Maths Teacher FON / MCL / PER	Tutor Class	Name	*Mark scheme*

NOVEMBER EXAMINATIONS 2015

SUBJECT: Year 7 Mathematics

Time allowed: 2 Hours   **Total Marks: 195**

READ THESE INSTRUCTIONS FIRST

All your answers and working are to be written on the examination paper.

Calculators are permitted.

<u>Show all your working for questions worth more than 1 mark.</u>

Answer **all** questions.

The number of marks is given in [ ] at the end of each question or part question.

Section	Total	Mark
Semester One	**60**	
2D and 3D Geometry	**25**	
Measurement	**15**	
Percentages	**15**	
Probability	**15**	
Statistics	**20**	
Fractions	**20**	
Problem Solving	**25**	
TOTAL	**195**	

This document consists of 28 printed pages and 0 blank pages

Semester One

1 Write the number 64 528 in words.

<u>Sixty four thousand, five hundred and twenty eight</u>... [1]

2 Write the value of the digit 6 in the number 5607.

<u>Six hundred/600</u>.......... [1]

3 Write as a simple numeral $3\,000\,000 + 20\,000 + 8000 + 600 + 70 + 8$.

...<u>3 028 678</u>.............. [1]

4 Four people share 9 pizzas. How much does each receive?

$$2\frac{1}{4}$$
.... [1]

5 Simplify using correct order of operations rules:

$$60 - 40 \div 4 - 6 \times 5$$
$$= 60 - 10 - 30 \;✔$$

...............<u>20 ✔</u>................. [2]

6 List the first four square numbers.

<u>1, 4, 9, 16</u> ✔✔ <u>all correct</u> [2]
✔ two correct

7 Use leading figure estimation, showing your working, to estimate the answer to:

$$736308 \times 2.45$$

$$= 700\,000 \times 2 \;✔$$

.....<u>1 400 000</u> ✔............... [2]

8 Write 934012 in expanded notation.

$9 \times 10^5 + 3 \times 10^4 + 4 \times 10^3 + 1 \times 10 + 2$ ✔ .... [1]

9 List all the factors of 36.

✔ 4 correct

.... 1, 2, 3, 4, 6, 9, 12, 18, 36 ✔✔ all correct .... [2]

10 Find the highest common factor of 45 and 60.

✔ for listing factors of both numbers

.......15 ✔.................. [2]

11 Find the lowest common multiple of 6 and 15.

✔ for listing multiples of both numbers

.......30 ✔.................. [2]

12 Complete the factor tree below.

48

2   24

✔ division by prime numbers

2   12

2   6

2   3
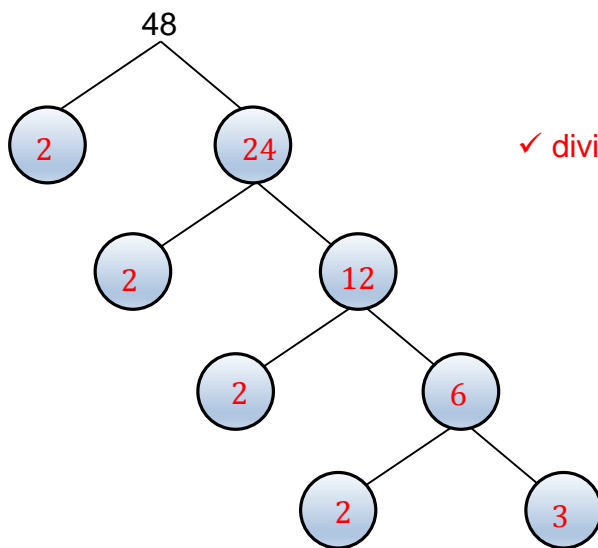
[2]

13 Write the next number in the pattern below.

   a 15, 11, 7 ……..

   ……………3………………… [1]

   b Write the rule, in words, you used to find the answer.

