ True ☐ False

Correction (if required):

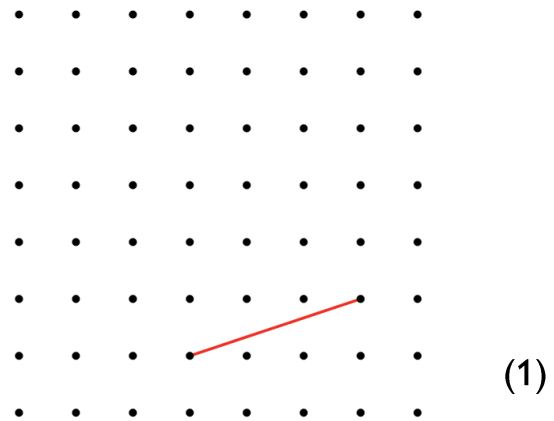
(1)

13. Select all the properties that apply to a rectangle.

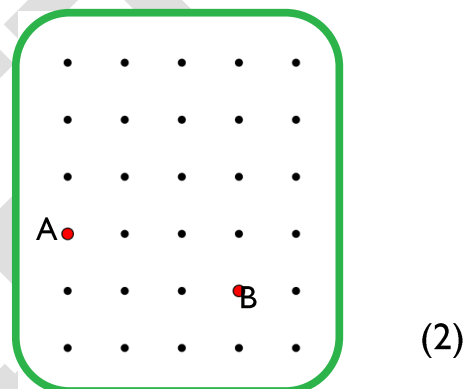
- ☒ Opposite sides are equal
☐ Opposite sides are parallel
☐ Diagonals are equal
☐ Diagonals bisect each other
☐ Diagonals meet at right angles

(1)

14. One side of a square is drawn on the grid. Complete the square.



15. Two points, A and B are labelled on a grid. Draw two different squares that both use A and B as vertices. Your squares may overlap, but you should not draw out of the grid.



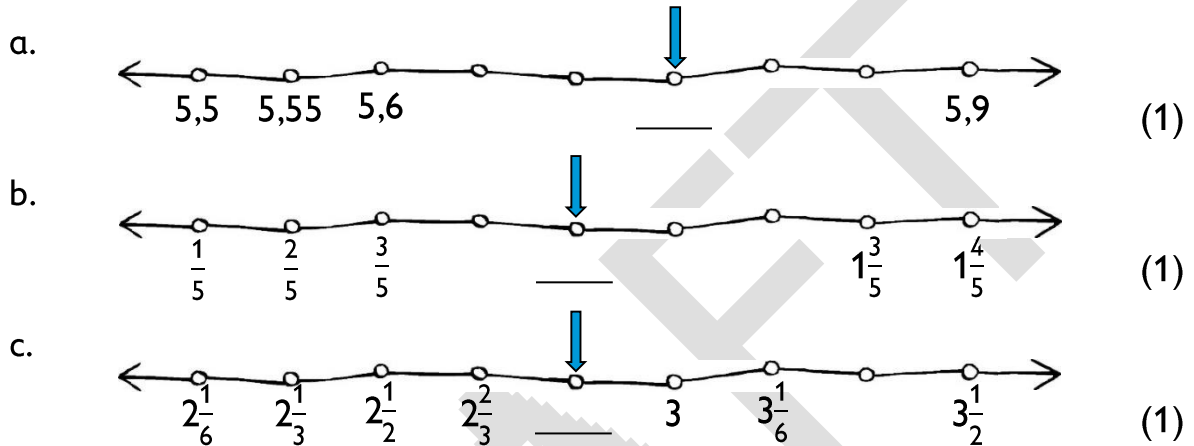
PART A

Name: _____

Class: _____

- Complete all answers on this question paper.
- Calculators may not be used.

1. Determine the values indicated by the arrows.



2. Determine which number is biggest? Select one in each case.

- a. ☐ $\frac{1}{2}$ ☐ $\frac{3}{5}$ ☐ $\frac{3}{7}$ (1)
- b. ☐ 0,45 ☐ 0,045 ☐ 0,405 (1)

3. Select all the numbers that:

a. are divisible by 2.

- ☐ 58 ☐ 83 ☐ 104
- ☐ 2 405 ☐ 115 620 ☐ 679 177 (1)

b. are factors of 124.

- ☐ 1 ☐ 4 ☐ 6
- ☐ 24 ☐ 62 ☐ 72 (1)

c. 6 195 is divisible by.

☐ 2☐ 3☐ 5☐ 6☐ 9☐ 10 (2)

d. are prime numbers.

☐ 7☐ 9☐ 13☐ 21☐ 29☐ 72 (1)

4. a. Write 8,02 as an equivalent number with a common fraction.

_____ (1)

b. Write $7\frac{1}{25}$ as an equivalent decimal fraction.

_____ (1)

5. Peter obtained 27 out of 30 for a Mathematics test. What percentage did Peter get?

_____ % (1)

6. What number is half way between 2,8 and 2,86?

_____ (1)

7. Give two different common fractions that are equal to $\frac{4}{6}$.

_____ and _____ (2)

8. Complete. Fill in the answer only.

a. $241 + 399 =$ _____ (1)

b. $2\frac{4}{7} + 1\frac{2}{7} =$ _____ (1)

c. $\frac{2}{5} + \frac{1}{10} =$ _____ (1)

d. $12,38 -$ _____ $= 12,3$ (1)

e. $R100 - R71,95 = R$ _____ (1)

f. $R399 \times 4 = R$ _____ (1)

g. $\frac{1}{5} \times R30,25 = R$ _____ (1)

h. 25% of R240 = R_____ (1)

i. $\frac{1}{2}$ of $\frac{1}{7} =$ _____ (1)

j. $R72,16 \div 8 = R$ _____ (1)

k. $6 \times 6 - 8 \div 2 =$ _____ (1)

9. Use the fact that $26 \times 325 = 8\,450$ to calculate $2,6 \times 3,25$.

_____ (1)

10. Calculate. Show your thinking.

a. 627×105 _____ (2)

b. $1\,263 \div 25$ _____ (2)

c. $4\frac{5}{12} - 2\frac{3}{4}$

(2)

d. $\frac{3}{4} - \frac{1}{6}$

(2)

11. A shop offers a 20% discount for paying cash. Mandla would like to buy a skateboard marked R330. How much would Mandla pay if he pays cash? Show your thinking.

R_____ (2)

12. Josie makes orange paint by mixing 2 litres of red paint and 5 litres of yellow paint.

a. Write down the ratio of red paint to yellow paint in its simplest form. _____ (1)

b. How much red paint should Josie mix with 15 litres of yellow paint to get the same colour? _____ litres (1)

c. Josie needs 35 litres of paint to paint a wall. How much red and yellow paint does she need? Show your thinking.

_____ litres red and _____ litres yellow paint (2)

13. Zodwa's team is painting the 48 windows on the set of the school play. So far they have painted 16 windows in 80 minutes. If they work at the same rate, determine how long it will take them to paint the remaining windows. Show your thinking.

(2)

14. Sally uses $\frac{2}{3}$ cups of milk in a recipe for 12 people. How many cups of milk should she use in the recipe for 18 people? Show your thinking.

_____ cup(s) (2)

15. Two whole numbers, A and B are chosen from this sequence of numbers: 1; 2; 3; 4; ...; 2 022; 2 023; 2 024.

Determine the largest possible value of $(A + B) \div (A - B)$. Show your thinking.

(2)

16. A palindrome is a whole number that reads the same forwards or backwards (e.g. 5 115). Determine the number of palindromes between 100 and 1000.

_____ palindromes (2)

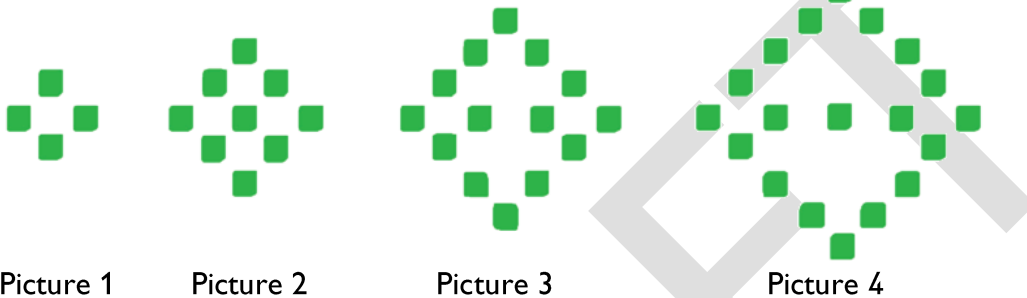
PART B

Name: _____

Class: _____

- Complete all answers on this question paper.
- Calculators may not be used.

