Summary

Test Identification	
Name	2022 MAT SW 1.6
Date Created	07 Jan 2022
Date Modified	07 Jan 2022
Subject	Mathematics
Status	ACCEPTED
Sequence Number	1195261
Total Test Time	59 minutes
Delivery Method	Onscreen

Curriculum Strand			
Number Sense & Operations	15	**Statistics**	15
Algebra	16		

Curriculum Level					
5B	1	**5P**	12	**5A**	6
6B	8	**6P**	10	**6A**	7

Cognitive Processing			
Surface	22	**Deep**	24

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

Marking Guide : 2022 MAT SW 1.6

Q.No	Marking Key
1	d
2	c
3	c
4	b
5	c
6	d
7	c
8	c
9	b
10	a
11	c
12	d
13	21
14	c
15	d
16	d
17	a
18	a
19	c
20	c
21	c
22	d
23	6
24	$73
25	Are the numbers of pigs in her region increasing? OR How does my region compare with NZ for stock numbers? OR similar 'Must refer to her region. Could use words like "compare" or "explore" or "relationship" to indicate a suitable investigation'
26	Sample too small, or only samples people at home with telephone, or some houses do not have a phone, or similar.
27	d
28	c
29	b
30	2/3 metre

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 (-).

Q.No	Marking Key
31	-5, 3 'Must have both values, and no more, for one mark'
32	6.4% OR 6.36% 'Percent sign not required'
33	24
34	30
35	b
36	scattergraph
37	a
38	c
39	$42.09 or $42 or $42.10
40	b
41	36
42	2.227 or 2.23 or 2.2
43	b
44	84 to 89 million
45	3.14 or 3.1
46	d

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	Unlike Me	Like Me	Very Like Me
	1	2	3	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.

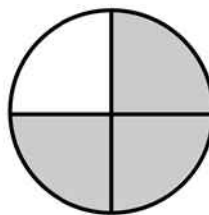**P01.** Who is holding a card with an even number on it?
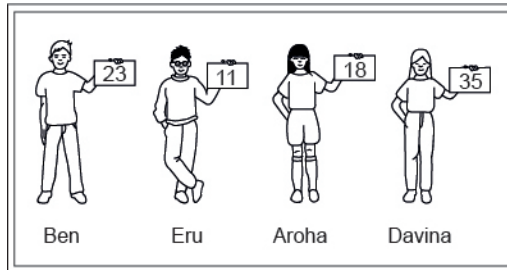
⬭   Ben

⬭   Eru

⬭   Aroha

⬭   Davina

P02. Complete this number pattern.

2, 4, ____, ____, 10

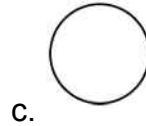**P03.** What fraction of this circle is shaded?

P04. Match the sentence with the correct shape.

☐   1. I have three sides

☐   2. I have 4 sides

a. ☐

b. △

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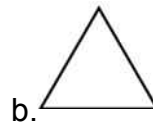
P05. Which numbers make this number sentence **TRUE**?

$$2 + ☆ > 5$$

☐ 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. Using the rule p = 2t + 2, what does p equal if t = 34?

○   34

○   36

○   68

○   70

02. The graph below shows the frequency of test scores on the algebra final exam. What is the *mode* of the algebra final exam scores?

Results of Algebra Final

Frequency (vertical axis, 0 to 10)
Scores on Algebra Final Exam (horizontal axis, 70 to 95)
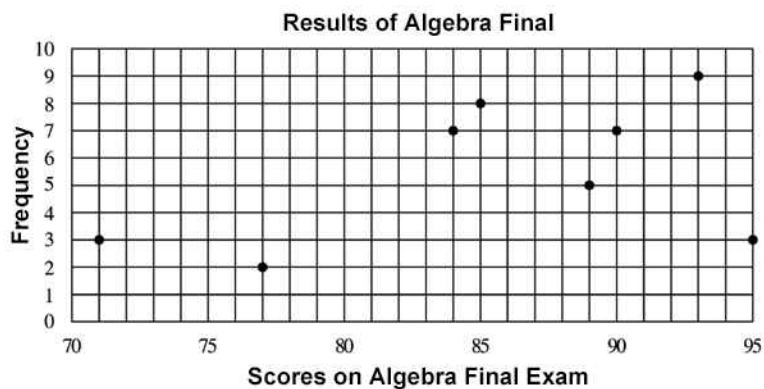
○   88

○   89

○   93

○   95

03. For large parties, a restaurant adds a 15% service charge to the bill. How much would be added to a bill of $638.40?

○ $42.56

○ $63.84

○ $95.76

○ $150.00

04. What is the value of $6n(n - 1) + 4$, when $n = 3$?

- ⬯ 44
- ⬯ 40
- ⬯ 36
- ⬯ 19

05. Soccer is the world's most popular sport. The table lists the records of five World Cup winners.
What was the mean number of total points scored by these teams?

