

## Summary

### Test Identification

<b>Name</b>	2020 MAT SW 1.6
<b>Date Created</b>	29 Jan 2020
<b>Date Modified</b>	29 Jan 2020
<b>Subject</b>	Mathematics
<b>Status</b>	ACCEPTED
<b>Sequence Number</b>	1005057
<b>Total Test Time</b>	57 minutes
<b>Delivery Method</b>	Onscreen

### Curriculum Strand

<b>Number Sense &amp; Operations</b>	13	<b>Statistics</b>	13
<b>Algebra</b>	19		

### Curriculum Level

<b>5B</b>	1	<b>5P</b>	4	<b>5A</b>	4
<b>6B</b>	12	<b>6P</b>	16	<b>6A</b>	8

### Cognitive Processing

<b>Surface</b>	16	<b>Deep</b>	29
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### Slider Settings

<b>Strands</b>		<b>Level</b>	
<b>Number Sense &amp; Operations</b>	Most	<b>Level 5</b>	Few
<b>Algebra</b>	Most	<b>Level 6</b>	Most
<b>Statistics</b>	Most		

## Marking Guide : 2020 MAT SW 1.6

Q.No	Marking Key
1	b
2	b
3	c
4	b
5	b
6	c
7	d
8	c
9	a
10	c
11	c
12	d
13	b
14	Many answers possible 'Any sensible and reasonable question.'
15	d
16	e
17	a
18	c
19	c
20	a
21	d
22	0.431 'Must be three decimal places'
23	a
24	b
25	d
26	d
27	b
28	slope or gradient
29	Metabolic rate AND time 'Must have both for one mark.'
30	c
31	53%

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### 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
32	b
33	b
34	b
35	a
36	c
37	a
38	b
39	a
40	c
41	a
42	b
43	d
44	c
45	d

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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
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**01.** I think maths is exciting and interesting.

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
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**02.** I never get tired of doing maths.

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
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**03.** I like to do and think about maths outside of school.

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
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**04.** I think maths helps me to understand life.

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
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**05.** I think that maths helps people make important decisions.

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
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**06.** Maths is NOT boring.

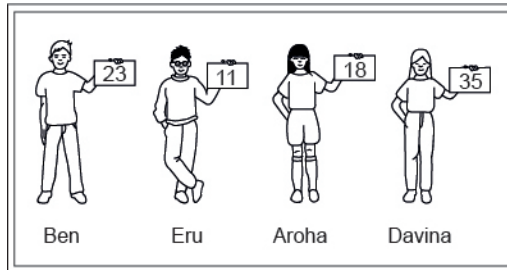
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
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## Practice Questions

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?

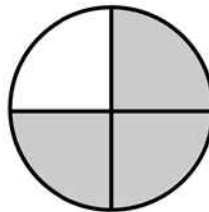


- Ben
- Eru
- Aroha
- Davina

**P02.** Complete this number pattern.

2, 4, \_\_\_\_\_, \_\_\_\_\_, 10

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



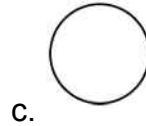
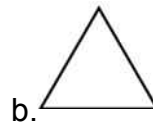
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**P04.** Match the sentence with the correct shape.

1. I have three sides

2. I have 4 sides



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

$$2 + \star > 5$$

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.

In the number 213, the value of 1 is ten.

**TRUE**

**FALSE**

In the number 504, the value of 5 is fifty.

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**01.** In a bowling tournament, there were 2 scores in the 200's, 6 scores in the 180's, 5 scores in the 160's, 5 in the 150's, and 3 in the 130's.  
The median score would be in the

- 150's.
- 160's.
- 180's.
- There is not enough information given.

