Carlingford High School

Year 7 Mathematics

Term 4 Examination

2018

Time allowed: 50 minutes

Student Name: SAMPLE SOLUTIONS + MARKING CRITERIA

Circle your class:

7C 7A 7R 7L 7I 7N 7G

Instructions:

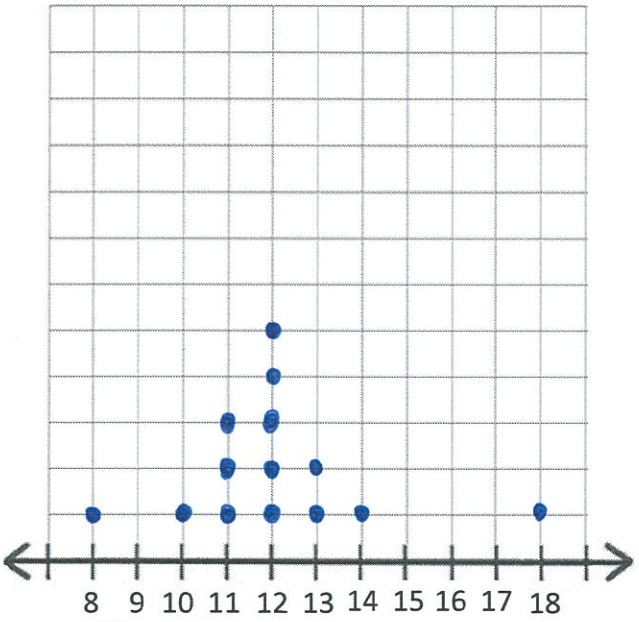
- Calculators are NOT allowed.
- Use black pen. Pencil may be used for graphs and diagrams.
- Write all answers in spaces provided.
- Show all necessary working.
- Extension questions are marked with an asterisk (*).

Section	1. Data (KC)	2. Number Theory (GF)	3. Probability (LW)	Total
Mark	/ 22	/ 29	/ 27	/ 78

Section 1: Data

Q 1) Over two weeks, the number of packets of chips sold from a vending machine each day was recorded: 10, 8, 12, 11, 12, 18, 13, 11, 12, 11, 12, 12, 13, 14.

(a) Draw a dot plot to represent this data. **2**



-1 for each error

(b) What was the most number of packets of chips sold in a day? **1**

18

(c) How many packets of chips are most commonly sold? **1**

12

(d) Which score is an outlier? **1**

18

Q 2) The marks scored out of 100 in a maths test by a Year 7 class were recorded:

Stem	Leaf
4	
5	2 7
6	7 7 7
7	2 5
8	6 8 9
9	0 1 1 3 4 5 6 8 9
10	0

(a) How many students are in the class? **1**

20

(b) Which mark occurred the most? **1**

67

(c) What was the range of marks? **2**

$100 - 52 = 48$

(1) (1)

(d) Where are the marks clustered? **1**

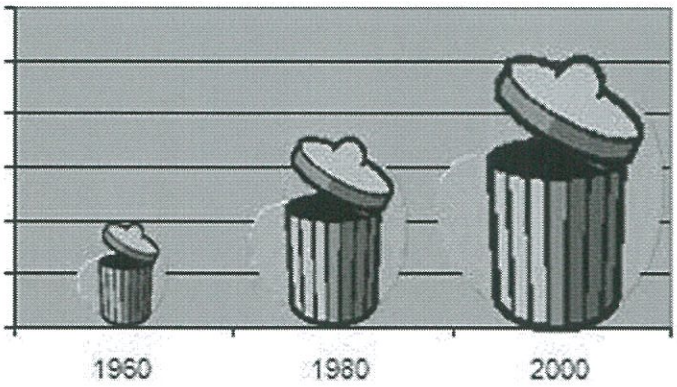
In the 90s.

