Summary

Test Identification	
Name	2021 MAT SW 1.6
Date Created	19 Jan 2021
Date Modified	19 Jan 2021
Subject	Mathematics
Status	ACCEPTED
Sequence Number	1098017
Total Test Time	59 minutes
Delivery Method	Onscreen

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

Curriculum Level					
5B	3	**5P**	5	**5A**	1
6B	12	**6P**	13	**6A**	10

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 1.6

Q.No	Marking Key
1	c
2	125
3	a
4	d
5	a
6	b
7	b
8	60
9	d
10	d
11	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'
12	46 °C
13	b
14	Can a heavier person lift more? OR Do people with big biceps lift more? OR Do heavier people with big biceps lift more? 'Could use words like "compare" or "explore" or "relationship" to indicate a suitable investigation'
15	b
16	a
17	d
18	a
19	a
20	d
21	c
22	a
23	a
24	1 -- e, 2 -- f, 3 -- d, 4 -- b 'All correct for one mark.'
25	a
26	d
27	d
28	3(x-2)

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
29	2/3 metre
30	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
31	b
32	a
33	b
34	b
35	a
36	Darlene: Town A grew by 60% and town B by 50% 'or equivalent'
37	d
38	b
39	45 m
40	2 metres, because the ball height is 48 metres, thus clearing the 46 metre tree by 2 metres. 'Shows working to get this answer. Does not need to explain it in words.'
41	9.5238% 'Any sensibly rounded equivalent'
42	Employer gave him more than minimum wage increase of 9.5%. He received 11.811% 'Accept any rounded answer equivalent to 11.811%'
43	$8.10 'Accept any valid method of working/explanation'
44	d
45	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.

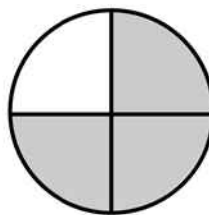**P01.** Who is holding a card with an even number on it?
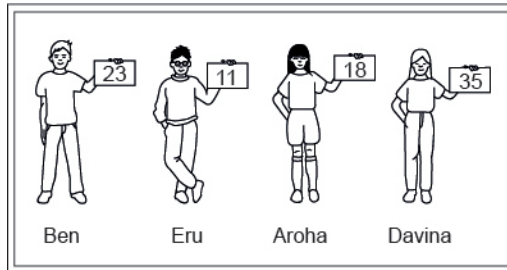
- ⬭ Ben
- ⬭ Eru
- ⬭ Aroha
- ⬭ Davina

P02. Complete this number pattern.

2, 4, ____, ____, 10
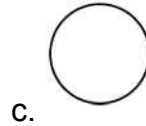
P03. What fraction of this circle is shaded?

☐

____

☐

P04. Match the sentence with the correct shape.

☐   1. I have three sides

☐   2. I have 4 sides

a. ▢

b. △

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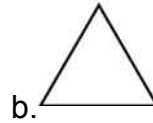
P05. Which numbers make this number sentence **TRUE**?

$$2 + \bigstar > 5$$

☐ 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 graph below shows the dollar amounts of a manufacturer's annual sales during a 4 year period.
Which of the following is closest to the mean of the domestic sales for this 4 year period?

Manufacturing Sales

$\bigcirc$ $5 million

$\bigcirc$ $5.5 million

$\bigcirc$ $6 million

$\bigcirc$ $6.5 million

02. What is the value of 5^3?

_____

03. Abe found the mean and median of this list of numbers.
1, 3, 3
If the number 6 were added to the list, then

$\bigcirc$ the mean would increase.

$\bigcirc$ the mean would decrease.

$\bigcirc$ the median would increase.

$\bigcirc$ the median would decrease.

04. What is the range of the following numbers?

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

◯   2

◯   3

◯   4

◯   6

05. The following marks were scored by 9 students in a spelling test:
0, 1, 2, 2, 2, 3, 3, 6, 8
Two students who were absent did the test the following day. When their marks were included, the mean stayed the same but the mode changed.
What must their marks have been?

◯   3 and 3

◯   2 and 4

◯   1 and 5

◯   0 and 6

06. 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

07. The box-and-whisker plot shown below represents 600 scores on a district geometry test.
How many students scored between 42 and 56?

- ⬭   84
- ⬭   150
- ⬭   300
- ⬭   450

08. The stem-and-leaf plot below shows the ages of the people who bought skateboards at a store during a sale.

Ages of People

Stem	Leaf
1	1 3 4 5 5 6 6 6 8
2	0 1 7 8
3	9
4	3 6
5	
6	5 5
7	1

What is the range of ages of people who bought skateboards during the sale?