**Use the following information to answer question02..**

Rasela works for the park service. She wanted to estimate the population of fish in a park lake. She obtained samples on which to base her estimate by casting a net in each of seven locations in the lake, counting the fish she caught and then releasing the fish. Her results are shown in the table below:

Results of fish sampling

Location	1	2	3	4	5	6	7
Number of Fish Caught	18	12	18	11	9	13	17

**02.** What is the mean number of fish caught?

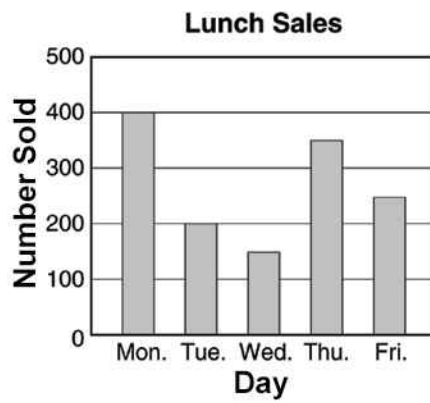
- 13
- 14
- 17
- 18

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End of Section



03. What was the daily average (mean) number of lunches sold during the week?



- 225
- 250
- 270
- 290

04. The **BEST** approximation to  $\frac{12.4 \times 37.85}{3.95 \times 4.78}$  is:

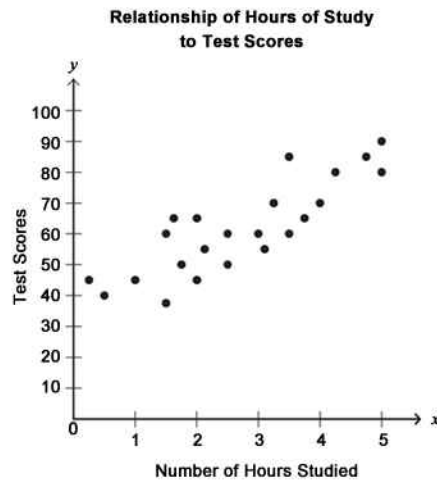
- 10
- 20
- 30
- 40

05. What is the value of  $\frac{\sqrt{3.2}}{2}$  to the nearest tenth?

- 0.7
- 0.9
- 1.3
- 1.5

**06.** Ms Kramer asked her students to report the number of hours they studied for their statistics test. The day after the test, she plotted the results on the scatterplot shown below.

Which of the following equations correctly approximates the line of best fit?



- $y = -10x + 30$
- $y = -10x + 60$
- $y = 10x + 30$
- $y = 10x + 60$

**07.** Which equation could have been used to create this function table?

$x$	$y$
-9	-5
-2	2
4	8
11	15

- $y = \frac{x}{2}$
- $y = 2x$
- $y = x - 4$
- $y = x + 4$

**08.** A school club uses a 45 seater bus for a trip to the wildlife park. The bus costs 600 centros (units of money) and the admission ticket for each student is 30 centros. The school charges each student 50 centros per person for the bus and admission. What is the minimum number of students needed to ensure that these costs are covered?

- 12
- 20
- 30
- 45

**09.** A coach in a large high school thinks that ballet training will improve the batting performance of his baseball team. He decides to have a randomly selected half of the team take six weeks of ballet training before the baseball season begins, while the other half does not take such training. He will compare the season batting averages of Group A (those with ballet training) and Group B (those without ballet training) by comparing the mean of Group A with the mean of Group B.

An independent variable is

- ballet training.
- batting average.
- runs batted in.
- the size of the school.
- the grade the players make in the ballet school.

**10.**  $2^4 \times 3^4$  is the same as

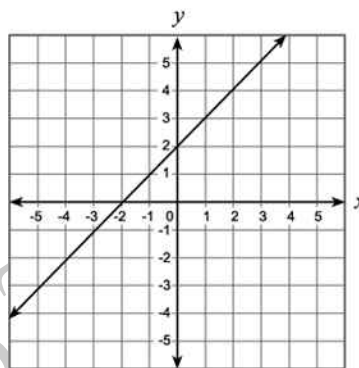
- $5^4$
- $5^8$
- $6^4$
- $6^8$

11. A scientist is comparing the weights of the four molecules listed in the table shown. Which of these molecules is the heaviest?

