## Summary

|  | Test Identification |
| :--- | :--- |
| Name | 2023 MAT SW 1.6 |
| Date Created | 30 Jan 2023 |
| Date Modified | 22 Feb 2023 |
| Subject | Mathematics |
| Status | ACCEPTED |
| Sequence Number | 1301143 |
| Total Test Time | 57 minutes |
| Delivery Method | Onscreen |


|  | Curriculum Strand |  |
| :--- | :---: | :---: |
| Number Sense \& | 13 | Number Knowledge |
| Operations |  |  |

## Curriculum Level

| 4B | 5 | $\mathbf{4 P}$ | 1 |
| :--- | :--- | :--- | :--- |
| 5B | 4 | $\mathbf{5 P}$ | 3 |
| $\mathbf{6 B}$ | 8 | $\mathbf{6 P}$ | 15 |


| Cognitive Processing |  |  |  |
| :---: | :---: | :---: | :---: |
| Surface | 23 |  | 27 |
| Slider Settings |  |  |  |
| Strands |  | Level |  |
| Number Knowledge | Most | Level 4 | Few |
| Number Sense \& | Most | Level 5 | Few |
| Operations |  | Level 6 | Most |
| Algebra | Most |  |  |
| Statistics | Most |  |  |

## Marking Guide : 2023 MAT SW 1.6

| Q.No | Marking Key |
| :--- | :--- |
| $\mathbf{1}$ | b |
| $\mathbf{2}$ | b |
| $\mathbf{3}$ | c |
| $\mathbf{4}$ | b |
| $\mathbf{5}$ | c |
| $\mathbf{6}$ | There will be too many possible answers to easily graph or there will <br> be too many different ways of naming the similar colours to be able to <br> compare responses (e.g., light blue, dark blue, navy blue, acqua blue, <br> robin"s egg blue, royal blue, <br> 'Any equivalent answer for 1 mark.' |
| $\mathbf{7}$ | d |
| $\mathbf{8}$ | d |
| $\mathbf{9}$ | c |
| $\mathbf{1 0}$ | d |
| $\mathbf{1 1}$ | c |
| $\mathbf{1 2}$ | 26.915 |
| $\mathbf{1 3}$ | any of: <br> $153,156,159,162,165,168,171,174,177,180,183,186,189,192,195,198$ <br> 'any of the above for 1 mark' |
| $\mathbf{1 4}$ | Any of these: $160,170,180,190$ <br> 'Need only one of these for 1 mark' |
| $\mathbf{1 5}$ | 180 <br> '150 is not acceptable' |
| $\mathbf{1 6}$ | Not possible. A prime number cannot be divisible by 3 (or similar) <br> 'need equivalent explanation to get 1 mark' |
| $\mathbf{1 7}$ | c |
| $\mathbf{1 8}$ | c |
| $\mathbf{1 9}$ | b |
| $\mathbf{2 0}$ | d |
| $\mathbf{2 1}$ | a |
| $\mathbf{2 2}$ | e |
| $\mathbf{2 3}$ | a |
| $\mathbf{2 4}$ | c |
| $\mathbf{2 5}$ | a |

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 |
| :--- | :--- |
| $\mathbf{2 7}$ | c |
| 28 | b |
| 29 | d |
| $\mathbf{3 0}$ | $1--$ e, 2 -- f, 3 -- d, 4 -- b <br> 'All correct for one mark.' |
| 31 | d |
| 32 | d |
| $\mathbf{3 3}$ | How much extra power are we using this month compared with the <br> same month last year? Or similar/equivalent <br> 'Could use words like "compare" or "explore" or "relationship" to <br> indicate a suitable investigation' |
| 34 | c |
| 35 | $(1,4)$ |
| 36 | a |
| 37 | a |
| 38 | b |
| 39 | b |
| 40 | b |
| 41 | a |
| 42 | b |
| 43 | a |
| 44 | a |
| 45 | e |
| 46 | d |
| 47 | b |
| 48 | c |
| 49 | d |
| 50 | b |

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 <br> Unlike <br> Me | Unlike <br> Me |  | Like Me |
| :---: | :---: | :---: | :---: | | Very |
| :---: |
| Like Me |

1. It is very important to me to be good at maths.
2. I try to get more maths answers right than my friends.
3. I like hard, challenging maths.
4. I do as much school work as possible in maths.
5. I like to help my friends with their maths school work.
6. I like it when the maths examples are hard.

