Summary

Test Identification	
Name	2021 MAT SW 3.6
Date Created	16 Sep 2021
Date Modified	05 Nov 2021
Subject	Mathematics
Status	ACCEPTED
Sequence Number	1164880
Total Test Time	59 minutes
Delivery Method	Onscreen

Curriculum Strand			
Number Sense & Operations	14	**Statistics**	13
Algebra	18		

Curriculum Level					
5B	3	**5P**	3	**5A**	3
6B	14	**6P**	13	**6A**	7

Cognitive Processing			
Surface	18	**Deep**	27

Slider Settings			
Strands		**Level**	
Number Sense & Operations	Most	**Level 5**	Few
		Level 6	Most
Algebra	Most		
Statistics	Most		

Marking Guide : 2021 MAT SW 3.6

Q.No	Marking Key
1	a
2	d
<u>**3**</u>	$10 458.83 or appropriate rounding up 'Accept $10 430.17 (between 10400 &10600) Do not accept rounded to nearest dollar.'
4	a
5	c
6	b
7	b
8	c
<u>**9**</u>	6r + 15s - 3t or equivalent
<u>**10**</u>	A more random sample of students. OR Responses should be the averages over one week. OR Part hours recorded. OR similar 'Must have TWO improvements'
<u>**11**</u>	46 °C
12	d
13	b
<u>**14**</u>	Which family has the cheapest grocery bill? Or similar 'Could use words like "compare" or "explore" or "relationship" to indicate a suitable investigation'
15	b
16	a
<u>**17**</u>	d
<u>**18**</u>	e
<u>**19**</u>	a
20	b
21	c
<u>**22**</u>	69 'Must give whole number answer only. 69.0 or 69.09 or any decimal is not acceptable.'
23	d
24	d

Q.No	Marking Key
25	Any suitable question eg Do Yr11 absences increase either side of the weekend, or before/after holidays, mufti days etc. 'Could use words like "compare" or "explore" or "relationship" to indicate a suitable investigation'
26	c
27	Exaggerates gradient, or skips the first 80 shirts and makes an increase of 5 look bigger, or looks like Pat had few/lots sales, or similar suitable explanation
28	Every 6th person in each row, or every 10th person at the door, or similar, showing either systematic selection or random selection 'Accept randomly'
29	b
30	a
31	d
32	b
33	a
34	Do not know the marks of individual students in English and Maths, or similar explanation.
35	c
36	b
37	Use Pi is approx 3
38	Impossible to dig accurate cylinder OR soil increases in volume when dug OR needs to dig bigger hole than calculated OR similar
39	c
40	e
41	b
42	9.5238% 'Any sensibly rounded equivalent'
43	Employer gave him more than minimum wage increase of 9.5%. He received 11.811% 'Accept any rounded answer equivalent to 11.811%'
44	$8.10 'Accept any valid method of working/explanation'
45	29

Instructions
Underlined Questions e.g. **10** :Use teacher judgement. Give 1 if answer matches marking guide (unless otherwise instructed). For incorrect answers give 0 (zero).
All other Questions: Enter the response chosen by the student using letters. For example, 'a' for the first option; 'b' for the second option; 'c' for the third option and so on.
Questions Not Answered: Enter a dash (-).

Choose a circle to show how much each sentence is like you	Very Unlike Me 1	Unlike Me 2	Like Me 3	Very Like Me 4
01. I like maths at school.	◯	◯	◯	◯
02. I am good at maths.	◯	◯	◯	◯
03. My teacher thinks I am good at maths.	◯	◯	◯	◯
04. My family/whānau think I am good at maths.	◯	◯	◯	◯
05. I enjoy doing maths in my own time (not at school).	◯	◯	◯	◯
06. I enjoy doing things in maths that I haven't tried before.	◯	◯	◯	◯

Practice Questions

These practice questions are to help you understand how to show your answer for different types of questions.

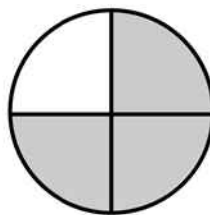**P01.** Who is holding a card with an even number on it?
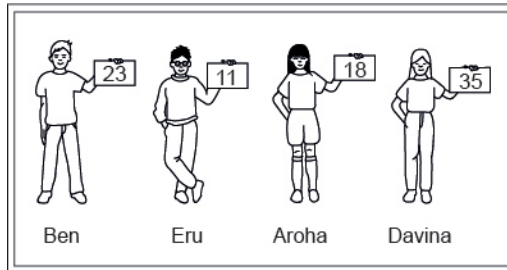
⬭   Ben

⬭   Eru

⬭   Aroha

⬭   Davina

P02. Complete this number pattern.