Country	Games Won	Games Lost	Ties	Total Points
Argentina	24	15	9	57
Brazil	44	11	11	99
England	18	11	12	48
Italy	31	11	12	74
West Germany	39	14	15	93

- ⬯ 51
- ⬯ 74
- ⬯ 74.2
- ⬯ 99

06. What is the range of the following numbers?

3, 7, 2, 7, 4, 8, 2, 3, 2

- ⬯ 2
- ⬯ 3
- ⬯ 4
- ⬯ 6

07. Of the following, which is the *closest* approximation of a 15 percent tip on a restaurant bill of $24.99?

○ $2.50

○ $3.00

○ $3.75

○ $4.50

○ $5.00

08. $3 + 15 \div 3 - 4 \times 2 =$

○   -9

○   -2

○   0

○   4

○   5

09. Edgar earned the following scores on his first 10 science tests.
73, 86, 91, 87, 88, 79, 82, 93, 90, 86
Which of these will be affected if Edgar earns a score of 50 on his next test?

○   Mean, median, and mode

○   Mean and median

○   Mean only

○   Median only

10. The table shows the scores of 10 students on a final examination. What is the range of these scores?

Student	Score
A	88
B	65
C	91
D	36
E	72
F	57
G	50
H	85
I	62
J	48

- ⬭ 55
- ⬭ 63.5
- ⬭ 65.4
- ⬭ 91

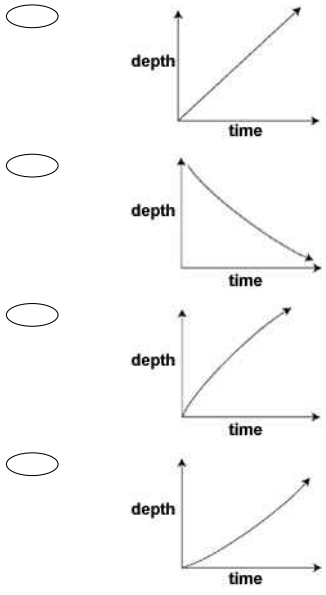**11.** The number of 750 mL bottles that can be filled from 600 L of water is:

- ⬭ 8
- ⬭ 80
- ⬭ 800
- ⬭ 8000

12. Water is poured into this flask at a constant rate.
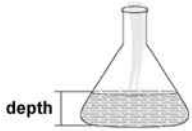
Which one of these graphs could **BEST** represent the depth of water in the flask as it fills?

13. Billy used a new fuel additive that increased his kilometres by 5%. He normally averaged 20 kilometres per litre of fuel.

What distance would he expect to get per litre of fuel with the additive?

_____ km

14. The stem-and-leaf plot shows the results of a science experiment in which 12 plants were each given a different combination of water and nutrients over a period of time and their growth in millimetres measured.
What was the median number of millimetres of growth?

Millimetres Growth

0	8
1	2 4 4 4 5 7 8
2	2 4 6
3	1

- ◯ 14
- ◯ 15
- ◯ 16
- ◯ 17

Use the following information to answer question15..

Overseas Merchandise Trade, 1984-99
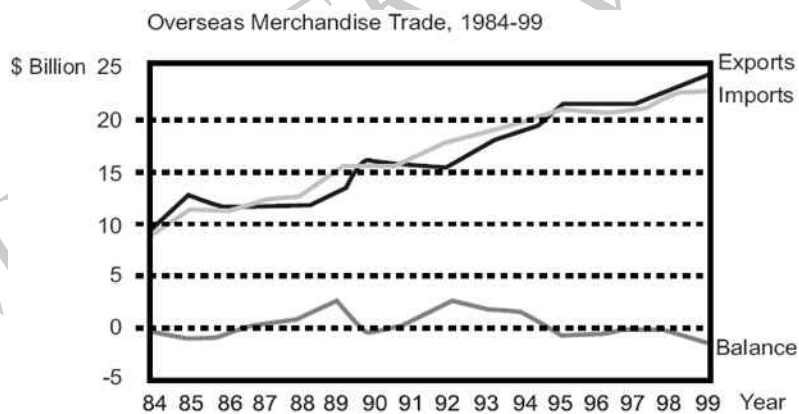
15. In the Overseas Merchandise Trade graph, how is the Balance related to the Exports and Imports?