WEIGHTS OF MOLECULES	
Salt	$9.350 \times 10^{-28}$
Pure water	$2.879 \times 10^{-26}$
Hydrochloric acid	$5.832 \times 10^{-22}$
Potassium hydroxide	$8.976 \times 10^{-24}$

- Salt
- Pure water
- Hydrochloric acid
- Potassium hydroxide

12. Which equation **BEST** represents this graph?



- $y = -x$
- $y = 2x + 2$
- $y = x - 2$
- $y = x + 2$

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

$\frac{x - 2y}{3}$

$\frac{x - 2y}{3y}$

$\frac{x + 2y}{3}$

$\frac{x + 2y}{3y}$

14. John and all his friends carry cell phones and use them heavily. Last year, two of John's friends developed brain tumours. John wonders if tumours are related to cell phones.

Write a question for a questionnaire that John could use to investigate this topic.

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15. The following numbers have to be arranged in order from smallest to largest.

A,  $6.87 \times 10^{-4}$

B,  $9.2 \times 10^{-5}$

C,  $8.14 \times 10^{-4}$

D,  $7.2 \times 10^{-5}$

The correct order is:

A, D, C, B

B, D, C, A

A, C, D, B

D, B, A, C

16.  $\frac{6 \times 10^3}{3 \times 10^5} =$

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

17. 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

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

18. 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.

Use the following information to answer question 19..

Mary did a survey of the different after school activities of 12 students. The results are as follows.

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

19. Mary said "Students who spend more time watching TV, spend less time playing sport."

What would be the **BEST** graph to show this?

- Pie graph
- Box and whisker
- Scattergraph
- Pictograph

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End of Section

20. The perimeter of a child's rectangular playground is 64 metres. The length and width of the playground are consecutive odd integers.

If the length ( $x$ ) is the longer of the two dimensions, what is the width of the playground?

- 15 metres
- 17 metres
- 31 meters
- 33 metres

21. 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 question22..

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.

**22.** In the next 10 turns at bat, the player has 10 safe hits.

What is the new batting average?

\_\_\_\_\_

End of Section

**23.** 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.



- $165\text{kg} \leq d < 175\text{kg}$
- $165\text{kg} \leq d < 174\text{kg}$
- $165\text{kg} < d < 174\text{ kg}$
- $165\text{kg} < d < 175\text{kg}$

**24.** 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?

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



25. Which pair of equations shares a solution?

- $5x + 2 = 32$   
 $2x + 3 = 8 + x$
- $5x + 2 = 32$   
 $-3x + 4 = 2(x - 5)$
- $5x + 2 = 32$   
 $x + 2(x - 4) = 34 - 3x$
- $5x + 2 = 32$   
 $4x + 9 = 5(14 - x) - 7$

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

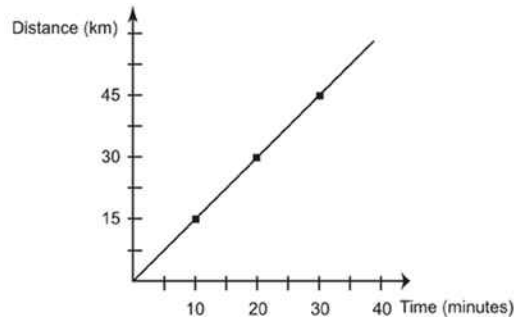
- $-32 - 8w$
- $-18 + 2w$
- $-2 + w$
- $-2 + 2w$

27. Which of the following numbers is an irrational number?

- $\frac{22}{7}$
- $\pi$
- $\sqrt{9}$
- 3.1416

Use the following information to answer question 28..

The distance - time graph shows Sue's trip down the motorway on a motorcycle.



28. What feature of the graph tells us about Sue's speed on this trip?

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End of Section

**Use the following information to answer question 29..**

The students in Hemi's science class were investigating the claim that exercise raises a person's metabolic rate for as long as 12 hours. This enables fat to be burnt off after exercise has finished.