2, 4, ____, ____, 10
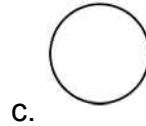

P03. What fraction of this circle is shaded?

□

____

□

P04. Match the sentence with the correct shape.

1. I have three sides

☐

2. I have 4 sides

☐

a. ☐

b. △

c. ○
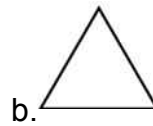
P05. Which numbers make this number sentence **TRUE**?

$$2 + ⭐ > 5$$

☐ 1

☐ 2

☐ 3

☐ 4

☐ 5

P06. Put the numbers 1, 2, 3, and 4 in the boxes to order these numbers from biggest (1) to smallest (4).

☐ 3

☐ 7

☐ 2

☐ 0

P07. Select whether the following statements are True or False.

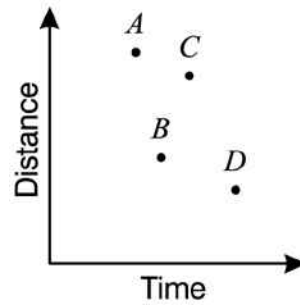|	TRUE	FALSE
In the number 213, the value of 1 is ten.	⬭	⬭
In the number 504, the value of 5 is fifty.	⬭	⬭

01. The scatter plot below gives information about four different car trips.
Which point represents the trip with the fastest average speed?

- ⬭ Point *A*
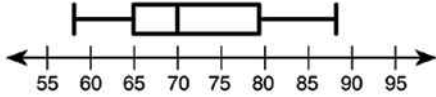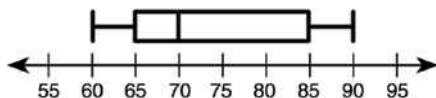- ⬭ Point *B*
- ⬭ Point *C*
- ⬭ Point *D*
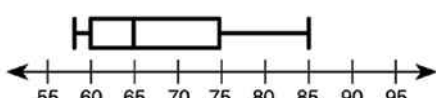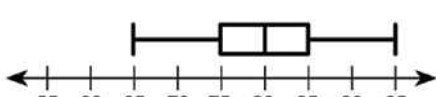
02. Marl borrowed $200 at 12% simple interest for one year.
If he makes no payments that year, how much interest will he owe at the end of the year?

- ⬭ $6.00
- ⬭ $12.00
- ⬭ $22.40
- ⬭ $24.00

03. The Zandalia Zoo uses 214,964 kilograms of meat per year.

If the meat costs $2.53 per kilogram, how much does the meat cost per *week*?

_____

04. A study was conducted to determine the effectiveness of a speed limit sign.
The speeds of cars at the 65 kph sign were:
79, 60, 70, 65, 70, 85, 74, 58, 71, 88, 65,
Which box-and-whisker plot correctly displays the information?

◯

◯

◯

◯

05. The graph below shows Tuau's scores from a computer game.
Which one of these statements is **TRUE**?
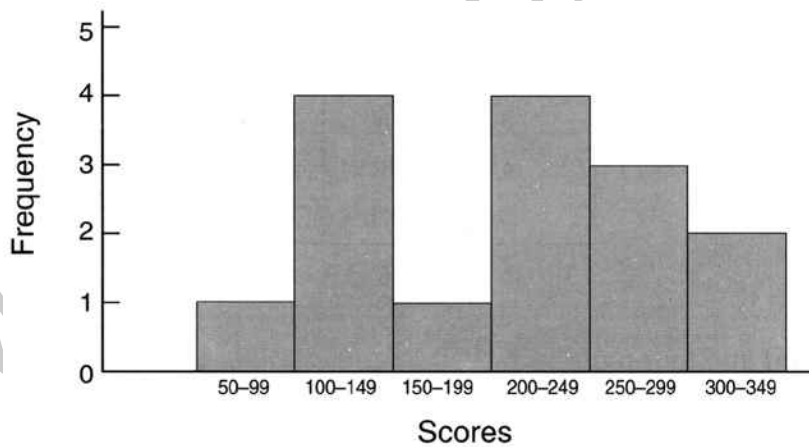
◯   Tuau scored less than 100 more than once.