## 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?
BenEruArohaDavina

P02. Complete this number pattern.
$2,4, \ldots, \ldots, 10$

P03. What fraction of this circle is shaded?

$\square$
$\square$

P04. Match the sentence with the correct shape.
$\square$ 1. I have three sides
2. I have 4 sides
a.

$\square$

c.


P05. Which numbers make this number sentence TRUE?

$$
2+\forall>5
$$123

4
5

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

$\square$
$\square$ 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.
$\bigcirc$
$\sigma$
$\sigma$
$\sigma$

1. Which number is closest to the median of the data set represented by the box-andwhisker plot below?
75656050
2. The numbers in this table follow a linear pattern. What is the missing value?

| $\boldsymbol{p}$ | $\boldsymbol{w}$ |
| :---: | :---: |
| -3 | 14 |
| -2 | 11 |
| -1 | $?$ |
| 0 | 5 |
| 1 | 2 |
| 2 | -1 |

3. Paige was asked to round 325672 to the thousands place. Which number below shows the correct value?
4. The table below shows the number of each kind of candle a shop sold on Saturday. Which of the following shows this information correctly graphed?

| Candle Sales |  |
| :---: | :---: |
| Kind of Candle | Number Sold |
| Floral | 35 |
| Vanilla | 48 |
| Berry | 39 |
| Cinnamon | 46 |
| Ocean Air | 27 |


$D$
Candle Sales


05. This figure is shaded to represent the number 1.


Which of the following numbers is represented by the shaded part of the figure below?
636.3
0.63
$\sigma$
0.063
06. Stan wrote his survey question: "What is your favourite colour?"

Write one problem that this question could cause Stan if he wanted to draw a graph of this data.
$\qquad$
$\qquad$
$\qquad$
07. In which list are the numbers ordered from greatest to least?
$\qquad$ $0.233,0.3,0.32,0.332$
$\sigma$
$0.3,0.32,0.332,0.233$
$\sigma$
$0.32,0.233,0.332,0.3$
$\sigma$
$0.332,0.32,0.3,0.233$
08. Which is read "fifty-five and twenty-one thousandths"?55210005521055.21
$\sigma$
55.021
09. A weather forecaster checked and emptied a rain gauge six times one day. The measurements in centimetres were $0.243,0.595,0.903,0.756,0.398$, and 0.112 . What is the BEST estimate of the total rainfall that day?
2.0 cm .2.5 cm .3.0 cm .
3.5 cm .
10. Which of the following is NOT a prime number?2517
$\sigma$
121
11. Sarah is filling numbers in the Venn diagram. No number is to be entered more than once.
What is the least number that can be appropriately placed in the shaded area of the diagram?

12. Using the digits $1,2,5,6$ and 9 write a number that has a 1 in the hundredths column, a 2 in the tens column, a 5 in the thousandths column, a 6 in the ones column and a 9 in the tenths column.

## Use the following information to answer questions 13 to 16

Terri and Nicholas invented a new game called Mix and Match Clues. These are the clues:
Clue A: The number is greater than 150 and less than 200.
Clue B: The number is evenly divisible by 3.
Clue C: The number is evenly divisible by 5.
Clue D: The number is evenly divisible by 2.
Clue $E$ : The number is a prime number.
13. If possible, write a number that fits Clues $A$ and $B$. If not possible, tell why.
14. If possible, write a number that fits Clues $A, C$, and $D$. If it is not possible, tell why.
15. If possible, write a number that fits Clues, $A, B, C$, and $D$. If it is not possible, tell why.
16. If possible, write a number that fits Clues, $A, B$, and $E$. If it is not possible, tell why.