Range_____

09. Each of 50 people bowled one game in a charity event at a bowling centre. The results of the games are shown in the chart below.
Which one of the following statements about the bowlers' scores is **TRUE**?

Bowlers' Scores

Score Range	Number of Bowlers
0 - 50	9
51 - 100	12
101 - 150	10
151 - 200	13
201 - 250	4
251 - 300	2

- ◯ 6% of the bowlers scored more than 200
- ◯ 52% of the bowlers scored less than 100
- ◯ The median score is between 51 and 100
- ◯ The median score is between 101 and 150

10. 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?

- ◯ $\frac{9}{12}$
- ◯ $\frac{3}{12}$
- ◯ $\frac{47}{60}$
- ◯ $\frac{13}{60}$

11. 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. _____

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

Average Daily Temperatures (ºC)
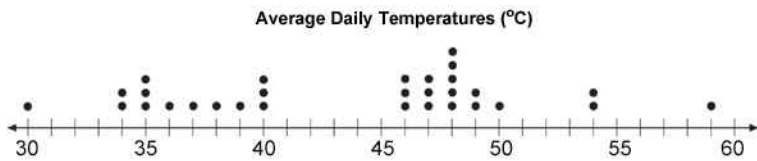
What was the median temperature?

_____

13. Which following point on the number line is closest to $\sqrt{N}$?

- ⬭ A
- ⬭ B
- ⬭ C
- ⬭ D
- ⬭ E

Use the following information to answer question14..

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

The scientists asked 12 students to conduct a fitness test.

The results were as follows.

Mass of Students (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

14. Write a statistical question that you wish to answer that involves comparing the data of your chosen variables from the information provided.

_____

_____

End of Section

15. What is $\dfrac{x^2 - 4xy + 4y^2}{3xy - 6y^2}$ reduced to lowest terms?

○ $\dfrac{x - 2y}{3}$

○ $\dfrac{x - 2y}{3y}$

○ $\dfrac{x + 2y}{3}$

○ $\dfrac{x + 2y}{3y}$

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. If x^2 is added to x, the sum is 42.
Which of the following could be the value of x?

- ⬭ -7
- ⬭ -6
- ⬭ 14
- ⬭ 42

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. 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

21. The table below reflects the number of different handshakes *(H)* for groups of *n* relatives.
For any size gathering of people, which formula gives the correct number of handshakes for *n* people?

n	7	8	12	20
H	21	28	66	190

○ $H = \frac{n(n+1)}{2}$

○ $H = \frac{(n-1)^2}{2}$

○ $H = \frac{n(n-1)}{2}$

○ $H = \frac{n^2+1}{2}$

22. A pharmacist mixed some 10%-saline solution with some 15%-saline solution to obtain 100 mL of a 12%-saline solution.
How much of the 10%-saline solution did the pharmacist use in the mixture?

◯ 60 mL

◯ 45 mL

◯ 40 mL

◯ 25 mL

23. A laboratory has a 75 gram sample of radioactive material. The half-life of the material is 10 days. (This means that it takes 10 days for half of the initial mass to decay).
The formula below can be used to find m , the remaining mass in grams, in terms of t , the number of **10-day intervals** that mass has been decaying.

$m = 75(0.5)^t$

Based on the formula, what is the mass of the laboratory's sample remaining after 30 days?

◯ 9.375 grams

◯ 11.25 grams

◯ 12.5 grams

◯ 22.5 grams

24. Match up each line of her working, with a description.

Moana wants to concrete her drive, which is about 12 metres long, 3 metres wide and 100 mm thick. Concrete costs $160 per cubic metre. The following are **some** of her calculations.

☐	1. 12 × 3	a. Thickness of concrete
☐	2. 12 × 3 × 0.1	b. Rounded cost
☐	3. 3.6 × 160	c. Cost per square metre
☐	4. 580	d. Cost of concrete
		e. Surface area of drive
		f. Volume of concrete required

25. Rounded to the nearest 10 kg the mass of a dolphin was reported as 170 kg. Select the weight range that includes all possible weights for the dolphin.

○   165kg ≤ d < 175kg

○   165kg ≤ d < 174kg

○   165kg < d < 174 kg

○   165kg < d < 175kg

26. Simplify: -10 + 2 (4 + w)

○   -32 - 8w

○   -18 + 2w

○   -2 + w

○   -2 + 2w

27. $(4x^2 - 2x + 8) - (x^2 + 3x - 2) =$

○ $3x^2 + x + 6$

○ $3x^2 + x + 10$

○ $3x^2 - 5x + 6$

○ $3x^2 - 5x + 10$

28. Factorise the expression 3x - 6

_____

29. 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.