◯   Tuau scored more than 250 three times.

◯   Tuau scored less than 200 six times.

◯   Tuau scored between 300 and 349 on most occasions.

06. Tina had $2\frac{3}{8}$ pizzas. She kept $1\frac{3}{4}$ pizzas for her family and gave the rest to Yogi. How much pizza did Yogi get?

◯ $\frac{1}{4}$ of a pizza

◯ $\frac{5}{8}$ of a pizza

◯ $1\frac{3}{4}$ of a pizza

◯ $1\frac{5}{8}$ of a pizza

07. According to the graph, what is the median of the monthly average rainfall?

Monthly Average Rainfall
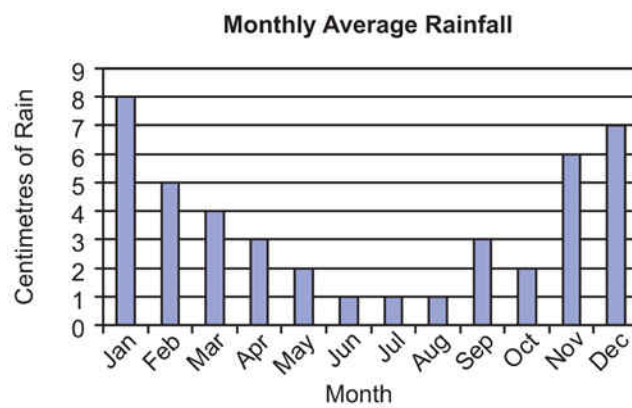
◯   1 cm

◯   3 cm

◯   4 cm

◯   7 cm

08. The height of a triangle is 4 centimetres greater than twice its base. The area of the triangle is 168 square centimetres.
What is the base of the triangle?

◯   7 cm

◯   8 cm

◯   12 cm

◯   14 cm

09. Expand the expression 3 (2*r* + 5*s* - *t*)

_____

10. Rachel is investigating the different after school activities of students.
To carry out the investigation the following process was followed:
12 volunteers were found from among Rachel's friends.
Responses were recorded for the previous day.
Any partial hour was recorded as a full hour.
The results are shown below.

Student	A	B	C	D	E	F	G	H	I	J	K	L
Hours playing sport	2	0	1	2	0	0	4	1	2	2	1	0
Hours watching TV	3	3	5	6	1	4	2	4	4	1	5	3
Hours on homework	0	4	1	0	3	2	1	2	0	0	1	3

Suggest two improvements to the statistical process used to obtain the data.

1. _____

2. _____

11. The line plot below shows the average daily temperature in a city for each day during the month of April.

Average Daily Temperatures (°C)
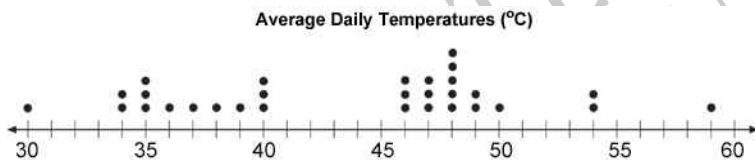
What was the median temperature?

_____

12. Which equation **BEST** represents this graph?
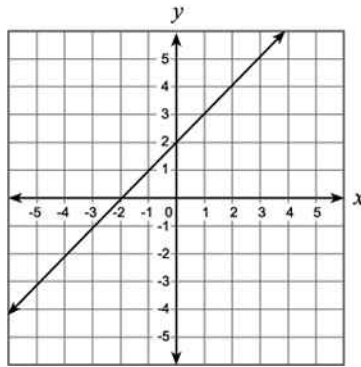
- ⬭   *y = -x*
- ⬭   *y = 2x + 2*
- ⬭   *y = x - 2*
- ⬭   *y = x + 2*

13. What is the solution to the inequality
$7x - 5 \geq x + 1$?

- ⬭ $x \leq 1$
- ⬭ $x \geq 1$
- ⬭ $x \geq -1$
- ⬭ $x \leq \frac{5}{2}$

Use the following information to answer question14..

