Carlingford High School

Mathematics

Year 9 5.2 Term 4 Examination 2019

Name: Answers.

Circle your teacher's name:

Mrs Virmani / Mr Fardouly Ms Lobejko Mr Gong

Time allowed: 50 minutes

- Show all necessary working.
- Answer all questions in the spaces provided.
- Marks may be deducted for careless or untidy work.
- **Complete the examination in blue or black pen.**

Topic	Data	Indices	Rates & Ratio	Equations	Total
Mark	TL / 21	AG / 20	GF / 18	MV / 19	/ 78

Data (21 marks)

Symmetrical distribution	**outlier**
bias	**Skewed distribution**	**cluster**

1 Fill in the blank part by choosing the correct phrase from the word bank.

a). A distribution in which all scores are distributed equally on both sides of the centre. Symmetrical distribution [1]

b). An extreme score that is very different from the other scores in a set of data.

Outlier [1]

c). Scores in a data set that are close or bunched together. cluster [1]

2 **For the set of scores**

32 37 42 38 41 87 35 37 41 37

a). Find the range. $= 87 - 32 = 55$ [1]

b). Write down the mode. 37 [1]

c). Write down the outlier. 87 [1]

2 **d).** Calculate the mean for the set of scores. [1]

$$\bar{x} = \frac{427}{10}$$

$$= 42.7$$

e). Calculate the mean for the set of scores without the outlier. [1]

$$\bar{x} = \frac{340}{9}$$

$$= 37.\dot{7}$$

f). How does the outlier affect the mean ? [1]

The outlier causes the mean to increase.

3 For the frequency table given:

Score (x)	Freq (f)	fx	$c.f$
26	**4**	104	4
27	**6**	162	10
28	**7**	196	17
29	**3**	87	20
Total	20	549	

a). Complete the fx column. [1]

b). Complete the $c.f$ column. [1]

c). Find the mode. 28 [1]

d). Calculate the mean. [1]

$$\bar{x} = \frac{549}{20}$$

$$= 27.45$$

e). Find the median. The median is the average of 10th & 11th score. [1]

ie median $= \frac{27+28}{2} = 27.5$

4 Decide if you would use a **census** or a **sample** to investigate:

a). the number of students at a high school. [1]

census

b). a favourite car brand. [1]

sample

5 Classify each type of data as **categorical** or **numerical (quantitative)**:

a). the rainfall in NSW [1]

numerical

b). types of cake [1]

categorical

6 The stem and leaf plot shows the number of sit ups completed each day by Michael and Ricky.

Runs scored

Michael	Stem	Ricky
	0	0
9 5 2	1	9
9 8 7 7 6	2	3 8
6 5 2	3	7 8 8 9 9
2 1	4	1 3 6
	5	2

a). Michael's median score = 28 [1]

b). Given Ricky's median score is 38. Comment on who performed better and why? Ricky performed better because of higher median value. [2]

Indices (20 marks)

1 Unjumble the following:-

a). abes base [1]

b). procalicer reciprocal [1]

2 Simplify each expression, writing the answer in index notation.

a). $5v^7w^3 \times 4v^3w^2 = 20v^{10}w^5$ [2]

b). $20a^3b^4 \div 4ab^3 = 5a^2b$ [2]

c). $(-4n^2)^3 = (-4)^3 \times (n^2)^3$
$= -64n^6$ [2]

3 Simplify each expression.

a). $(-e)^0 = 1$ [1]

b). $-e^0 = -1$ [1]

4 Simplify each expression using a positive index where necessary.

a). $(3b)^{-1} = \frac{1}{3b}$ [1]

b). $3b^{-2} = \frac{3}{b^2}$ [1]

c). $\left(\frac{7}{m}\right)^{-2} = \left(\frac{m}{7}\right)^2 = \frac{m^2}{49}$ [2]

5 Round each value correct to 3 significant figures.

a). 15752 ≈ 15800 [1]

b). 0.9054 ≈ 0.905 [1]

6 Express each number in scientific notation.

a). 260 000 = 2.6×10^5 [2]

b). 0.000 000 07 = 7×10^{-8} [2]