$\bigcirc$ Imports = Balance - Exports

$\bigcirc$ Exports = Imports + Balance

$\bigcirc$ Balance = Exports + Imports

$\bigcirc$ Balance = Imports - Exports

End of Section

16. The table shows the mean number of points scored per game by four professional basketball players in four seasons.
Which player had the greatest range of mean points per game for the seasons shown in the table?

MEAN POINTS SCORED PER GAME

	Season			
Player	1998-1999	1999-2000	2000-2001	2001-2002
Alonzo Mourning	20.1	19.2	19.8	23.2
Tim Hardaway	17.4	18.9	20.3	17.2
Jamal Mashburn	14.8	15.1	13.4	10.6
Terry Mills	9.0	14.2	10.8	9.4

$\bigcirc$ Alonzo Mourning

$\bigcirc$ Tim Hardaway

$\bigcirc$ Jamal Mashburn

$\bigcirc$ Terry Mills

17. When completely factored,
4 - 16x + 28y equals

⬭   4(1 - 4x + 7y)

⬭   4(1 - 4x) + 28y

⬭   (4 - 7y)(1 + 4x)

⬭   4 - 4(4x - 7y)

18. Part of the statement below is circled.
Which **BEST** describes the circled part of the statement?

$$\textcircled{3}x + 5 = 21$$

⬭   Coefficient

⬭   Variable

⬭   Term

⬭   Expression

19. In statistics, which of the words below **BEST** describes discrete data?

⬭   Measured

⬭   Continuous

⬭   Countable

⬭   Average

20. 2^4 x 3^4 is the same as

⬭ 5^4

⬭ 5^8

⬭ 6^4

⬭ 6^8

21. Which equation is equivalent to
4(2 - 5x) = 6 - 3(1 - 3x)?

○   8x = 5

○   8x = 17

○   29x = 5

○   29x = 17

22. Janis ate $\frac{1}{3}$ of the cake. Maija ate $\frac{1}{4}$ of the cake. Their mother ate $\frac{1}{5}$ of the cake. How much of the cake is left?

○ $\frac{9}{12}$

○ $\frac{3}{12}$

○ $\frac{47}{60}$

○ $\frac{13}{60}$

Use the following information to answer question 23..

A baseball player's batting average is determined by dividing the number of safe hits by the number of turns at bat. Batting averages are expressed as decimals rounded to three places.
For example, a player who made 15 safe hits in 48 turns at bat would have a batting average of .313.

23. Assume that the player begins with 15 safe hits in 48 turns at bat.

How many safe hits would the player need in his next 10 turns at bat in order to increase his batting average from .313 to .362?

Number of safe hits_____

End of Section

24. A circular spa pool holds 4500 litres of water.
It costs 12.45 cents to raise the temperature of 100 litres of water by 1ºC.

Spa Pool

Calculate the cost (to the nearest dollar) of heating the spa pool from 15ºC to 28ºC.

$_____

25. A farming advisor has information about the number of pigs, sheep and cattle in her local region, and for the whole of New Zealand. She is keen to know how her region is performing in terms of stock numbers.
Write a statistical question suitable for her investigation.

_____

_____

26. An ACC safety officer wanted to know whether their last month's television campaign in safety in the household was successful.
She did a telephone survey of 50 Wellington households.
What is one possible limitation in her survey?