As part of a statistics project Rose collected the following data on the weekly food bill for two families one in Wellington and the other in Whangarei. To do this:

- she chose families (with 2 young children) having similar incomes.
- the families shopped at the same brand supermarket.
- spending was rounded to the nearest dollar.
- data was rank ordered.

Rose's Data

Wellington weekly food bill ($S)
66, 68, 75, 78, 82, 84, 86, 87, 88, 90, 92, 94, 96, 100, 104, 108, 110, 116, 120, 124, 128, 130, 136, 142, 145, 152

Whangarei weekly food bill ($S)
48, 52, 56, 58, 60, 62, 64, 66, 74, 76, 78, 86, 88, 91, 95, 98, 98, 102, 105, 108, 110, 116, 118, 120, 125, 125

14. Write a statistical question, which involves comparing the two sets of data.

_____

_____

15. What is the slope of the line defined by the equation shown below?
$5x + 2y = 10$

- $-\frac{2}{5}$
- $-\frac{5}{2}$
- $\frac{5}{2}$
- $\frac{2}{5}$

16. Which is an irrational number?

- $\sqrt{5}$
- $\sqrt{9}$
- -1
- $-\frac{2}{3}$

17. Calculate $4\frac{3}{4} - 3\frac{1}{2} \times 1\frac{2}{7}$

- ⬭ $1\frac{17}{28}$
- ⬭ $9\frac{1}{4}$
- ⬭ $1\frac{3}{4}$
- ⬭ $\frac{1}{4}$

18. $\dfrac{6 \times 10^3}{3 \times 10^5} =$

- ⬭ 0.5×10^2
- ⬭ 2×10^2
- ⬭ $2 \times 10^{0.6}$
- ⬭ 0.5×10^{-2}
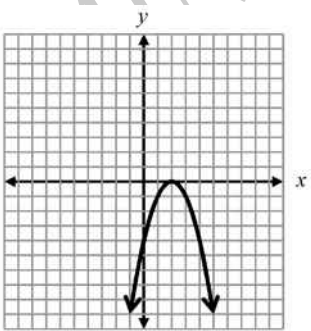- ⬭ 2×10^{-2}

19. A **linear** relationship between x and y is shown in the table below. What is the value of a?

x	-5	. . . . .	0	1	2	3
y	a		5	2	-1	-4

- ⬭ $a = 20$
- ⬭ $a = 3$
- ⬭ $a = 8$
- ⬭ $a = -10$

20. Which of the following represents the graph of the equation below?

$y = -x^2 + 2$

○

○

○

○
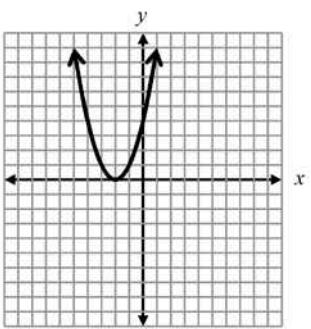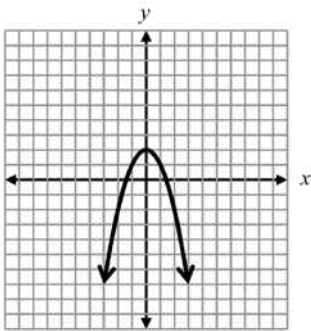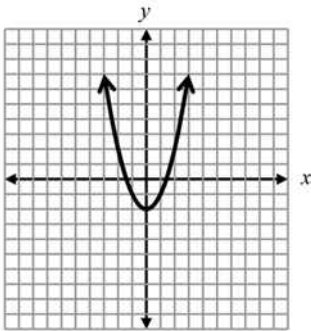
21. For a linear graph of the form $y = mx + c$ the effect of increasing the value of m is to

○ translate the graph.

○ increase the rate of change of y with c.

○ increase the rate of change of y with x.

○ increase the intercept with the y axis.

22. The table below shows the scores of a group of 11 students in a history test.

Score	Number of Students
90	1
80	3
70	4
60	0
50	3

What is the average (mean) score of the group to the nearest whole number?