They were also told that eating raises the metabolic rate.

The students walked briskly on a treadmill for a fixed period of time and then measured their metabolic rate before, immediately after, and then 12 hours after the exercise.

29. What are the 2 variables of interest in this study?

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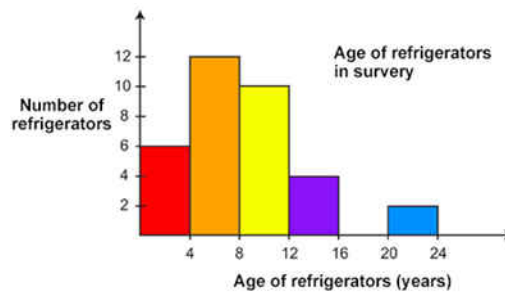
End of Section

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

- $(3a - 8b)(a - 6b)$
- $(3a - 16b)(a - 3b)$
- $3(a - 4b)(a - 4b)$
- $3(a - 8b)(a - 8b)$

Use the following information to answer question 31..

This histogram shows the result of a survey of the ages of refrigerators, chosen at random, in Picton.



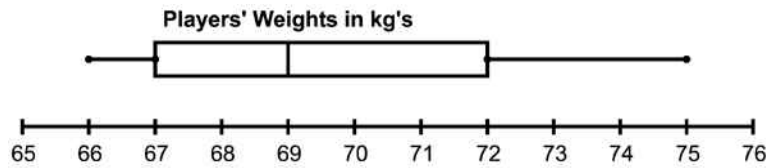
31. Complete this statement:

\_\_\_\_\_ % of refrigerators in Picton are less than 8 years old.

End of Section

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**?



- 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.

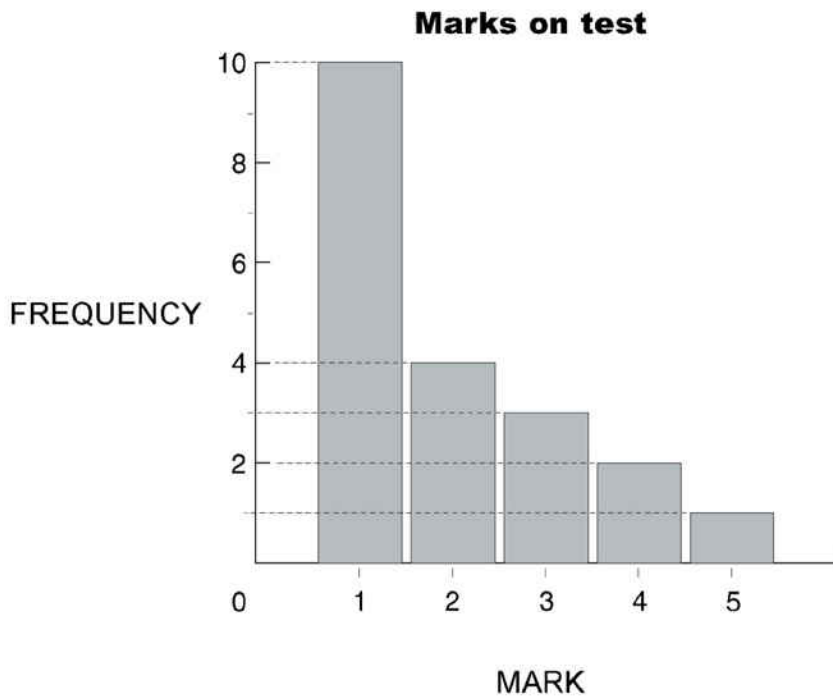
33. An article of clothing is on sale for 20% off its original price.

What percent of increase is needed to return the sale item to its original price?

- 50%
- 25%
- 20%
- 75%

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



What is the mean mark?