_____

_____

27. The table shows the values of x and y, where y is proportional to x.
What are the values of P and Q ?
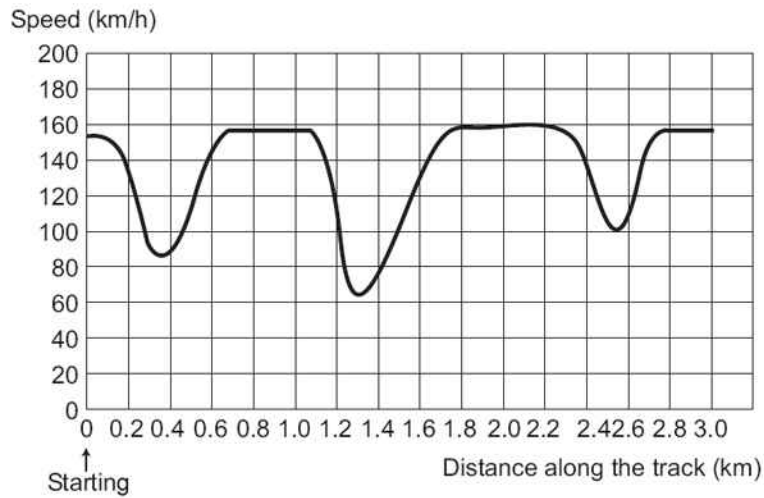
x	3	6	P
y	7	Q	35

◯　　P = 10 and Q = 14

◯　　P = 10 and Q = 31

◯　　P = 14 and Q = 15

◯　　P = 15 and Q = 14

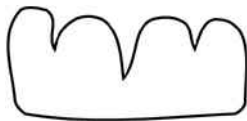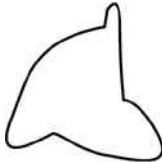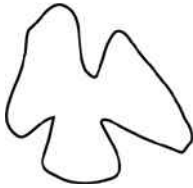**Use the following information to answer question28..**

This graph shows the speed of a racing car along a flat 3 kilometre track during its second lap.

Speed of a racing car along a 3 km track (second lap)

28. Here are pictures of five tracks.
Along which one of these tracks was the car driven to produce the speed graph shown above?

29. Tina solved a quadratic equation and found the solutions to be $-\frac{3}{2}$ and 6.
Which of the following is equivalent to the quadratic equation that Tina solved?

$\bigcirc$ $(x - 6)(3x + 2) = 0$

$\bigcirc$ $(x - 6)(2x + 3) = 0$

$\bigcirc$ $(x + 6)(2x - 3) = 0$

$\bigcirc$ $(x + 6)(3x - 2) = 0$

30. Wayne had a pipe 6 metres long and he cut off a length *(p)*. Susan has a 4 metre pipe and she added on twice the length that Wayne cut off.
Wayne's pipe and Susan's pipe are now the same length.

Calculate *p*, the length of pipe that Wayne cut off.

—————————————————

31. Find **all** the values of *x* that satisfy the following equation.
$x^2 + 2x - 15 = 0$

—————————————————

32. Kawarau has an annual rainfall of 110mm. In one week, the rainfall was 7mm.
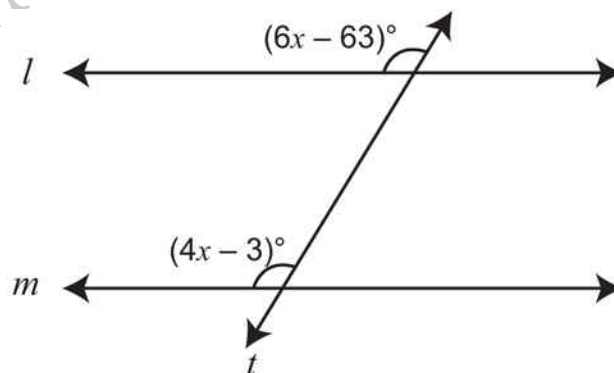
What percentage of the annual rainfall is this?

————————— %

33. Dan baked some cookies. Sam took half of the cookies. Then Sue took half of the remaining cookies. Later, Lisa took half of the cookies that were left. When Dan came home, he saw only three cookies.

How many cookies did Dan bake altogether?

—————————

34. Line *l* is parallel to line *m*.

Calculate the value of *x*.

—————————————————

35. 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?

    ◯ $7.50a + 4.00c = 7600$

    ◯ $7.50a + 4.00c \geq 7600$

    ◯ $7.50a + 4.00c > 7600$

    ◯ $7.50a + 4.00c < 7600$

Use the following information to answer question36..

A sports scientist is interested in the importance of mass, muscle bulk and strength.

The scientist asked 12 students to conduct a fitness test.

The results were as follows.

Mass (kg)	Circumference of biceps (cm)	Lift test (kg)
52	22	48
57	24	52
62	28	51
59	26	55
62	31	54
64	30	60
73	34	58
76	28	57
84	35	63
78	33	60
80	34	61
82	36	62

36. He said. "Students with greater mass can lift more".

What would be the **BEST** graph to draw to see if the sports scientist is correct?