* also accepted: 80s and 90s

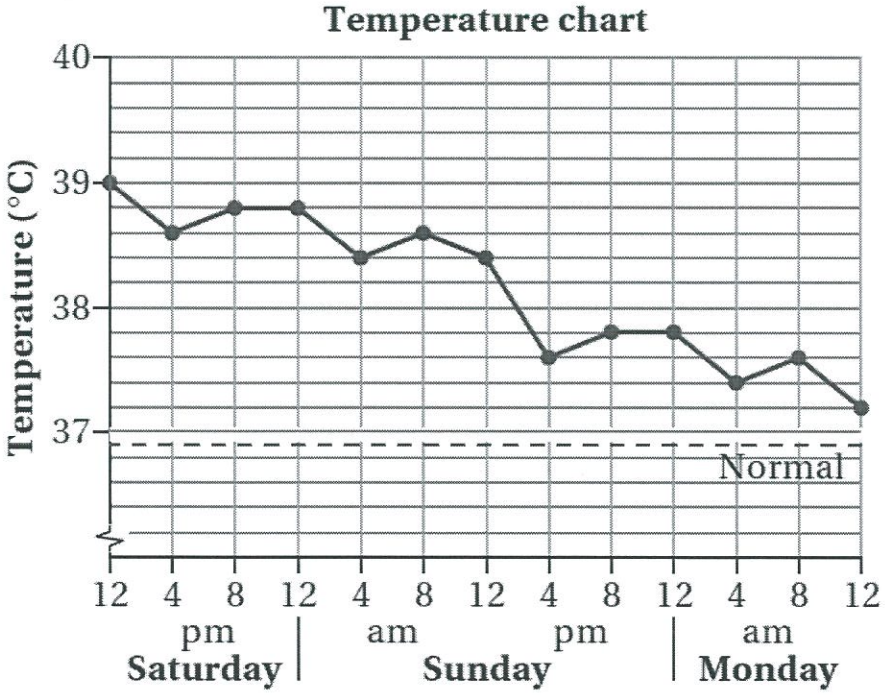
Q 3) How is the graph on the right misleading? **2**

- No scale on the vertical axis (1)
- An image instead of columns (or line) is used. (1)

Amount of Trash in Eastern Creek Landfill



Q 4) Lina was sick and had a fever (high temperature). This graph shows her temperature that was taken every 4 hours.



(a) What was Lina's temperature at 4pm on Saturday? **1**

38.6 °C

(b) What was the change in her temperature from 8am Sunday to 8am Monday? **2**

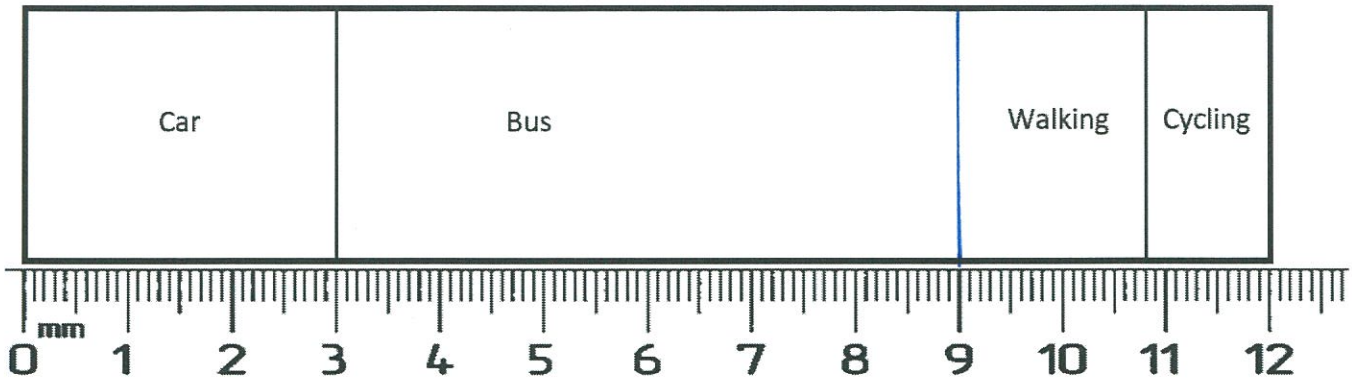
38.6°C − 37.6°C = 1° (1) (1)

(c) Lina took some medicine to treat the fever. About what time and day do you think she took the medicine? Why? **2**

- 12pm Sunday (1)
- The greatest decrease in temperature was from 12pm Sunday. (1)

* or at any time where there is a decrease in temperature, with suitable explanation

Q 5) This **incomplete** divided bar graph shows the mode of transport to school by students in a school. Students go to school either by car, bus, walking or cycling.