Rates & Ratio (18 marks)

1

Rate	**inversely**	**Ratio**
Simplify		**directly**

Fill in the blank space with the correct word.

a). A ratio compares quantities of the same type measured in the same units. [1]

b). To simplify a ratio, keep dividing each term by the HCF, until each term is as small as possible. [1]

c). Two variables are directly proportional to each other if one variable is a constant multiple of the other, and when one variable changes, the other one changes by the same factor. [1]

2 Simplify each ratio.

a). 15 : 36 = 5 : 12 [1]

b). $\frac{5}{8} : \frac{2}{3}$ = 15 : 16 [1]

c). 9 : 27 : 36 = 1 : 3 : 4 [1]

d). 800g : 5 kg = 800 : 5000 [1]

= 4 : 25 [1]

3 Two people invest in a business in the ratio 4 : 6. If the larger investment is \$480 000, find the amount of the smaller investment. [2]

6 shares = \$480000
1 share = \$80000
∴ 4 shares = \$80000 × 4
= \$320000
The smaller investment is \$320 000.

4 Convert the following:

a). 5 m/s to m/h = 5×3600 = 18000 m/h. [1]

b). 2.5 tonnes/h to kg/day = $\frac{2.5 \times 1000 \times 24}{24}$ [1]

= 60000 kg/day [1]

5 If Jack's reaction time is 0.9 seconds, how far will his car travel in this time if its speed is 80 km/h ? [2]

80 km/h = 80000 m/h
= 22.2̇ m/s.
Distance = 22.2̇ × 0.9
= 20 m

6 The mass, M, in grams of a chemical is directly proportional to its volume, V, cm^3.

a). Write the formula for M in terms of V, given that $M = 160$ when $V = 80$. [2]

$M \propto V$
$M = kV$
when $M=160$ & $V=80$ then
$160 = k(80)$
$k = 2$
∴ The formula is $M = 2V$

b). Calculate the mass of 412 cm^3 of the chemical. [1]

$M = 2 \times 412$
$= 824g$

Equations (19 marks)

1

solution solve quadratic linear subject

Fill in the blank part by choosing the correct phrase from the word bank.

a). A quadratic equation involves a variables squared. **[1]**

b). The subject of a formula is the variable on its own on the left-hand-side of the equal sign. **[1]**

c). The answer to an equation or problem, the correct value(s) of the variable that makes an equation true. solution **[1]**

2

Solve each equation.

a). $3x - 5 = 10$ **[2]**

$3x = 15$

$\therefore x = 5$

b). $\frac{a}{2} - 5 = 3$ **[2]**

$\frac{a}{2} = 8$

$\therefore a = 16$

c). $2y - 71 = -5y - 8$ **[2]**

$7y = 63$

$\therefore y = 9$

d). $\frac{2m}{3} - \frac{m}{2} = 4$ **[2]**

$6\left(\frac{2m}{3}\right) - 6\left(\frac{m}{2}\right) = 4 \times 6$

$4m - 3m = 24$

$\therefore m = 24$

2 **e).** $5p - 2(p - 6) = 18 - 3p$ **[2]**

$5p - 2p + 12 = 18 - 3p$

$3p + 12 = 18 - 3p$

$6p = 6$

$\therefore p = 1$

3 Solve $8y^2 = 40$, leave your answer in surd form. **[2]**

$8y^2 = 40$

$y^2 = 5$

$\therefore y = \pm\sqrt{5}$

4 The length of a rectangle is 6 cm longer than it is wide. The perimeter of the rectangle is 76 cm. Find the dimensions of the rectangle, show all necessary working. **[2]**

$2(w + w + 6) = 76$

$4w + 12 = 76$

$4w = 64$

$w = 16$

$\therefore$ The dimensions are 16cm x 22cm.

5 If 6 more than a number is the same as 5 more than double the number, what is the number ? Show all necessary working. **[2]**

Let the number be n.

$n + 6 = 2n + 5$

$\therefore n = 1$

Thus the number is 1.

End of Exam