_____

30. 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
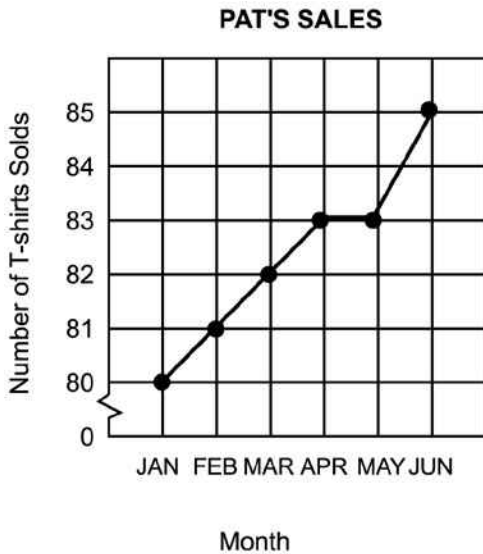
Why does the break in the vertical axis make the graph misleading?

_____

31. 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?

- $7.50a + 4.00c = 7600$
- $7.50a + 4.00c \geq 7600$
- $7.50a + 4.00c > 7600$
- $7.50a + 4.00c < 7600$

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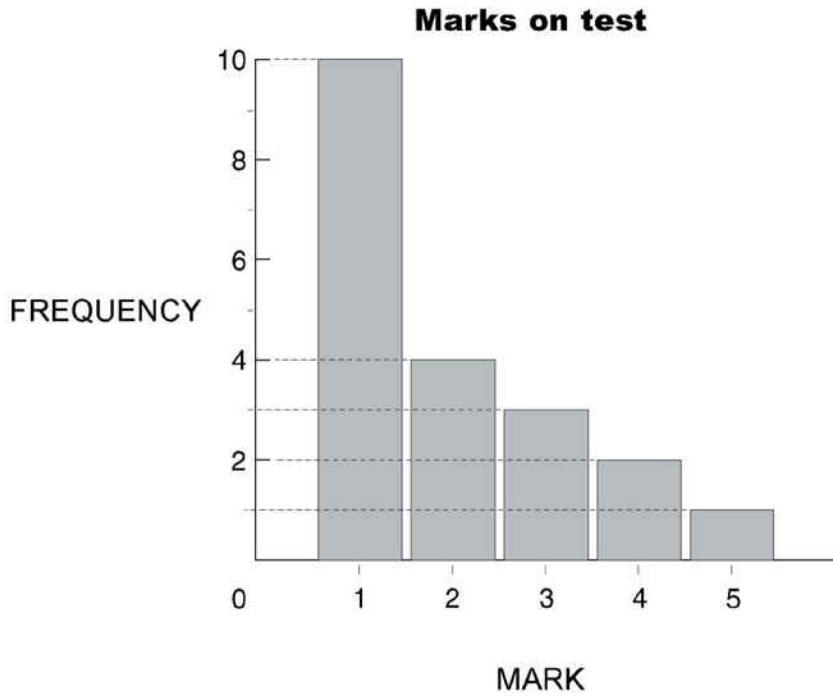3(x + 2) = 3 - (x + 1)?

○   3x + 6 = 3 - x - 1

○   3x + 2 = 3 - x - 1

○   3x + 6 = 3 - x + 1

○   3x + 5 = 3 - x + 1

33. An article of clothing is on sale for 20% off its original price.
What percent of increase is needed to return the sale item to its original price?

○   50%

○   25%

○   20%

○   75%

34. The graph shows the marks gained by each student in a class on a test.

Marks on test

FREQUENCY

MARK

What is the mean mark?

- ◯ 1
- ◯ 2
- ◯ 3
- ◯ 4

35. The students at Albermarle High held a car wash each week for 10 weeks to earn money for the student council. The students made the scatter plot below to represent the amount of money they earned each week.
Which of the following equations **BEST** represents the line of best fit for these data?

- ⬭ $y = 110$

- ⬭ $y = 110x$

- ⬭ $y = x + 55$

- ⬭ $y = -x + 55$

Use the following information to answer question36..