17. Nomsa draws pictures with dots like this.

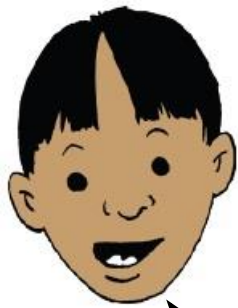


- How many dots does Nomsa add each time to the previous picture to make the next picture in the pattern? _____ dots (1)
- How many dots will there be in Picture 5? _____ dots (1)
- Complete the flow diagram to show how you can calculate the number of dots if you know the picture number. (2)

Picture no. →

(2)

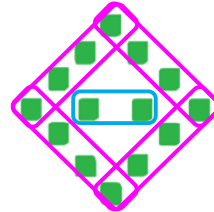
- d. Abdul looked for patterns in the picture.



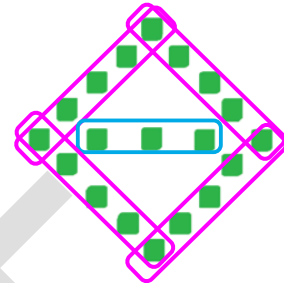
I see four sides of a diamond and a diagonal row of dots in the middle.



Picture 2



Picture 3



Picture 4

Picture 2: $4 \times 3 - 4 + 1 = 9$

Picture 3: $4 \times 4 - 4 + 2 = 14$

Picture 4: $4 \times 5 - 4 + 3 = 19$

Use Abdul's thinking to write a rule that can be used to calculate the number of dots in any picture number. Complete.

No. of dots = _____ (2)

- e. Use Abdul's thinking to determine how many dots there will be in Picture 100. Show your thinking.

_____ dots (1)

- f. Use the flow diagram, Abdul's thinking or your own thinking to determine which picture number will have exactly 99 dots. Show your thinking.

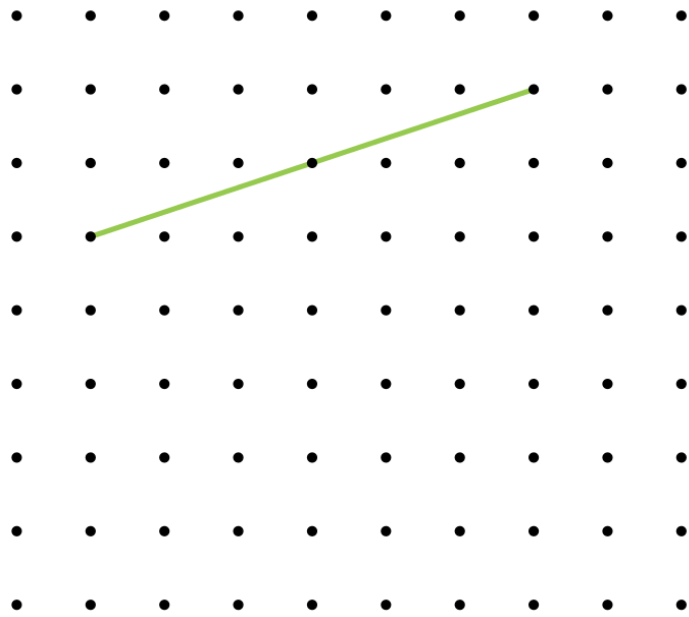
Picture _____ (2)

- Determine the sum of the numbers in Row 8. Show your thinking.



- (1)

20. One side of a rectangle is drawn on the grid. Complete the rectangle on the grid.



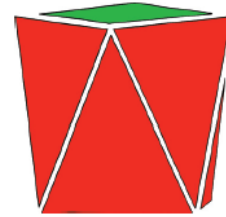
(1)

21. Select all the properties that apply to a square.

- ☐ Opposite sides are equal
- ☐ Opposite sides are parallel
- ☐ Diagonals are equal
- ☐ Diagonals bisect each other
- ☐ Diagonals meet at right angles

(2)

22. Sally used her GeoGenius Construction kit pieces to make this polyhedron.



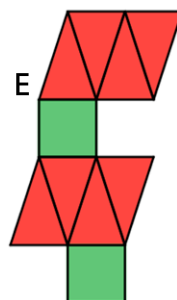
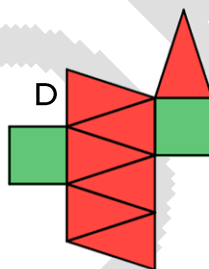
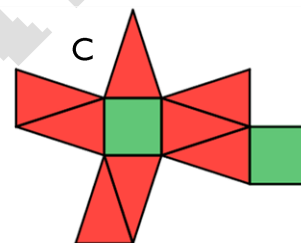
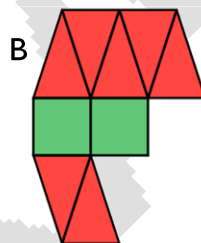
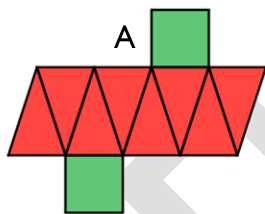
- a. What is the name of the polyhedron? Select all the correct options.

- | | | |
|---|---|-----|
| <input type="checkbox"/> Square | <input type="checkbox"/> Square-based pyramid | |
| <input type="checkbox"/> Square-based prism | <input type="checkbox"/> Square-based antiprism | |
| <input type="checkbox"/> Tetrahedron | <input type="checkbox"/> Cube | (1) |

- b. How many vertices does this polyhedron have?

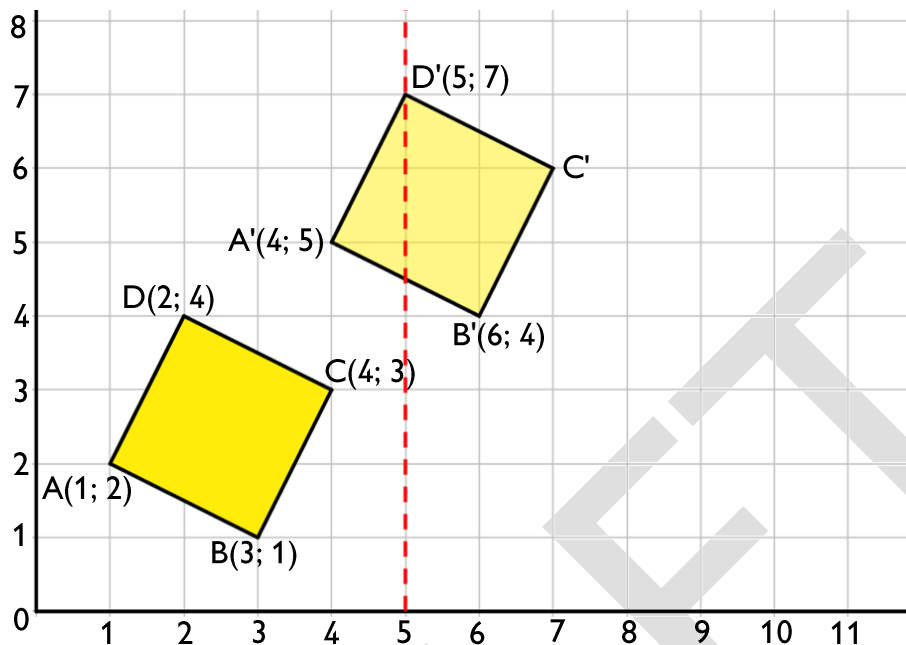
_____ vertices (1)

- c. Which of the following nets could you fold to create Sally's polyhedron? Select all the correct ones.



- | | | | | | |
|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|-----|
| <input type="checkbox"/> A | <input type="checkbox"/> B | <input type="checkbox"/> C | <input type="checkbox"/> D | <input type="checkbox"/> E | (2) |
|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|-----|

23. Quadrilateral ABCD has been transformed to create an image A'B'C'D'.



- a. Describe how ABCD was transformed. Select the best option.