## Use the following information to answer question17.

Last year, John sold 15 chocolate bars. He wrote down the prices of the three kinds of chocolate bars as he sold them.

| 50 c | 75 c | 50 c | 50 c | $\$ 1.00$ |
| :--- | :--- | :--- | :--- | :--- |
| 50 c | 75 c | 75 c | $\$ 1.00$ | $\$ 1.00$ |
| 50 c | 75 c | 50 c | 75 c | 50 c |

17. Which measure should he use to find his best-selling chocolate bar?MeanMedianModeRange

End of Section
18. Arrange from smallest to largest:

2, $2 \frac{3}{4}, \frac{8}{3}, 2.6$2, 2.6, $2 \frac{3}{4}, \frac{8}{3}$$2,2 \frac{3}{4}, 2.6, \frac{8}{3}$$2,2.6, \frac{8}{3}, 2 \frac{3}{4}$$2, \frac{8}{3}, 2.6,2 \frac{3}{4}$
19. Which following point on the number line is closest to $\sqrt{N}$ ?


CDE
20. Which equation BEST represents this graph?

$\sigma$

$$
y=-x
$$

$\sigma$
$y=2 x+2$

$$
y=x-2
$$

$\sigma$
$y=x+2$
21. Which is an irrational number?$\sqrt{5}$
$\infty$
$\sqrt{9}$
$\sigma$
-1
0 $-\frac{2}{3}$
22. $\frac{6 \times 10^{3}}{3 \times 10^{5}}=$
$D$
$0.5 \times 10^{2}$
$\sigma$
$2 \times 10^{2}$
$\sigma$
$2 \times 10^{0.6}$
$\sigma$
$0.5 \times 10^{-2}$
$\sigma$
$2 \times 10^{-2}$
23. The least common multiple of 8,12 , and a third number is 120 . Which of the following could be the third number?15162432
$\sigma$ 48

## Use the following information to answer question24..

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 | $\mathbf{1}$ | 3 |

24. Mary said "Students who spend more time watching TV, spend less time playing sport."
What would be the BEST graph to show this?Pie graphBox and whiskerScattergraph
Pictograph
25. 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 metres17 metres31 meters33 metres
26. 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?

| $\boldsymbol{n}$ | 7 | 8 | 12 | 20 |
| :--- | :--- | :--- | :--- | :--- |
| $\mathbf{H}$ | 21 | 28 | 66 | 190 |

$$
\begin{aligned}
& \mathrm{H}=\frac{n(n+1)}{2} \\
& \mathrm{H}=\frac{(n-1)^{2}}{2} \\
& \mathrm{H}=\frac{n(n-1)}{2} \\
& \mathrm{H}=\frac{n^{2}+1}{2}
\end{aligned}
$$

27. The mass of an electron is $9 \times 10^{-28}$ grams. A proton weighs 1836 times as much as an electron.
Which of the following represents the weight, in grams, of a proton written in scientific notation?
$1.0836 \times 10^{-24}$$1.0836 \times 10^{-28}$$1.6524 \times 10^{-24}$$1.6524 \times 10^{-28}$
28. There are two numbers with the following properties.
1) The second number is 3 more than the first number.
2) The product of the two numbers is 9 more than their sum.

Which of the following represents possible values of these two numbers?-6, -3-4, -1-1, 4$-3,6$
29. A certain company keeps a list of 50 employees and their annual salaries.

When the salary of the very highly paid president is added to the list, which of the following statistics is MOST likely to be approximately the same or nearly the same for the original list and the new list?The highest salaryThe rangeThe meanThe medianThe interquartile range
30. 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. $12 \times 3$
a. Thickness of concrete
2. $12 \times 3 \times 0.1$
b. Rounded cost
3. $3.6 \times 160$
c. Cost per square metre
4. 580
d. Cost of concrete
e. Surface area of drive
f. Volume of concrete required
5. A set contains the numbers
$\frac{8}{2},-2.3,0, \frac{2}{7}, \sqrt{9}, 0.3 i, \sqrt{15},-12,2 \pi$
Which of the following statements is TRUE?The set contains 8 irrational numbersThe set contains 7 irrational numbersThe set contains 3 irrational numbers
$\sigma$
The set contains 2 irrational numbers
6. $\left(4 x^{2}-2 x+8\right)-\left(x^{2}+3 x-2\right)=$

$$
\begin{aligned}
& 3 x^{2}+x+6 \\
& 3 x^{2}+x+10 \\
& 3 x^{2}-5 x+6 \\
& 3 x^{2}-5 x+10
\end{aligned}
$$