In 1980, the populations of Town A and Town B were 5000 and 6000 respectively.
The 1990 populations of Town A and Town B were 8000 and 9000 respectively.
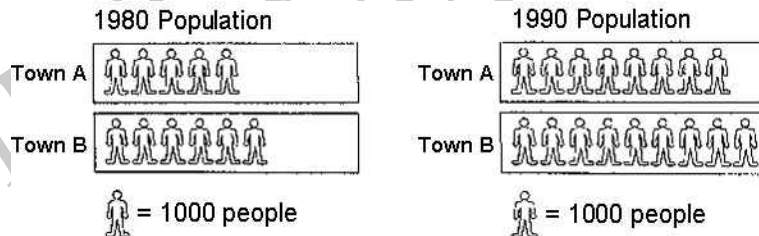
36. Darlene claims that from 1980 to 1990 the population of Town A had grown more.

Explain how Darlene might have justified her claim.

_____

_____

_____

37. In the *xy*-plane, a line parallel to the *x*-axis intersects the *y*-axis at the point (0, 4). This line also intersects a circle in two points. The circle has a radius of 5 and its centre is at the origin.
What are the coordinates of the two points of intersection?

○ (1, 2) and (2, 1)

○ (2, 1) and (2, -1)

○ (3, 4) and (3, -4)

○ (3, 4) and (-3, 4)

○ (5, 0) and (-5, 0)

38. Suppose that $a_1,\ a_2,\ a_3,\ \cdots$ 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 $n \geq 1$.
To the nearest hundredth, the value of a_5 is

○ 1.63

○ 2.62

○ 2.73

○ 3.24

○ 5.73

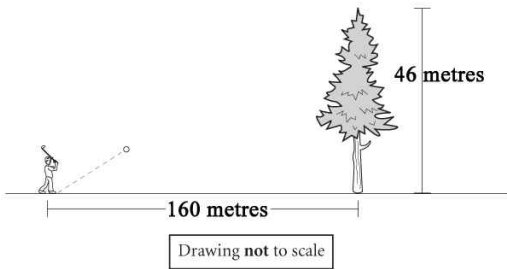**Use the following information to answer questions 39 to 40.**

Russell hits a golf ball, the path of which can be approximated by the equation shown below.

$$y = \frac{-1}{400}(x - 140)^2 + 49$$

y = height of the balls, in metres
x = horizontal distance, in metres

39. Find the height of the ball after it has travelled a horizontal distance of 100 metres.

Height_____ metres.

40. Study the diagram below. The diagram shows a tree at a horizontal distance of 160 metres from the starting point of the ball. The tree is 46 metres tall.

46 metres

160 metres

Drawing **not** to scale

By how many metres will the ball clear the tree?

_____

_____

End of Section

Use the following information to answer questions 41 to 43

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

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

_____

42. 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.

_____

_____

_____

_____

43. 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?

_____

_____

End of Section

44. A right circular cone has radius 5 centimetres and height 8 centimetres.
What is the lateral area of the cone?
(Lateral area of cone = $\pi r l$, where l = slant height.)
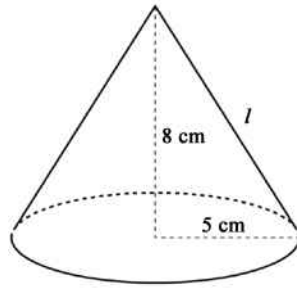
- ⬭ 40π sq cm
- ⬭ 445π sq cm
- ⬭ $5\pi\sqrt{39}$ sq cm
- ⬭ $5\pi\sqrt{89}$ sq cm

45. The Year 13 class plans to sell T-shirts with the school's name on them. The cost of each T-shirt alone is $3.50, and the printing cost of each is $0.75.
If the class plans on selling each printed T-shirt for $11, what expression can you use to calculate the class profit for selling n printed T-shirts?

- ⬭   11.00 - (3.50 + 0.75)n
- ⬭   11.00n - (3.50 + 0.75)
- ⬭   11.00 - 3.50 - 0.75n
- ⬭   (11.00 - 3.50 - 0.75)n

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.
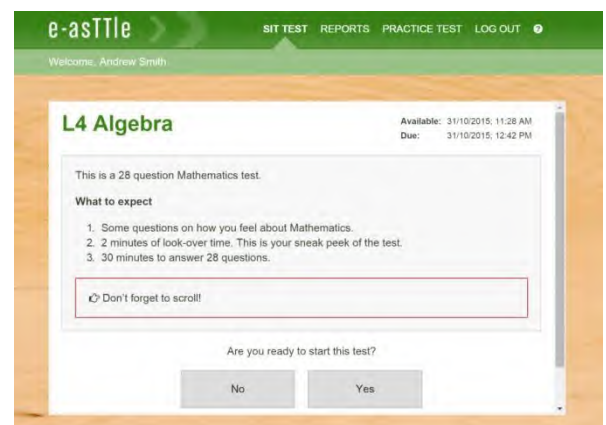
Other reminders to discuss with students:

- 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.