- ☐ Rotated around C
- ☐ Reflected about CD
- ☐ Translated 2 units right and 1 unit up
- ☒ Translated 3 units right and 3 units up
- ☐ Translated 2 units up

(1)

- b. What are the coordinates of C'? C'(__; __)

(1)

- c. On the grid, draw the reflection of ABCD about the vertical red line.

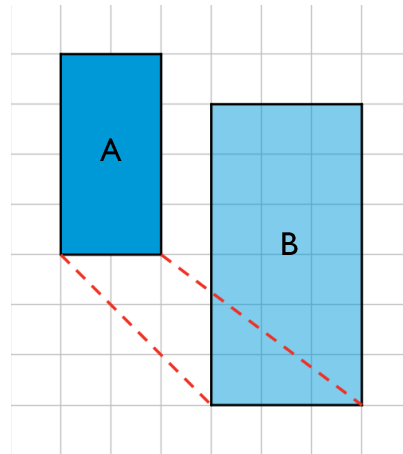
(1)

24. Rectangle A has been transformed to create an image, Rectangle B.

- a. Is rectangle B an enlargement or reduction of rectangle A? Select one.

☐ Enlargement

☐ Reduction

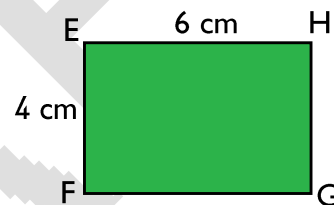


(1)

- b. Determine the ratio of the lengths of the corresponding sides of rectangle A to rectangle B. _____

(1)

25. If rectangle EFGH is enlarged so that side E'F' = 6 cm, determine the length of E'H'. Show your thinking.



_____ cm (1)

26. a. What is the most likely weight of a cow? Select the best option.

☐ 5 kg

☐ 50 g

☐ 50 kg

☒ 500 g

☐ 500 kg

☐ 5 000 kg (1)

b. What is the most likely temperature to set an oven to roast a chicken? Select the best option.

☐ 18°C

☐ 180°C

☐ 380°C

☐ 1 000°C

☐ 1 380°C

☐ 1 800°C (1)

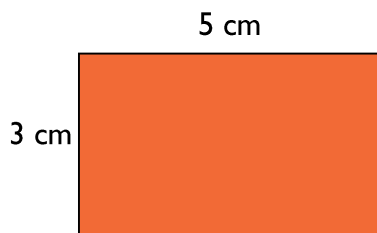
27. Ottawa is 5 hours behind the UTC zone.

South Africa is 2 hours ahead of the UTC zone.

If it is 23:15 in South Africa, what is the time in Ottawa? Show your thinking.

_____ (2)

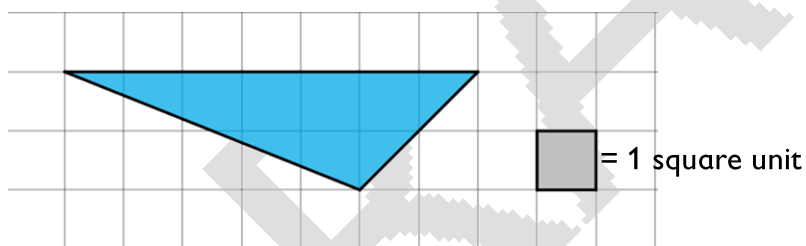
28. Calculate the perimeter and area of the rectangle.



Perimeter = _____ cm

Area = _____ cm² (2)

29. Determine the area of the triangle. Show your thinking.



_____ square units (2)

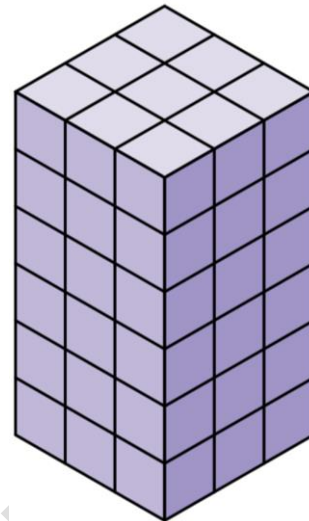
30. The rectangular prism is made up of 1 cm by 1 cm by 1 cm cubes. It has dimensions 3 cm by 3 cm by 6 cm.

a. Calculate the volume of the prism.

_____ cm^3

(1)

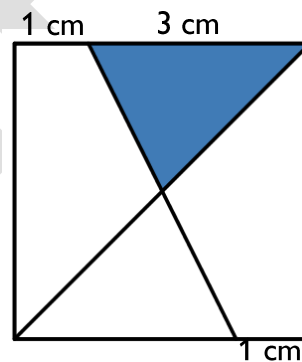
b. Determine the surface area of the prism.
Show your thinking.



_____ cm^2

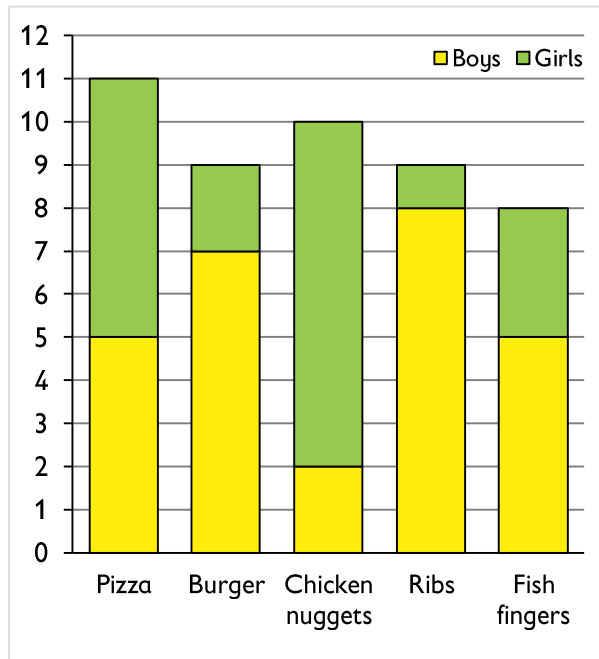
(2)

31. A square is divided by a diagonal and a second straight line as shown. Determine the fraction of the square that is shaded. Show your thinking.



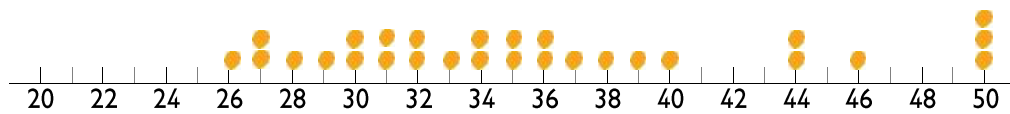
(3)

32. Ruan asked the children in his class, what their preferred dinner was and recorded the results in this graph.

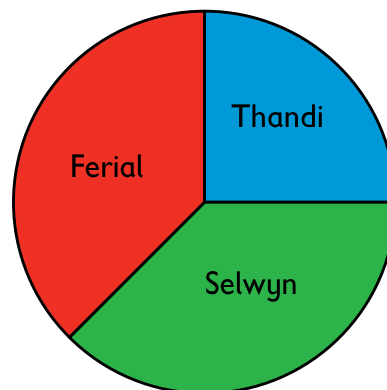


- a. Which dinner was the boys' most preferred dinner? _____ (1)
- b. Which dinner was the girls' most preferred dinner? _____ (1)
- c. Ruan can select one option to share amongst his whole class. Which dinner should he choose? Justify your answer. _____ (2)

33. Selwyn sold ice creams. He recorded the number of ice creams that he sold each day in February on a dot plot.



- Determine the modal number of ice creams Selwyn sold in February. _____ ice creams (1)
 - Determine the median number of ice creams Selwyn sold in February. _____ ice creams (1)
 - Which summary, the mode or median, is a better representation of Selwyn's data? Give a reason for saying so. (2)
- 34 The pie chart shows how much pocket money three children get. Ferial and Selwyn get the same amount and Thandi gets R120. How much pocket money does Selwyn get? Show your thinking.



R_____

(2)

To prepare for this assessment, learners should have completed NumberSense Workbooks 23 and 24, pages 1 – 38.