(a) If 600 students go to the school, how many students does each centimetre represent? **1**

$600 \div 12 = 50$

$\therefore$ 1cm = 50 students

(b) How many students go to school by car? **1**

$3 \times 50 = 150$ students

(c) There are 300 students who catch the bus to school. Draw a vertical line on the graph between 'Bus' and 'Walking' to show this. **1**

(d) What fraction of students cycle to school? Write the fraction in simplest form. **2**

$\frac{1.2}{12} = \frac{12}{120} = \frac{1}{10}$

(1) (1)

Section 2: Number Theory

Q 1) From the numbers

1, 2, 3, 4, 5, 6, 7, 8, 9, 10

List all the numbers above that are:

(a) Prime numbers **1**

2, 3, 5, 7

(b) Square numbers **1**

1, 4, 9

Q 2) 3216 is divisible by which of the following numbers? Circle all that apply. **2**

(-1) for each error

(2), (3), (4), 5, (6)

Q 3) For the numbers 8 and 12, what is the:

(a) Lowest common multiple? **1**

24

(b) Highest common factor? **1**

4

Q 4) Some characters in Roman numerals are:

I	V	X	L	C	D	M
1	5	10	50	100	500	1000

(a) Write 97 in Roman numerals. **1**

XCVII

(b) Write MMDCCIV in basic numbers **1**

2704

Q 5) In 4^7, the 4 is called the base and **2**

the 7 is called the index.

(or "power" or "exponent")

Q 6) Write 5^4 in expanded form. **1**

$5 \times 5 \times 5 \times 5$

Q 7) Evaluate:

(a) 5^2 25 **1**

(b) 3^3 27 **1**

(c) $(-4)^2$ 16 **1**

(d) $\sqrt{36}$ 6 **1**

(e) $\sqrt[3]{27}$ 3 **1**

(f) $\sqrt{8^2 + 6^2}$ $\sqrt{64+36} = \sqrt{100} = 10$ **2**

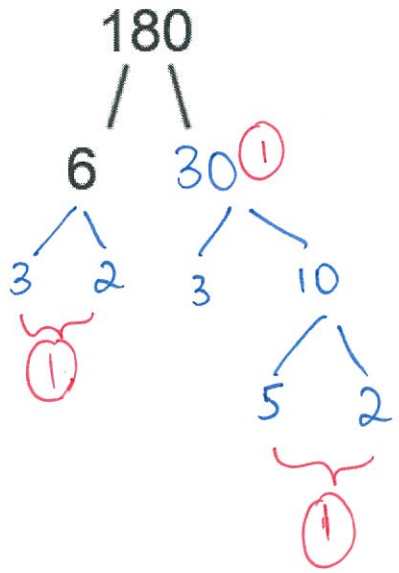
(1) (1)

Q 8) Between which two consecutive whole numbers does $\sqrt{52}$ lie?

(Note: Consecutive numbers follow each other in order.) 1

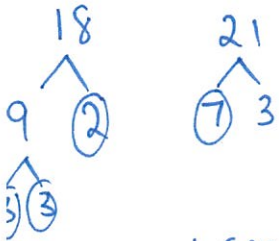
7 and 8

Q 9) Complete the prime factor tree for 180. 3



(1) (1) (1)

***Q 10)** Find the LCM of 18 and 21. 2



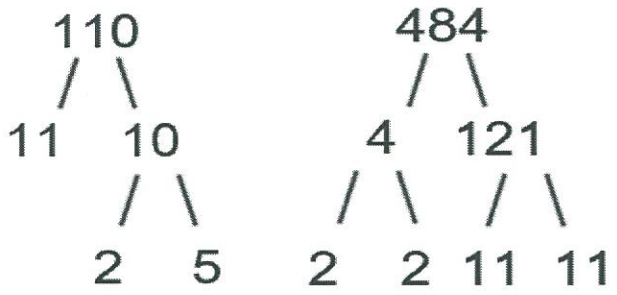
(1) for working, either by factor tree or list of multiples

$LCM = 3 \times 3 \times 2 \times 7$

$= 18 \times 7$

$= 126$ (1)

Q 11) The factor trees of 110 and 484 are provided below.



(a) Write 484 as a product of its prime factors, in index notation. 1

$484 = 2^2 \times 11^2$

(b) Find $\sqrt{484}$. 2

$\sqrt{484} = \sqrt{2^2 \times 11^2}$

$= \sqrt{2^2} \times \sqrt{11^2}$ (1)

$= 2 \times 11$

$= 22$ (1)

***(c)** Find the HCF of 110 and 484. 2

$11 \times 2 = 22$ (1)

(1)

working by using the tree, or by a list of factors

Section 3: Probability

* simplified fractions not required.

Q 1) Describe the likelihood of each of the following events occurring as: certain, likely, even chance, unlikely or impossible.

(a) A student will get 85% or more on a math test without paying attention in class, completing homework or studying. 1

Unlikely

(b) The day following Monday is Tuesday. 1

Certain

Q 2) For each of the following, list the sample space, and state whether the outcomes are equally likely or not.