_____

23. The table shows the values of x and y, where y is proportional to x.
What are the values of P and Q?

x	3	6	P
y	7	Q	35

○ $P = 10$ and $Q = 14$

○ $P = 10$ and $Q = 31$

○ $P = 14$ and $Q = 15$

○ $P = 15$ and $Q = 14$

24. Which pair of equations shares a solution?

○ $5x + 2 = 32$
       $2x + 3 = 8 + x$

○ $5x + 2 = 32$
       $-3x + 4 = 2 (x - 5)$

○ $5x + 2 = 32$
       $x + 2(x - 4) = 34 - 3x$

○ $5x + 2 = 32$
       $4x + 9 = 5(14 - x) - 7$

25. The Year 11 Dean at your school recorded the number of daily absences for a year, to look for a pattern.
Write a suitable question that the Dean could ask to investigate the pattern of student absences.

_____

_____

26. What is the factored form of
$3a^2 - 24ab + 48b^2$?

○ $(3a - 8b)(a - 6b)$

○ $(3a - 16b)(a - 3b)$

○ $3(a - 4b)(a - 4b)$

○ $3(a - 8b)(a - 8b)$

27. Pat was planning to ask her boss for a raise. She made the graph below to show her boss the increase in her T-shirt sales.

PAT'S SALES

Month
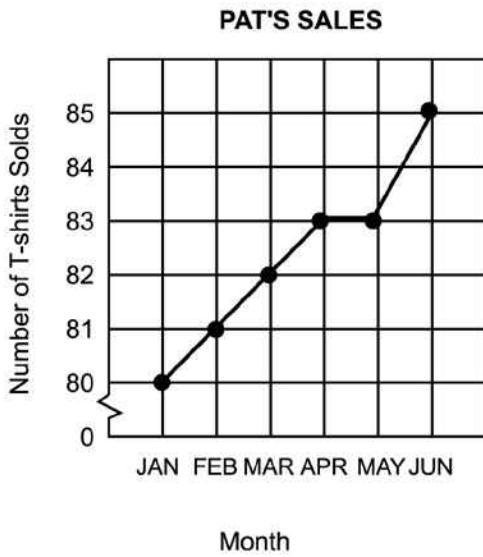
Why does the break in the vertical axis make the graph misleading?

_____

28. The audience at a school concert was asked to rate the concert as great, good, fair or poor. The following are the responses from a sample of the audience.

Good	Fair	Poor	Fair	Poor	Poor	Good	Good
Great	Good	Great	Good	Good	Fair	Good	Good
Poor	Good	Good	Poor	Good	Great	Good	Poor
Fair	Fair	Good	Good	Great	Poor	Good	Good
Fair	Good	Good	Fair	Good	Poor	Great	Fair

What would be a suitable way of selecting a sample from the audience?

_____

_____

29. Ticket sales at the First Run Theatre total at least $7,600 per week. An adult's ticket costs $7.50 and a child's ticket costs $4.00. If a represents the number of adult tickets sold in a week and c represents the number of child tickets, which algebraic sentence represents the money received each week from ticket sales?
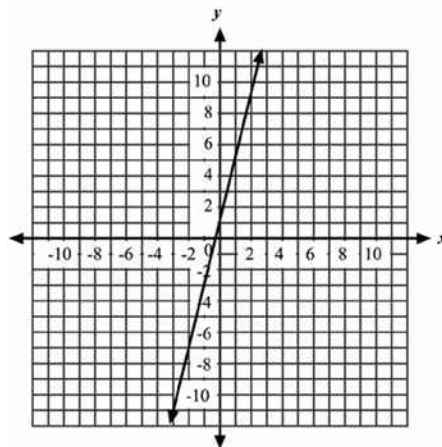
◯ $7.50a + 4.00c = 7600$

◯ $7.50a + 4.00c \geq 7600$

◯ $7.50a + 4.00c > 7600$

◯ $7.50a + 4.00c < 7600$

30. Which of the following could be the next step in solving the equation $3(x + 2) = 3 - (x + 1)$?

◯ $3x + 6 = 3 - x - 1$

◯ $3x + 2 = 3 - x - 1$

◯ $3x + 6 = 3 - x + 1$

◯ $3x + 5 = 3 - x + 1$

31. The graph of $y = 4x + 1$ is shown.
How would the graph change if the 4 in the equation were replaced with a 2?

⬭   The line would be parallel with a shift up of 2 units.

⬭   The line would be parallel with a shift down of 2 units.

⬭   The line would have a greater slope, but it would pass through the y-axis at the same point.

⬭   The line would have a lesser slope, but it would pass through the y-axis at the same point.

32. The weights of the 20 players on a school soccer team are summarised in the box-and-whisker plot shown below.
Which of the following statements is **TRUE**?