Memo:

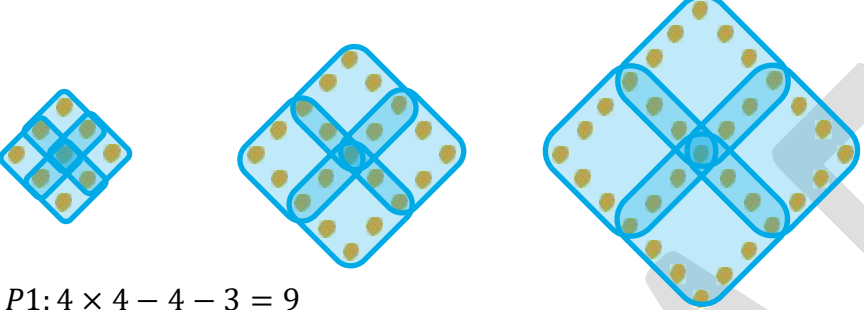
Ques	Correct solution(s)	Comment	Content area	Page ref.	Cognitive domain	Mark allocation
1.a.	<p>12 665</p> <p><i>Possible thinking:</i></p> <ul style="list-style-type: none"> $3500 + 2000 + 7000 = 12500$. $74 + 2 \rightarrow 76 + 90 - 1 \rightarrow 165$. $12500 + 165 = 12665$ <i>Column method</i> 	<p>1 mrk: correct</p> <p>1 mrk: valid thinking</p>	NOR	24.31	A	(2)
1.b.	<p>3019</p> <p><i>Possible thinking:</i></p> <ul style="list-style-type: none"> $5406 - 2387 = 5400 - 2381$. $5000 - 2000 = 3000$ and $400 - 381 = 19$ $2387 + 613 \rightarrow 3000 + 2406 \rightarrow 5406$. $613 + 2406 = 3019$ $5406 - 2000 \rightarrow 3406 - 300 \rightarrow 3106 - 80 \rightarrow 3026 - 7 \rightarrow 3019$ <i>Column method</i> 	<p>1 mrk: correct</p> <p>1 mrk: valid thinking</p>	NOR	24.31	A	(2)

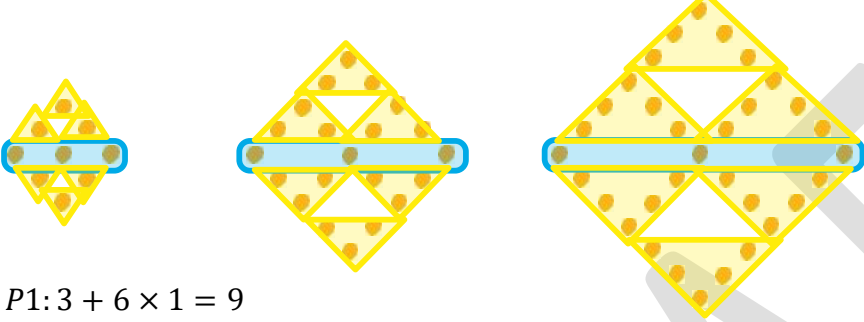
Ques	Correct solution(s)	Comment	Content area	Page ref.	Cognitive domain	Mark allocation
1.c.	9240 <i>Possible thinking:</i> <ul style="list-style-type: none"> $264 \times 30 = (264 + 264 + 264) \times 10 = 7920$ $264 \times 5 = \text{Half of } 2640 = 1320$ $7920 + 1320 = 9240$ See records of thinking in Wkbk 23, p. 24 	1 mrk: correct 1 mrk: valid thinking	NOR	23.24, 23.34	A	(2)
1.d.	218,88 or 218 remainder 22 <i>Possible thinking:</i> <ul style="list-style-type: none"> $5472 \div 25 = 10944 \div 50 = 21888 \div 100$ $5472 - 5000(200) \rightarrow 472 - 250(10) \rightarrow 222 - 125(5) \rightarrow 97 - 75(3) \rightarrow 22.$ $200 + 10 + 5 + 3 = 218$ See records of thinking in Wkbk 23, p. 29 	1 mrk: correct 1 mrk: valid thinking	NOR	23.29, 23.34	A	(2)
1.e.	1000 <i>Possible thinking:</i> <ul style="list-style-type: none"> $(2000 - 1999) + (1998 - 1997) + \dots + (2 + 1) = 1 + 1 + 1 + \dots 1000 \text{ times} = 1000$ 	1 mrk: correct 1 mrk: valid thinking	NOR		R	(2)

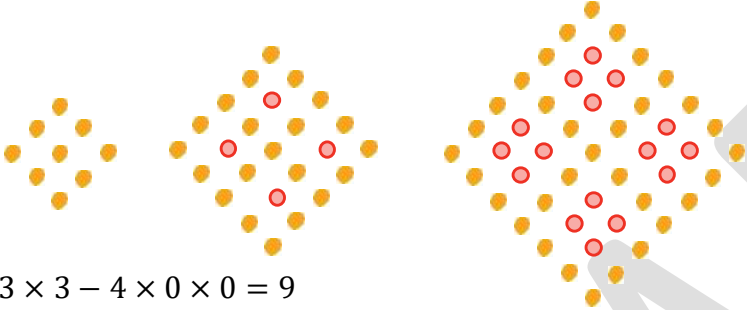
Ques	Correct solution(s)	Comment	Content area	Page ref.	Cognitive domain	Mark allocation
2.	<p>The employer is incorrect.</p> <p><i>Possible explanation using R400 as initial cost of toy:</i></p> <p>If a toy costs R400, a 5% increase will be: $R400 + R20 = R420$ and another 5% increase will be: $R420 + R21 = R441$</p> <p>A 10% will be: $R400 + R40 = R440$</p>	<p>1 mrk: correct</p> <p>1 mrk: correct example of increase by 5% and again by 5%</p> <p>1 mrk: correct example of increase by 10%</p> <p><i>NB: Learners may use any amount to show that there is a difference. R400 has been used as an illustration.</i></p>	NOR	24.13, 24.17	R	(3)

Ques	Correct solution(s)	Comment	Content area	Page ref.	Cognitive domain	Mark allocation
3.	<p>47</p> <p><i>Possible thinking:</i></p> <p><i>Guess and check using equivalent fractions:</i></p> $\frac{6}{7} = \frac{12}{14} = \frac{1}{14} + \frac{7}{14} + \frac{4}{14} = \frac{1}{14} + \frac{1}{2} + \frac{4}{12} \dots \text{can only make 2 unit fractions}$ $\frac{6}{7} = \frac{18}{21} = \frac{1}{21} + \frac{3}{21} + \frac{14}{21} = \frac{1}{21} + \frac{1}{7} + \frac{2}{7} \dots \text{again makes 2 unit fractions}$ $\frac{6}{7} = \frac{36}{42} = \frac{1}{42} + \frac{14}{42} + \frac{21}{42} = \frac{1}{42} + \frac{1}{3} + \frac{1}{2} \dots \text{3 unit fractions} \text{ 😊}$ $42 + 3 + 2 = 47$	<p>1 mrk: correct</p> <p>1 mrk: finding fractions equivalent to $\frac{6}{7}$</p> <p>1 mrk: writing sum of equivalent fractions</p> <p>1 mrk: converting the sum to equivalent fractions in the attempt to get unit fractions.</p>	NOR		R	(4)
4.	<p><i>Another four ways of thinking about the pattern are given here. Learners have been asked for 3 ways. There may be other ways of thinking about it too. If your learners describe an interesting way of thinking about the pattern to describe a rule to calculate the number of dots in any pattern and it is not covered here, please share it with the NumberSense Team by emailing: info@NumberSense.co.za</i></p>	<p>For each pattern:</p> <p>1 mrk: showing thinking on picture</p> <p>1 mrk: calculations relating to thinking on picture</p> <p>1 mrk: rule</p> <p>1 mrk: no. of dots in P50 by substituting into rule</p>	PFA	23.31	A	(4 × 3 = 12)

Ques	Correct solution(s)	Comment	Content area	Page ref.	Cognitive domain	Mark allocation
	<p> $P1: 9 + 12 \times 0 = 9$ $P2: 9 + 12 \times 1 = 21$ $P3: 9 + 12 \times 2 = 33$ </p> <p>Rule: No. of dots = $9 + 12 \times (\text{pic. no.} - 1)$</p> <p> $P50: 9 + 12 \times 49 = 9 + 490 + 98$ $= 597$ </p>					