_____

37. If the equation $y = 2^x$ is graphed, which of the following values of x would produce a point closest to the x-axis?

- ⬭ $\dfrac{1}{4}$
- ⬭ $\dfrac{3}{4}$
- ⬭ $\dfrac{5}{3}$
- ⬭ $\dfrac{8}{3}$

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

- ⬭ $x = 4$
- ⬭ $y = 2$
- ⬭ $x = 2$
- ⬭ $x = -2$
- ⬭ $y = 4$

39. The Thomas family is travelling from Takaka to Christchurch, a distance of 489 kilometres. Their car has a fuel consumption of 8.12 litres per 100 kilometres. They have to pay $1.06 a litre for petrol.

Find the cost of petrol for this journey.

_____

40. Suppose that $a_1,\ a_2,\ a_3,\ \ldots$ is the sequence of numbers such that
$a_1 = 3,\ a_2 = \sqrt{a_1} + 1,\ a_3 = \sqrt{a_2} + 1$, and, in general, $a_{n+1} = \sqrt{a_n} + 1$ for all $n \geqq 1$.
To the nearest hundredth, the value of a_5 is

○   1.63

○   2.62

○   2.73

○   3.24

○   5.73

41. Calvin sees a bumper box of crunchie bars in the supermarket at a bargain price of $10.

If he gives away 25% of them on the first day and $\frac{1}{3}$ of the remaining bars the next day he is left with 18.

How many bars were in his new $10 box?

_____ bars

**42.** Calculate $\dfrac{\sqrt{96.4 + 68.1}}{(5.1 - 2.7)^2}$ rounding sensibly.

_____

43. Daniel cleans swimming pools. For a fixed charge of $50 per month he cleans your pool twice. Extra cleanings cost $30 each.
Which of these equations represents the cost per month, C, to a customer whose pool is cleaned x times per month?
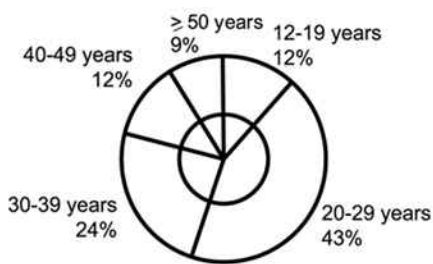
○ $C = 30 + 50x$

○ $C = 30 (x - 2) + 50$

○ $C = 50 (2) + 30x$

○ $C = (30 + 50)x + 2$

44. The graphs give information about sales of CDs and other sound recording media in Zedland. Zeds are the monetary units used in Zedland.

Value of various sound recording media sold in Zedland (millions of Zeds)

■ Music Cassettes ▫ Records ▪ CD
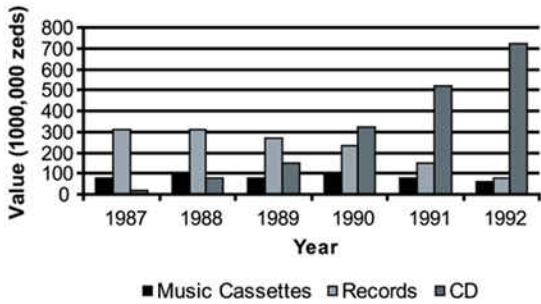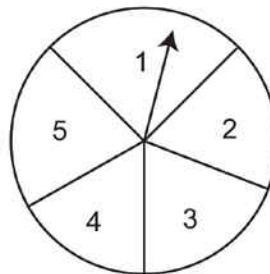
CD sales according to age in 1992

With the aid of both graphs calculate how much money was spent by 12 - 19 year olds on CDs in 1992.

_____

Use the following information to answer question45..

The diagram shows a spinning wheel where the arrow can point to one of the five numbers 1, 2, 3, 4, 5. The results from 100 spins are shown in the table.

Number	1	2	3	4	5
Frequency	15	18	24	24	19

45. Work out the mean of these 100 results.

_____

46. After conducting an experiment to test a hypothesis they proposed, a pair of students concluded that the hypothesis was incorrect.
Assuming that their data are correct, which of the following would be the **LEAST** appropriate response for their teacher to make to them?

○   Encouragement, because they have discovered evidence that casts doubt on a plausible hypothesis.

○   A recommendation that they reformulate their hypothesis with the new data in mind.

○   A suggestion that the students repeat the experiment to check their results.

○   An explanation of what the students did wrong.

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	Tablet (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: iOS10+ 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.

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.