Players' Weights in kg's
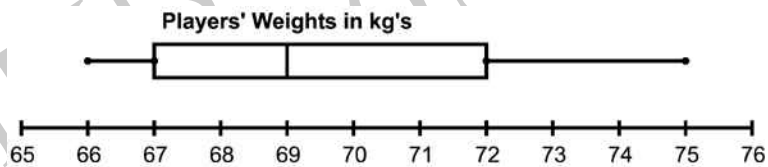
⬭   The mean weight of the team is 69 kg.

⬭   Half the players' weights are between 67 and 72 kg.

⬭   The lightest player in the team is 67 kg.

⬭   The range of weights of players on the team is 5 kg.

33. Which of the following real numbers is **NOT** a rational number?

◯ $\sqrt{21}$

◯ $3\frac{5}{8}$

◯ 2.41414

◯ -13

Use the following information to answer question34..

The table shows a comparison of marks of Maths and English in 10Mt's end of year exams.

	Minimum	Lower Quartile	Median	Upper Quartile	Maximum
Maths	12	36	46	58	76
English	24	32	48	61	82

34. Why is it **NOT** possible to tell from the data the total marks gained by each class?

_____

_____

End of Section

35. The formula shown below can be used to convert *C*, the temperature in degrees Celsius, to *F*, the temperature in degrees Fahrenheit.

$F = \frac{9}{5}C + 32$

Based on this information, which of the following statements is **TRUE**?

◯ A 9-degree increase in *C* results in a 32-degree increase in *F*.

◯ A 5-degree increase in *C* results in a 32-degree increase in *F*.

◯ A 5-degree increase in *C* results in a 9-degree increase in *F*.

◯ A 9-degree increase in *C* results in a 5-degree increase in *F*.

36. $(2 + m) - (7 - 4m)$ is equal to

- ◯ -5 - 3m
- ◯ -5 + 5m
- ◯ 9 - 3m
- ◯ 9 + 5m

Use the following information to answer questions 37 to 38.

Rhonda wants to know how much soil she will have to remove to install a circular swimming pool in her garden. The pool will have a diameter of approximately 4 metres and an average depth of about 1.5 metres. She used π on her calculator and worked out that it would require 18.84956 cubic metres of soil to be removed.

37. What would have been a sensible approximation she could have made during her calculations?

_____

38. An accurate calculation is of little practical use to Rhonda.

Give two reasons for this.

1 _____

2 _____

End of Section

39. For the graph of $y = -(x - 2)^2 + 4$, the axis of symmetry is

◯ $x = 4$

◯ $y = 2$

◯ $x = 2$

◯ $x = -2$

◯ $y = 4$

40. $\dfrac{2.4 \times 10^6}{2.0 \times 10^{-2}} =$

◯ 1.2×10^{-3}

◯ 1.2×10^3

◯ 1.2×10^4

◯ 0.4×10^8

◯ 1.2×10^8

41. Monica wants to earn an 'A' in mathematics.
- An 'A' requires an average greater than or equal to 92%
- The final project is 20% of the grade.
If Monica has an average of 95%, what is the lowest possible score she can earn on the final project and still earn an 'A'?

◯ 75%

◯ 80%

◯ 86%

◯ 92%

Use the following information to answer questions 42 to 44

The minimum wage increased from $5.25 to $5.75 per hour.

42. What is the percentage increase of the minimum wage?

_____

43. Kevin was earning $6.35 per hour at the time of the minimum wage increase. His employer raised his salary to $7.10 per hour.

Did his manager give him an increase comparable to the rate of increase given the minimum wage earners?
Explain your reasoning.

_____

_____

_____

_____

44. Allana, who also works for the same employer, was promised a raise.

If she is making $7.40 per hour, what new hourly wage would reflect an increase comparable to that received by the minimum wage earners?

_____

_____

Use the following information to answer question45..

The stem and leaf diagram shows the Science marks gained by students in a class.

```
9 | 3 7
8 | 1 5
7 | 4 8 8
6 | 1 4 4 5 7 9
5 | 5 6 6 7
4 | 0 2 3 4 6 9
3 | 1 4 7
2 | 2 8
1 | 5 6
```

45. Use these data to work out the interquartile range.

_____

Please provide these instructions to all staff involved with administering e-asTTle online.