Ques	Correct solution(s)	Comment	Content area	Page ref.	Cognitive domain	Mark allocation
	 <p> $P1: 4 \times 4 - 4 - 3 = 9$ $P2: 4 \times 8 - 8 - 3 = 21$ $P3: 4 \times 12 - 12 - 3 = 33$ </p> <p>Rule: No. of dots = $4 \times (4 \times \text{pic. no.}) - (4 \times \text{pic. no.}) - 3$</p> <p> $P50: 4 \times 200 - 200 - 3 = 800 - 200 - 3$ $= 597$ </p>					

Ques	Correct solution(s)	Comment	Content area	Page ref.	Cognitive domain	Mark allocation
	 <p> $P1: 3 + 6 \times 1 = 9$ $P2: 3 + 6 \times 3 = 21$ $P3: 3 + 6 \times 5 = 33$ </p> <p>Rule: No. of dots = $3 + 6 \times (2 \times \text{pic. no.} - 1)$</p> <p> $P50: 3 + 6 \times 99 = 3 + 594$ $= 597$ </p>					

Ques	Correct solution(s)	Comment	Content area	Page ref.	Cognitive domain	Mark allocation
	 <p> $P1: 3 \times 3 - 4 \times 0 \times 0 = 9$ $P2: 5 \times 5 - 4 \times 1 \times 1 = 21$ $P3: 7 \times 7 - 4 \times 2 \times 2 = 33$ </p> <p> Rule: No. of dots = $(2 \times \text{pic. no.} + 1) \times (2 \times \text{pic. no.} + 1) - 4 \times (\text{pic. no.} - 1) \times (\text{pic. no.} - 1)$ </p> <p> $P50: 101 \times 101 - 4 \times 49 \times 49 = 10\,201 - 4 \times 2\,401$ $= 10\,201 - 9604$ $= 597$ </p>					

This project is in NumberSense Workbook 23, pages 56 to 62. Teachers should assign learners to a group of 4 learners and on the day that the project is due set a target distance for the learners to drive their balloon-powered cars.

All questions can be answered in learner's NumberSense Workbooks. If teachers would prefer that projects are submitted in an alternative way (maybe for marking purposes), then they should advise the learners how to do so.

Because learners are collecting data, this project is not marked with a traditional memorandum. This project should be marked using the rubric supplied.

Research question (pg. 56)	3 At least two other research questions are clearly stated with relevant criteria of what it could mean to meet a challenge.	2 One other research question is clearly stated with relevant criteria of what it could mean to meet a challenge.	1 0 The research questions are neither well stated nor relevant to what it means to meet a challenge.	[3]
Balloon-powered car construction (pgs. 57 – 59)	3 Instructions were clearly followed to build a structurally sound balloon-powered car and the groups cars demonstrate an awareness of how variables could vary the outcome.	2 Most instructions were followed and balloon-powered cars are mostly structurally sound.	1 0 Balloon-powered cars constructed, but not necessarily according to instructions. Some structural errors and/or no variation in design.	[3]
Data collection (pgs. 59 – 60)	4 All the required data has been collected and recorded, i.e. the distance driven by each of the four cars has been measured 3 times with no marbles, 6 marbles and 12 marbles for 1, 2 and 3 breaths.	3 2 More than half the required data has been collected.	1 0 Half or less than half the required data has been collected.	[4]
Data organisation 1 (pg. 60)	3 The median for each set of three data items has been correctly determined and summarized in a table.	2 The median for each set of data items has mostly been correctly determined and summarized in a table.	1 0 The median for each set of data items has been correctly determined and summarized in a table for half or less than half of the requirement	[3]

Data organisation 2 (pg. 59)	<p>5 4</p> <p>Range of distances has correctly been used to calculate appropriate distance intervals.</p> <p>Graph clearly communicates the conditions of cars which travelled in those distance intervals.</p>	<p>3 2</p> <p>Range of distances has correctly been used to calculate appropriate distance intervals.</p> <p>Graph mostly communicates the conditions of cars which travelled in those distance intervals.</p>	<p>1 0</p> <p>Minor errors in calculating distance intervals creates an unclear picture in the graph and/or the conditions of the cars which travelled in those intervals is unclear.</p>	[5]
Data interpretation (pg. 62)	<p>5</p> <p>Interpretation shows evidence of a thoughtful analysis and explanation of the data presented in the graphs</p>	<p>4 3 2</p> <p>Interpretation shows some evidence of a thoughtful analysis but the link with what is presented in the graphs may lack some clarity.</p>	<p>1 0</p> <p>The interpretation is not supported by evidence in the data.</p>	[5]
Winning team (pg. 62)	<p>2</p> <p>These marks are awarded to the group members whose car travelled closest to the target set by the teacher.</p>			[2]
TOTAL				[25]

To prepare for this assessment, learners should revise from NumberSense Workbook 23, pages 1 – 30 and pages 40 – 45. Learners may also benefit from revising from Workbook 21 pages 39 – 46 (Rectangles, squares and parallelograms).

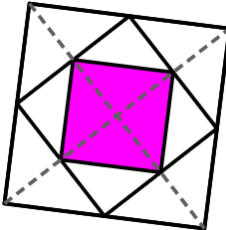
Assessment framework:		Cognitive domain						
		Knowing (K)		Applying (A)		Reasoning (R)		TOTAL
Content area	Number, operations and relationships (NOR)	1(1), 2(2), 3(2), 4a(1), 4b(1), 4c(1), 4d(1), 4h(1), 6a(1)	11	4e(1), 4f(1), 4g(1), 5(6), 6b(2)	11	7(2), 8(1), 9(2)	5	27
	Patterns, functions & algebra (PFA)	10a(1)	1	10b(2), 10c(2)	4			5
	Space & shape (SS)	11(2), 14(1)	3	12(2), 13(1)	3	15(2)	2	8
	Measurement (M)							
	Data handling (DH)							
	TOTAL	15		18		7		40

Memo:

Ques	Correct solution(s)	Comment	Content area	Page ref.	Cognitive domain	Mark allocation
1.	3,05	1 mrk: correct	NOR	23.3	K	(1)
2.a.	0,16	1 mrk: correct	NOR	23.19	K	(1)

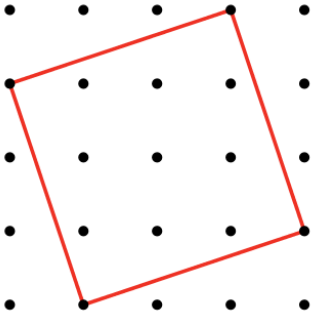
Ques	Correct solution(s)	Comment	Content area	Page ref.	Cognitive domain	Mark allocation
2.b.	$\frac{13}{100}$	1 mrk: correct	NOR	23.19	K	(1)
3.a.	$\frac{1}{8} ; \frac{1}{2} ; \frac{3}{4}$	1 mrk: correct	NOR	23.10	K	(1)
3.b.	1,03 ; 1,13 ; 10,3	1 mrk: correct	NOR	23.3	K	(1)
4.a.	1	1 mrk: correct	NOR	23.23	K	(1)
4.b.	$2\frac{1}{5}$	1 mrk: correct	NOR	23.10; 23.12	K	(1)
4.c.	2093	1 mrk: correct Learners could do this mentally as: $300 \times 7 \rightarrow 2100 - 7 \rightarrow 2093$	NOR	23.6	K	(1)
4.d.	11,5	1 mrk: correct Learners could do this mentally as: $2 \times 5 + 0,3 \times 5 = 10 + 1,5$ OR Half of 23	NOR	23.2; 23.16	K	(1)
4.e.	213	1 mrk: correct Learners could do this mentally as: $\frac{1}{2}$ of 426	NOR	23.13	A	(1)
4.f.	4	1 mrk: correct	NOR	23.3	A	(1)