33. The electricity company posts the monthly bill to each household.

The bill shows the amount of power used that month, and the cost.
It also shows the amount of power used in the same month the previous year.
Write a suitable question to investigate the effect of an electricity saving campaign this year.
34. What is the factored form of
$3 a^{2}-24 a b+48 b^{2} ?$

$$
\begin{aligned}
& (3 a-8 b)(a-6 b) \\
& (3 a-16 b)(a-3 b) \\
& 3(a-4 b)(a-4 b) \\
& 3(a-8 b)(a-8 b)
\end{aligned}
$$

35. The ordered pairs below should lie on a straight line, but one has been typed incorrectly.
$(-2,-5)(-1,-2)(0,1)(1,2)(2,7)$
Write down the correct co-ordinates for this point, so all of the points do form a straight line.

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

$$
\begin{aligned}
& 3 x+6=3-x-1 \\
& 3 x+2=3-x-1 \\
& 3 x+6=3-x+1 \\
& 3 x+5=3-x+1
\end{aligned}
$$

37. Which of the following values of $x$ makes the proportion below true?
$\frac{7}{4}=\frac{x-3}{x+3}$
38. 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 .
$\sigma$
The range of weights of players on the team is 5 kg .
39. 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\%
$\sigma$ 75\%
40. The graph shows the marks gained by each student in a class on a test.

Marks on test


MARK

What is the mean mark?
$\qquad$ - 1
$\sigma$
23
$\sigma$
4
41. Which of the following real numbers is NOT a rational number?$\sqrt{21}$
$3 \frac{5}{8}$2.41414-13
42. $(2+m)-(7-4 m)$ is equal to

$$
\begin{aligned}
& -5-3 m \\
& -5+5 m \\
& 9-3 m \\
& 9+5 m
\end{aligned}
$$

43. 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?


$$
y=110
$$

$$
y=110 x
$$

$$
y=x+55
$$

$$
y=-x+55
$$

44. Which of the following shows the next step using the least common denominator to simplify $\frac{7}{8}-\frac{5}{6}$ ?$\left(\frac{7}{8} \times \frac{3}{3}\right)-\left(\frac{5}{6} \times \frac{4}{4}\right)$
$\sigma$
$\left(\frac{7}{8} \times \frac{4}{4}\right)-\left(\frac{5}{6} \times \frac{3}{3}\right)$
0
$\left(\frac{7}{8} \times \frac{5}{5}\right)-\left(\frac{5}{6} \times \frac{7}{7}\right)$
$\left(\frac{7}{8} \times \frac{7}{7}\right)-\left(\frac{5}{6} \times \frac{5}{5}\right)$
45. $\frac{2.4 \times 10^{6}}{2.0 \times 10^{-2}}=$
$\qquad$ $1.2 \times 10^{-3}$$1.2 \times 10^{3}$$1.2 \times 10^{4}$$0.4 \times 10^{8}$
$\sigma$
$1.2 \times 10^{8}$
46. In the $x y$-plane, a line parallel to the $x$-axis intersects the $y$-axis at the point $(0,4)$. This line also intersects a circle in two points. The circle has a radius of 5 and its centre is at the origin.
What are the coordinates of the two points of intersection?$(1,2)$ and $(2,1)$$(2,1)$ and $(2,-1)$$(3,4)$ and $(3,-4)$$(3,4)$ and $(-3,4)$$(5,0)$ and $(-5,0)$
47. 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
48. 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.
$\sigma$
The median and the mean both stayed the same.The median and the mean increased.
49. 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.)

$40 \pi \mathrm{sq} \mathrm{cm}$
$D$
$445 \pi \mathrm{sq} \mathrm{cm}$
$5 \pi \sqrt{39} \mathrm{sq} \mathrm{cm}$
$5 \pi \sqrt{89} \mathrm{sq} \mathrm{cm}$
50. 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+50 x$$C=30(x-2)+50$$C=50(2)+30 x$$C=(30+50) x+2$

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 Chrome, Edge or Firefox
- Windows tablets/hybrids e.g., Surface Pro must have a keyboard attached
- Mac devices need up-to-date Safari or Chrome


## Tablet (9"+)

- iPads: The 2 most recent major iOS versions are supported. Students must use Safari.
- Androids: The 2 most recent major Android versions are supported. Students must use up-todate 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: 08002255428.