- 1
- 2
- 3
- 4

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

- $\sqrt{21}$
- $3\frac{5}{8}$
- 2.41414
- 13

**36.** 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  $F$ .

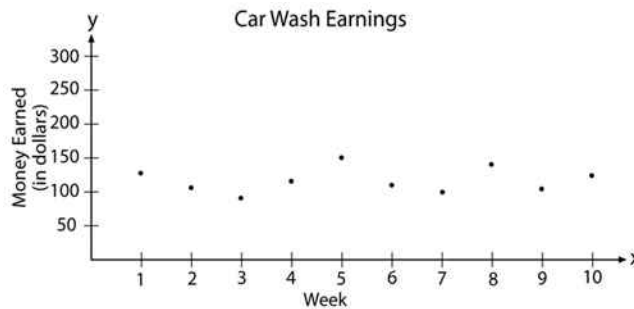
**37.** Which equation is equivalent to  $5x - 2(7x + 1) = 14x$  ?

- $-9x - 2 = 14x$
- $-9x + 1 = 14x$
- $-9x + 2 = 14x$
- $12x - 1 = 14x$

**38.**  $(2 + m) - (7 - 4m)$  is equal to

- $-5 - 3m$
- $-5 + 5m$
- $9 - 3m$
- $9 + 5m$

39. 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?



- $y = 110$
- $y = 110x$
- $y = x + 55$
- $y = -x + 55$

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

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

41. Which of the following shows the next step using the least common denominator to simplify  $\frac{7}{8} - \frac{5}{6}$ ?

- $(\frac{7}{8} \times \frac{3}{3}) - (\frac{5}{6} \times \frac{4}{4})$
- $(\frac{7}{8} \times \frac{4}{4}) - (\frac{5}{6} \times \frac{3}{3})$
- $(\frac{7}{8} \times \frac{5}{5}) - (\frac{5}{6} \times \frac{7}{7})$
- $(\frac{7}{8} \times \frac{7}{7}) - (\frac{5}{6} \times \frac{5}{5})$

**42.** 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%

**43.** 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  $(-5, 0)$

**44.** The mean exam score for 31 students in a geometry class was 79. The median exam score for the same set of students was 75.

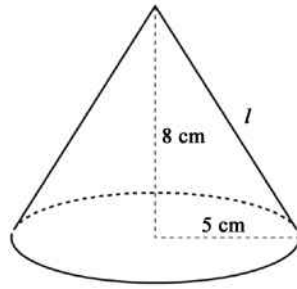
Two additional students took the exam at a later time and scored 65 and 93.

How did the mean and median change when these two additional scores were included?

- The median increased and the mean stayed the same.
- The median stayed the same and the mean increased.
- The median and the mean both stayed the same.
- The median and the mean increased.



45. 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.)



- $40\pi$  sq cm
- $445\pi$  sq cm
- $5\pi\sqrt{39}$  sq cm
- $5\pi\sqrt{89}$  sq cm

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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

- 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

#### Large Tablets (9" +)

- 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

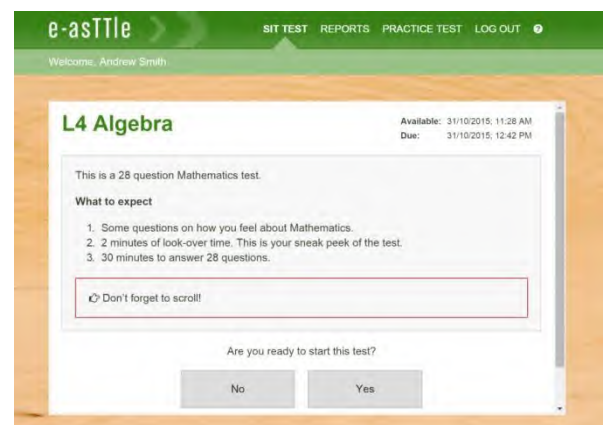
### 1. Check equipment

- 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.



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.  **INFO MISSING**  
[Click to reload](#)

#### 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.