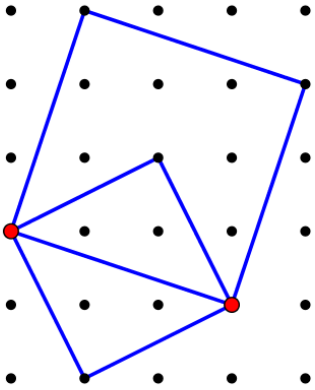
Ques	Correct solution(s)	Comment	Content area	Page ref.	Cognitive domain	Mark allocation
4.g.	17	1 mrk: correct	NOR	23.5	A	(1)
4.h.	45	1 mrk: correct	NOR	23.19	K	(1)
5.a.	1586 <i>Possible thinking:</i> <ul style="list-style-type: none"> $845 + 55 \rightarrow 900 + 1100 \rightarrow 2000 + 431 \rightarrow 2431. 55 + 1100 + 431 = 1586$ $2431 - 800 \rightarrow 1631 - 40 \rightarrow 1591 - 5 \rightarrow 1586$ <i>A column strategy like those on p. 11 would also be appropriate here.</i> 	1 mrk: correct 1 mrk: valid thinking	NOR	23.11	A	(2)
5.b.	$4\frac{3}{6}$ or $4\frac{1}{2}$ <i>Possible thinking:</i> <ul style="list-style-type: none"> $5\frac{1}{6} - \frac{4}{6} = 5\frac{1}{6} - \frac{1}{6} - \frac{3}{6} = 4\frac{3}{6}$ $5\frac{1}{6} - \frac{4}{6} = 5\frac{3}{6} - 1 = 4\frac{3}{6}$ 	1 mrk: correct 1 mrk: valid thinking	NOR	23.12	A	(2)

Ques	Correct solution(s)	Comment	Content area	Page ref.	Cognitive domain	Mark allocation
5.c.	3276 <i>Possible thinking:</i> <ul style="list-style-type: none"> • Double 78 = 156 and double 156 = 312. So $42 \times 78 = 3120 + 156 = 3276$ • $2 \times 8 = 16$; $2 \times 70 = 140$; $40 \times 8 = 320$ and $40 \times 70 = 2800$. $16 + 140 + 320 + 2800 = 3276$ • A column strategy like those on p. 24 would also be appropriate here. 	1 mrk: correct 1 mrk: valid thinking	NOR	23.12	A	(2)
6.a.	loss	1 mrk: correct	NOR	23.7	K	(1)
6.b.	10 <i>Possible thinking:</i> <ul style="list-style-type: none"> • $R50 - R45 = R5$ and $\frac{5}{50} = 10\%$ 	1 mrk: correct 1 mrk: valid thinking	NOR	23.7	A	(2)
7.	$\frac{1}{4}$ <i>Possible thinking:</i> <ul style="list-style-type: none"> • $\frac{1}{2}$ of $\frac{1}{2} = \frac{1}{4}$ • Divide image into sixteenths 	c Accept equivalent fractions	NOR		R	(2)

Ques	Correct solution(s)	Comment	Content area	Page ref.	Cognitive domain	Mark allocation
8.	8	1 mrk: correct <i>Guess and check: $8 \div 2 = 4$ and $32 \div 8 = 4$</i>	NOR		R	(1)
9.	4 <i>Possible thinking:</i> <ul style="list-style-type: none"> She scored 5 points for 6 games. Must have won fewer than 6 games and even number as no fraction in points. Try: $4 \times 1 + 2 \times \frac{1}{2} = 5$ 	1 mrk: correct 1 mrk: valid thinking	NOR		R	(2)
10.a.	22	1 mrk: correct	PFA	23.4	K	(1)
10.b.	$21 \times 22 - 19 \times 20 = (440 + 22) - (400 - 20)$ $= 462 - 380$ $= 82$	1 mrk: Zoliswa's formula 1 mrk: correct substitution <i>Note that marks are awarded for thinking not answer.</i>	PFA	23.4; 23.5	A	(2)

Ques	Correct solution(s)	Comment	Content area	Page ref.	Cognitive domain	Mark allocation
10.c.	402 <i>Possible thinking:</i> <ul style="list-style-type: none"> $100 \times 4 + 2$ $2 \times 101 + 2 \times 100 = 202 + 200$ $22 + 95 \times 4 = 22 + 400 - 20$ $101 \times 102 - 99 \times 100 = 10302 - 9900$ 	1 mrk: correct 1 mrk: valid thinking	PFA	23.4; 23.5	A	(2)
11.a	parallelogram	1 mrk: correct	SS	23.44, 23.45, 23.46	K	(1)
11.b.	rectangle	1 mrk: correct	SS	23.43, 23.45, 23.46	K	(1)
12.a.	True	1 mrk: correct	SS	23.44	A	(1)
12.b.	False The diagonals of a square are equal . OR The diagonals of a square bisect each other . OR The diagonals of a square cross at right angles . OR The opposite sides of a square are parallel.	1 mrk: correct <i>Mark is only given for a correction</i>	SS	23.40, 23.41	A	(1)

Ques	Correct solution(s)	Comment	Content area	Page ref.	Cognitive domain	Mark allocation
13.	Select first three only, i.e. Opposite sides are equal Opposite sides are parallel Diagonals are equal	1 mrk: all correct and no extra	SS	21.46, 23.43	A	(1)
14.		1 mrk: correct	SS	23.45	K	(1)

Ques	Correct solution(s)	Comment	Content area	Page ref.	Cognitive domain	Mark allocation
15.		1 mrk: each correct square	SS	23.46	R	(2)

This examination covers all content from NumberSense Comprehensive Workbooks 21, 22, 23 and 24.

It is recommended that learners complete this examination over 2 days (preferably consecutive days) and that they have at least 1,25 hours to complete each part, i.e. 1,25 hours for Part A and 1,25 hours for Part B.

Assessment framework:

Assessment framework:		Cognitive domain						
		Knowing (K)		Applying (A)		Reasoning (R)		TOTAL
Content area	Number, operations and relationships (NOR)	1a(1), 1b(1), 2(2), 3(5), 4(2), 8a(1), 8b(1), 8d(1), 8e(1), 8f(1), 8h(1), 8j(1), 12a(1), 12b(1)	20	1c(1), 5(1), 6(1), 7(2), 8c(1), 8g(1), 8i(1), 8k(1), 9(1), 10a(2), 10b(2), 10c(2), 11(2), 12c(2)	20	10d(2), 13(2), 14(2), 15(2), 16(2)	10	50
	Patterns, functions & algebra (PFA)	17a(1), 17b(1), 17c(2)	4	17d(2), 17e(1), 17f(2)	5	18(2)	2	11
	Space & shape (SS)	19(1), 20(1), 22a(1), 22b(1), 23a(1), 24a(1)	6	21(2), 22c(2), 23b(1), 23c(1), 24b(1)	7	25(2)	2	15
	Measurement (M)	26(2), 28(2), 30a(1),	5	27(2), 29(2), 30b(2)	6	31(3)	3	14
	Data handling (DH)	32a(1), 32b(1), 33a(1), 33b(1)	4	32c(2), 33c(2)	4	34(2)	2	10
	TOTAL	39		42		19		100

Part A Memo:

Ques	Correct solution(s)	Comment	Content area	Page ref.	Cognitive domain	Mark allocation
1.a.	5,75	1 mrk: correct	NOR	24.1	K	(1)
1.b	1	1 mrk: correct	NOR		K	(1)
1.c.	$2\frac{5}{6}$	1 mrk: correct	NOR		A	(1)
2.a.	$\frac{3}{5}$	1 mrk: correct	NOR		K	(1)
2.b.	0,45	1 mrk: correct	NOR	24.1	K	(1)
3.a.	58, 104, 115620	1 mrk: all correct and no extra	NOR		K	(1)
3.b.	1; 4; 62	1 mrk: all correct and no extra	NOR		K	(1)
3.c.	3 and 5	2 mrks: both correct & no extra or 1 correct and no extra or 1 mrk: both correct and only 1 extra	NOR	24.8, 24.14, 24.35	K	(2)
3.d.	7, 13, 29	1 mrk: correct and no extra	NOR	21.4	K	(1)
4.a.	$8\frac{2}{100}$ or $8\frac{1}{50}$	1 mrk: correct	NOR		K	(1)
4.b.	7,04	1 mrk: correct	NOR	24.36	A	(1)