(a) Rolling a standard six-sided die. 2

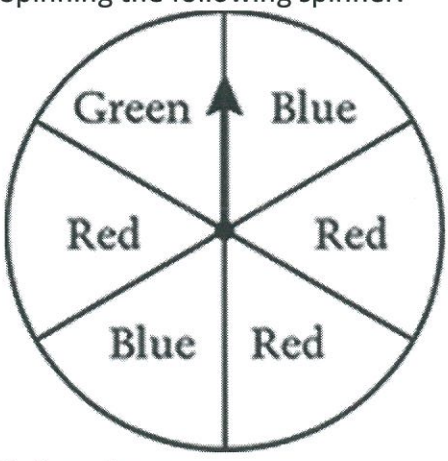
(i) Sample space:

{1, 2, 3, 4, 5, 6}

(ii) Are the outcomes equally likely?

Yes

(b) Spinning the following spinner. 2



(i) Sample space:

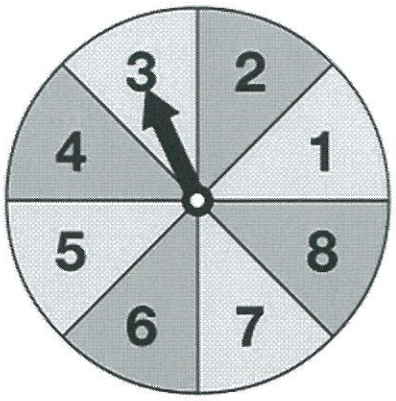
{Red, Blue, Green}

(ii) Are the outcomes equally likely?

NO

could be interpreted as {Red, Red, Red, Blue, Blue, Green}

Q 3) The following spinner is spun.



Find the probability that the arrow lands on:

(a) 4 $\frac{1}{8}$ 1

(b) A number less than 6 $\frac{5}{8}$ 1

(c) A number greater than 0 1 1

(d) A multiple of 2 $\frac{4}{8} = \frac{1}{2}$ 1

(e) A multiple of 2 or a multiple of 3 1

$\frac{5}{8}$

(f) A multiple of 2 and a multiple of 3 1

$\frac{1}{8}$

Q 4) In a soccer match between France and Australia, what is the complementary event of 'Australia Winning'? 1

Australia not winning.

Q 5) Tom randomly draws a card from a standard deck of cards. **An image of a deck of cards has been provided on the last page.**

Find the probability that the card is:

(a) a 6 $4/52 = 1/13$ **1**

(b) a Heart $13/52 = 1/4$ **1**

(c) a 6 of Hearts $1/52$ **1**

(d) a picture card $12/52 = 3/13$ **1**

(e) a black card $26/52 = 1/2$ **1**

(f) Not an Ace $48/52 = 12/13$ **1**

Q 6) There is a 63% chance that it will rain tomorrow. What is the probability of the complementary event? **1**

37%

Q 7) Ashwin takes note of the colour of 100 vehicles that pass his shop. He recorded the results in the following table:

Colour	Frequency
White	19
Black	24
Red	16
Blue	32
Other	9

(a) What is the experimental probability that the next vehicle to pass Ashwin's shop will be coloured black? **1**

$24/100 = 6/25$

(b) If Ashwin records the colour of the next 75 cars, how many cars will he expect to be coloured red? **2**

(1) $\frac{16}{100} \times 75 = 12$ (1)

***Q 8)** A bag contains white, blue and red counters, with the following probabilities: $P(\text{white}) = \frac{1}{2}$ and $P(\text{blue}) = \frac{3}{8}$.

(a) What is the probability of selecting a red counter? **2**

$P(\text{red}) = 1 - \left(\frac{1}{2} + \frac{3}{8}\right)$

$= 1 - \left(\frac{4}{8} + \frac{3}{8}\right)$ (1) for calculating $\frac{7}{8}$

$= 1 - \left(\frac{7}{8}\right)$

$= \frac{1}{8}$ (1)

(b) There are 12 white counters in the bag. How many more blue counters should be added to the bag so that there is an even chance of selecting a blue counter? **2**

(1) using equivalent fractions

White: $\frac{1}{2} \overset{\times 12}{=} \frac{12}{24}$ ∴ There are 24 counters in total.

Blue: $\frac{3}{8} \overset{\times 3}{=} \frac{9}{24}$ ∴ There a 9 blue counters.

Adding blue counters:

$\frac{10}{25}, \frac{11}{26}, \frac{12}{27}, \frac{13}{28}, \frac{14}{29}, \left(\frac{15}{?} = \frac{1}{2}\right)$

(1) ∴ Add 6 more blue counters