Before the testing session

1. Make sure students have the right devices and browsers installed
Unsupported devices may result in the test not displaying correctly and affect students' scores.

Desktop/Laptop	Large Tablets (9"+)
- Windows, Mac or Chromebook - Minimum window width: 1280 pixels - Windows devices need up-to-date Edge, Chrome, Firefox or IE11 - Windows tablets/hybrids e.g., Surface Pro must have a keyboard attached - Mac devices need recent Chrome or Safari	- iPads: iOS 10+ with Safari - Androids: Large tablet e.g., Samsung Galaxy Tab 4. Must have Android 5+ and latest Chrome - Minimum window width: 768 pixels iPad Minis and small Androids must not be used.

More information on device requirements and the underlying rationale is available on the help site.

2. Sit the Practice Test
A practice test for each subject is available. These are also available in the Student Portal (no login required). Practice tests are designed to familiarise you and your students with e-asTTle online before sitting a real test. Each practice test contains attitude questions, look-over time and 5-8 questions designed to be relatively simple to answer. Teacher scripts are available for practice tests.

3. Ensure you have student login information
More information on accessing student logins and resetting passwords is available on the help site.

4. Check if calculators are required (Maths/Pāngarau)
Tests with questions at mostly Level 5 and 6 require the use of calculators. Tests with questions at mostly Levels 2 to 4 do NOT require a calculator.

During the testing session

1.   Check equipment
- Make sure students' devices are charged.
- Make sure students have scrap paper and a pen/pencil for working, calculators (if needed) and a quiet activity they can continue with if they finish early.

2.   Read the Test Details to students

Once students select a test, they will see the test details page (example shown on right).

Read through this page aloud with your students.
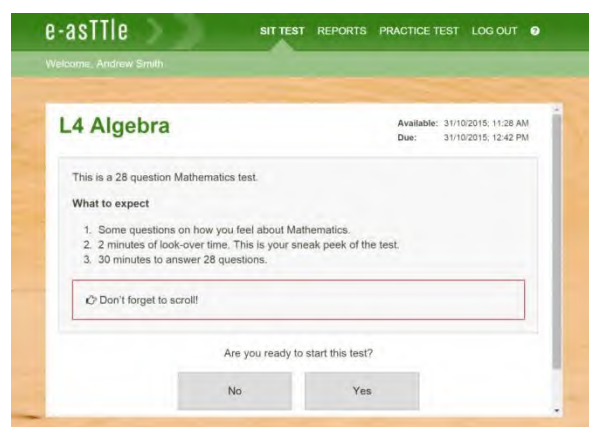
Other reminders to discuss with students:

- Once they choose 'Yes', the timer starts. Once the timer is counting down, there is no way to pause the test. If students close the test accidentally, they can re-open it again, provided the timer hasn't finished.
- Ask students to raise their hand if something seems wrong.
- Fullscreen mode is recommended.

For students on iPad or Android tablet devices: remind them to lock their device in portrait mode.

For students on Windows hybrid devices (such as the Surface Pro): remind them to keep the keyboard attached during the test.

3.   Supervising the test

Make sure you walk around and monitor students during the test. Students tend to continue with their test even if something has gone wrong – for example, a question does not display correctly. For this reason, check that pages are loading correctly, and students are scrolling to see all the content and options. It's a good idea to have a paper booklet of the test available during the testing session.

Students are generally expected to read the test content without assistance. Information on accommodations (e.g., reader-writers) is available on the help site.

4.   Know what to do if things go wrong

Internet disconnected

If student answers aren't saving, e-asTTle will show a yellow banner at the top of the page. The banner will turn red when there has been disconnection for 2 minutes or more. Students can keep answering whatever they can, and e-asTTle will try and save answers. Don't refresh or close the window if a coloured banner is showing.


```
3 answers still saving...You can keep going.

34:50 test time left                                          Question 4 of 30
```

If the Internet has been down, use your professional judgement to decide if students' results should be excluded.

Images not loading

If an image is missing, students will see an icon they can click to try and reload the image.

A question doesn't load fully or looks strange

If something has loaded incorrectly, it can sometimes be corrected by selecting the 'Next' button then the 'Previous' button to reload the question.

Detailed troubleshooting information is available on the help site. To report issues with online testing or for additional assistance, please contact the Education Service Desk: 0800 225 5428.