Ques	Correct solution(s)	Comment	Content area	Page ref.	Cognitive domain	Mark allocation
5.	90	1 mrk: correct	NOR	24.36	A	(1)
6.	2,83	1 mrk: correct	NOR	24.7	A	(1)
7.	2 from: $\frac{2}{3}; \frac{8}{12}; \frac{12}{18}; \frac{16}{24}; \frac{20}{30}$ <i>Other possibilities do exist. Please check for equivalence with $\frac{4}{6}$</i>	1 mrk: each correct	NOR	24.11	A	(2)
8.a.	640	1 mrk: correct <i>Can be done mentally as $241 + 400 - 1$</i>	NOR	24.3	K	(1)
8.b.	$3\frac{6}{7}$	1 mrk: correct	NOR		K	(1)
8.c.	$\frac{5}{10}$ or $\frac{1}{2}$	1 mrk: correct <i>Accept all equivalent fractions</i>	NOR	24.3	A	(1)
8.d.	0,08	1 mrk: correct	NOR	24.1	K	(1)
8.e.	28,05	1 mrk: correct <i>Can be done mentally as $R100 - R72 + 5c$</i>	NOR	24.3	K	(1)
8.f.	1596	1 mrk: correct <i>Can be done mentally as $400 \times 4 - 4$</i>	NOR	24.4, 24.6	K	(1)

Ques	Correct solution(s)	Comment	Content area	Page ref.	Cognitive domain	Mark allocation
8.g.	6,05	1 mrk: correct	NOR	24.3	A	(1)
8.h.	60	1 mrk: correct	NOR	24.2, 24.3, 24.6	K	(1)
8.i.	$\frac{1}{14}$	1 mrk: correct	NOR	21.36; 22.19	A	(1)
8.j.	9,02	1 mrk: correct Can be done mentally as $R72 \div 8$ and $16c \div 8$	NOR	24.12	K	(1)
8.k.	32	1 mrk: correct	NOR	24.1	A	(1)
9.	8,45 or 8,450	1 mrk: correct	NOR	24.7	A	(1)
10.a.	65 835 <i>Possible thinking:</i> <ul style="list-style-type: none"> $627 \times 100 = 62700$ and $627 \times 5 = \text{Half of } 6270 = 3135$. $62700 + 3135 = 65835$ 	1 mrk: correct 1 mrk: valid thinking	NOR	24.31	A	(2)
10.b	50,52 or 50 remainder 13 or $50\frac{13}{25}$ <i>Possible thinking:</i> <ul style="list-style-type: none"> $1263 \div 25 = 2526 \div 50 = 5052 \div 100 = 50,52$ $1263 - 1000(40) \rightarrow 263 - 250(10) \rightarrow 13$ 	1 mrk: correct 1 mrk: valid thinking	NOR	24.29, 24.31	A	(2)

Ques	Correct solution(s)	Comment	Content area	Page ref.	Cognitive domain	Mark allocation
10.c.	$1\frac{8}{12}$ or $1\frac{2}{3}$ <i>Possible thinking:</i> <ul style="list-style-type: none"> $4\frac{5}{12} - 2\frac{9}{12} = 4\frac{5}{12} - 2\frac{5}{12} - \frac{4}{12}$ $= 2 - \frac{4}{12}$ $= 1\frac{8}{12}$ $4\frac{5}{12} - 2\frac{9}{12} = 4\frac{8}{12} - 3$ $= 1\frac{8}{12}$ 	1 mrk: correct 1 mrk: valid thinking	NOR		A	(2)
10.d.	$\frac{7}{12}$ <i>Possible thinking:</i> <ul style="list-style-type: none"> <i>Suppose we think of a box with 12 sweets. $\frac{3}{4}$ of 12 = 9 sweets and $\frac{1}{6}$ of 12 = 2 sweets. $9 - 2 = 7$, so $\frac{7}{12}$ of the box</i> $\frac{3}{4} - \frac{1}{6} = \frac{9}{12} - \frac{2}{12} = \frac{7}{12}$ 	1 mrk: correct 1 mrk: valid thinking <i>Accept equivalent fractions</i> <i>Note: The box of sweets could contain any number of sweets that is a multiple of both 4 and 6.</i>	NOR	24.30	R	(2)

Ques	Correct solution(s)	Comment	Content area	Page ref.	Cognitive domain	Mark allocation
11.	264 <i>Possible thinking:</i> <ul style="list-style-type: none"> 20% of R330 = $2 \times R33 = R66$. $R330 - R66 = R264$ 80% of R330 = $8 \times R66 = R264$ 	1 mrk: correct 1 mrk: valid thinking	NOR	24.17, 24.34	A	(1)
12.a.	2: 5	1 mrk: correct	NOR	21.23	K	(1)
12.b.	6	1 mrk: correct	NOR	24.37	K	(1)
12.c.	10ℓ red and 25ℓ yellow <i>Possible thinking:</i> <ul style="list-style-type: none"> With 2ℓ and 5ℓ she makes 7ℓ of paint. $7 \times 5 = 35$ ℓ; so $2 \times 5 = 10$ and $5 \times 5 = 25$ $2: 5 = 10: 25$ 	1 mrk: correct 1 mrk: valid thinking	NOR	24.37	A	(2)
13.	160 minutes or 2 hours, 40 minutes <i>Possible thinking:</i> <ul style="list-style-type: none"> $48 - 16 = 32$ windows remain. 32 is double 16, so double the time is $80 \times 2 = 160$ minutes 	1 mrk: correct 1 mrk: valid thinking	NOR		R	(2)

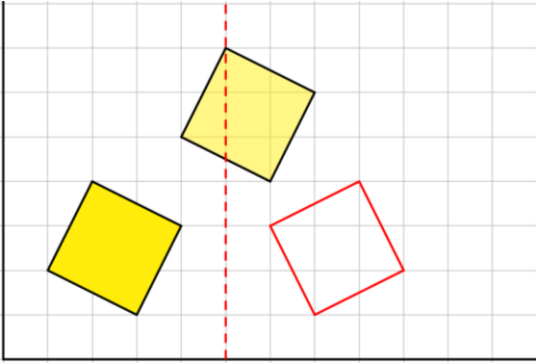
Ques	Correct solution(s)	Comment	Content area	Page ref.	Cognitive domain	Mark allocation
14.	<p>1</p> <p><i>Possible thinking:</i></p> <ul style="list-style-type: none"> • 2-thirds for 12 people and 1-third for 6 people. $12 + 6 = 18$ people. $\frac{2}{3} + \frac{1}{3} = 1$ • $12 \text{ people} \times 3 \rightarrow 36 \text{ people} \div 2 \rightarrow 12 \text{ people}$. 2-thirds $\times 3 = 6$-thirds or 2 cups and $2 \text{ cups} \div 2 = 1 \text{ cup}$ • $\frac{2}{3} \times 3 \rightarrow 2 \div 2 \rightarrow 1$ 	<p>1 mrk: correct</p> <p>1 mrk: valid thinking</p>	NOR		R	(2)
15.	<p>4047</p> <p><i>Possible thinking:</i></p> <ul style="list-style-type: none"> • We need to divide the largest possible number by 1. Using the largest numbers: $2024 + 2023 = 4047$ and : $2024 - 2023 = 1$ 	<p>1 mrk: correct</p> <p>1 mrk: valid thinking</p>	NOR		R	(2)
16.	<p>90</p> <p><i>Possible thinking:</i></p> <ul style="list-style-type: none"> • Make a list: 101; 111; 121; 131; 141; 151; 161; 171; 181; 191... • Every group of 100 would have 10 palindromes. $9 \times 10 = 90$ 	<p>1 mrk: correct</p> <p>1 mrk: valid thinking</p>	NOR		R	(2)

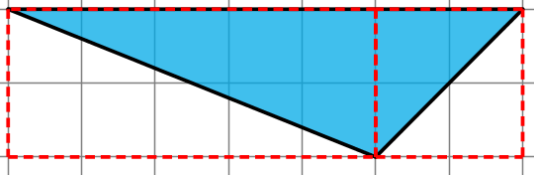
Part B Memo:

Ques	Correct solution(s)	Comment	Content area	Page ref.	Cognitive domain	Mark allocation
17.a.	5	1 mrk: correct	PFA		K	(1)
17.b.	24	1 mrk: correct	PFA	21.34; 22.9; 22.16; 22.20	K	(1)
17.c.	<i>Picture no. $\rightarrow \times 5 \rightarrow - 1 \rightarrow$ no. of dots</i>	1 mrk: $\times 5$ 1 mrk: $- 1$	PFA	21.22, 22.9; 22.20	K	(2)
17.d.	$4 \times (\text{pic. no.} + 1) - 4 + (\text{pic. no.} - 1)$	1 mrk: correctly substituting expressions $n + 1$ and $n - 1$ for the variables in formula 1 mrk: Multiplying $n + 1$ by 4 and subtracting 4	PFA	23.31	A	(2)
17.e.	$4 \times 101 - 4 + 99 = 404 - 4 + 99$ $= 499$	1 mrk: correct substitution C/A <i>Note that this mark is for using Abdul's formula, not for the answer.</i>	PFA	21.6; 21.7; 21.35; 22.21; 22.29; 23.31; 24.26	A	(1)

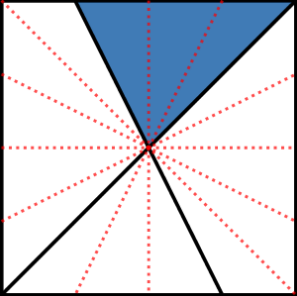
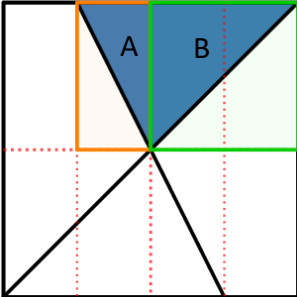
Ques	Correct solution(s)	Comment	Content area	Page ref.	Cognitive domain	Mark allocation
17.f	20 <i>Possible thinking:</i> <ul style="list-style-type: none"> $99 + 1 \rightarrow 100 \div 5 \rightarrow 20$ 	1 mrk: correct 1 mrk: valid thinking	PFA	24.4, 24.5	A	(2)
18.	256 <i>Possible thinking:</i> <ul style="list-style-type: none"> <i>Pattern of sums in each row: 1; 2; 4; 8 ... So continue doubling ... 16; 32; 64; 128; 256</i> <i>Pattern of sums in each row: 1; 2; ; 4; 8 ... Rule is: Sum = $2 \times 2 \times 2 \dots$ the number of rows. So, Row 8 = $2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2$</i> <i>Learners could also complete the triangle up to row 8 and add up the values. This would be inefficient, but without errors, they should get: $1 + 8 + 28 + 56 + 70 + 56 + 28 + 8 + 1$</i> 	1 mrk: correct 1 mrk: valid thinking	PFA		R	(2)
19.	parallelogram	1 mrk: correct	SS	23.44, 23.45, 23.46	K	(1)

Ques	Correct solution(s)	Comment	Content area	Page ref.	Cognitive domain	Mark allocation
20.		1 mrk: correct	SS	23.45	K	(1)
21.	Select ALL	2 mrks: all correct OR 1 mrk: 4 correct	SS	21.46, 23.43	A	(2)
22.a	Square-based antiprism	1 mrk: correct	SS	22.41	K	(1)
22.b.	8	1 mrk: correct	SS	22.41	K	(1)
22.c.	A and C only	2 mrks: both correct and no extra OR 1 mrk: only 1 correct and no extra or both correct and at most 1 extra	SS	24.39, 24.40, 24.41	A	(2)

Ques	Correct solution(s)	Comment	Content area	Page ref.	Cognitive domain	Mark allocation
23.a.	Translated 3 units up and 3 units down	1 mrk: correct	SS	24.49, 24.50	K	(1)
23.b.	(7; 6)	1 mrk: correct	SS	24.48	A	(1)
23.c.		1 mrk: correct	SS	24.51	A	(1)
24.a.	Enlargement	1 mrk: correct	SS	24.53, 24.54, 24.55	K	(1)
24.b.	2: 3	1 mrk: correct	SS	24.53, 24.54, 24.55	A	(1)
25.	9 cm <i>Possible thinking:</i> <ul style="list-style-type: none"> $EF = 4. 4 \div 2 \times 3 = 6. \text{ So } E'H' = 6 \div 2 \times 3 = 9$ 	1 mrk: correct	SS	24.53, 24.54, 24.55	R	(2)
26.a.	500 kg	1 mrk: correct	M	23.51	K	(1)

Ques	Correct solution(s)	Comment	Content area	Page ref.	Cognitive domain	Mark allocation
26.b.	180°C	1 mrk: correct	M	23.54	K	(1)
27.	16: 15 or 4: 15 pm <i>Possible thinking:</i> <ul style="list-style-type: none"> • $5 + 2 = 7$ hours behind. $23: 15 - 7hrs = 16: 45$ • $23: 15 - 2hrs = 21: 15$ at UTC and $21: 15 - 5 = 16: 15$ in Ottawa 	1 mrk: correct 1 mrk: valid thinking	M	21.50; 21.51	A	(2)
28.	$P = 16\text{ cm}$ $A = 15\text{ cm}^2$	1 mrk: perimeter correct 1 mrk: area correct	M	22.52; 22.53; 22.56; 22.57	K	(2)
29.	7 square units <i>Possible thinking:</i> <ul style="list-style-type: none"> • Half of 10 + half of 4 = $5 + 2 = 7$ 	1 mrk: correct 1 mrk: valid thinking	M	22.60	A	(2)
30.a.	54 cm^3	1 mrk: correct	M	22.61, 22.62, 22.64	K	(1)

Ques	Correct solution(s)	Comment	Content area	Page ref.	Cognitive domain	Mark allocation
30.b.	90 <i>Possible thinking:</i> <ul style="list-style-type: none"> • $2 \text{ squares} + 4 \text{ rectangles} = 2 \times 3 \times 3 + 4 \times 3 \times 6$ $= 18 + 72$ $= 90 \text{ cm}^2$ 	1 mrk: correct 1 mrk: valid thinking	M	22.63, 22.64		(2)

Ques	Correct solution(s)	Comment	Content area	Page ref.	Cognitive domain	Mark allocation
31.	$\frac{3}{16}$ <p><i>Possible thinking:</i></p> <div style="display: flex; align-items: flex-start;"> <div style="margin-right: 20px;">  </div> <div> <p>Divide square into sixteenths. Three pieces are shaded.</p> </div> </div> <p>•</p> <div style="display: flex; align-items: flex-start;"> <div style="margin-right: 20px;">  </div> <div> <p>Divide square into eighths. The shaded area can be thought of as triangle A and triangle B.</p> <p>Area of A = $\frac{1}{2}$ of $\frac{1}{8} = \frac{1}{16}$</p> <p>Area of B = $\frac{1}{2}$ of $\frac{1}{4} = \frac{1}{8}$</p> <p>$\frac{1}{16} + \frac{1}{8} = \frac{1}{16} + \frac{2}{16}$</p> <p>$= \frac{3}{16}$</p> </div> </div> <p>•</p>	<p>1 mrk: 3 pieces shaded</p> <p>1 mrk: out of 16 pieces</p> <p>1 mrk: valid thinking</p>	M		R	(3)
32.a.	Ribs	1 mrk: correct	DH	21.57	K	(1)
32.b.	Chicken nuggets	1 mrk: correct	DH	21.57	K	(1)

Ques	Correct solution(s)	Comment	Content area	Page ref.	Cognitive domain	Mark allocation
32.c.	Pizza is the best option as it is most popular overall and equally popular amongst boys and girls. Very few girls preferred ribs and few boys preferred chicken nuggets.	1 mrk: correct 1 mrk: valid explanation	DH	21.62	A	(2)
33.a.	50	1 mrk: correct	DH	23.63	K	(1)
33.b.	34,5	1 mrk: correct	DH	23.63	K	(1)
33.c.	Median is better because Selwyn actually sold more than 40 ice creams on very few days. He just happened to sell 50 ice creams on three days which was more days than any other number of ice creams.	1 mrk: correct 1 mrk: valid explanation	DH	23.63	A	(2)
34.	180 Possible thinking: <ul style="list-style-type: none"> Total pocket money between 3 children = $R120 \times 4 = R480$. $R480 - R120 \rightarrow R360 \div 2 \rightarrow R180$ $\frac{3}{8}$ of $R120 \times 4 = \frac{3}{8}$ of $R480 = R180$ 	1 mrk: correct 1 mrk: valid explanation	DH	21.58	R	(2)