   …….Subtract four to get the next number………………………………………………………………………… [1]

14 Complete the table of values using the rule given.

$$b = 3 \times t + 2$$

t	1	3	4	7
b	5	11	14	23

✓✓ all correct

✓ two correct

[2]

15 Simplify each of the following expressions as far as possible.

   a $8 \times p \times q$

   b $3 \times s + 4 \times t$

   ……………$8pq$…………… [1]

   ……………$3s + 4t$…………… [1]

   c $2m + 3n + 4m + 5n$

   d $4 \times a \times 2 \times a \times a \times a \times b$

   …………$6m + 8n$………… [1]

   ✓ ✓
   …………$8a^4b$………… [2]

16 For the angle shown:
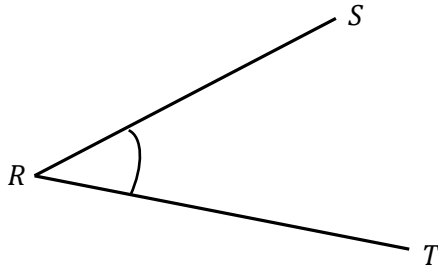
a name the vertex

.... *R* .... [1]

b name the arms

.... *RS and RT* .... [1]

c name the angle

.... ∠*SRT or* ∠*TRS* ...... [1]

17 Use a protractor to find the measure of the **reflex** angle in the following diagram.
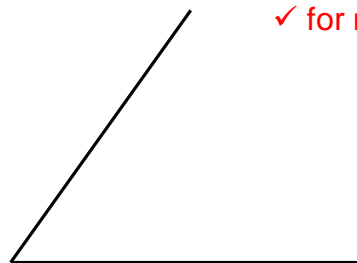
✓ for measuring acute angle = $55° \pm 1°$

...... $304° - 306°$ ✓ .... [2]

18 Use a protractor to draw an angle of $145°$ in the space below. *One of the arms is already drawn for you.*

Must have angle marking to get the mark

[1]

19 Write down:

    a the complement of 50°

    b

……………40°……………… [1]

    c the supplement of 30°

……………150°……………… [1]

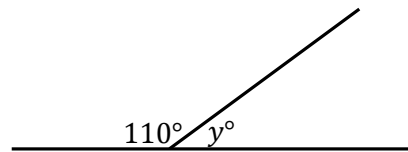**20** Find the value of each unknown angle. In each case, give a reason (not a calculation) for your answer.

a
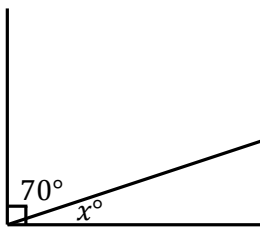
Angle ………20°.✓…………….

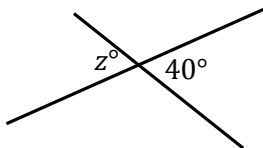Reason ..Complementary angles sum to 90°✓..

[2]

b

Angle ………70°.✓……………

Reason ..Supplementary angles sum to 180° ✓..
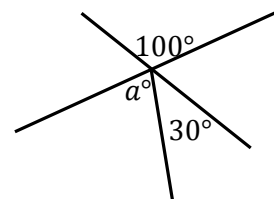
[2]

c

Angle ……………40°✓………

Reason Vertically opposite angles are equal ✓..

[2]

d

Angle …………70°✓…………

Reason ..Angles round a point sum to 360°.✓…

[2]

21 Write in expanded notation the decimal number 63.251.

$6 \times 10 + 3 \times 1 + 2 \times \frac{1}{10} + 5 \times \frac{1}{100} + 1 \times \frac{1}{1000}$

.... [1]

22 Arrange in **ascending** order:

$$0.15, 0.152, 0.105$$

.... $0.105, 0.15, 0.152$ .... [1]

23 Perform the following calculations by hand (**without using a calculator**) making your method clear.

    a $689.5 - 18.25$ **b** 8.12×2.4

correct method ✓   correct method ✓

..........671.25 dependent.... [2]   ....19.488 dependent.......... [2]
    on working above ✓   on working above ✓

    c $62.1 \div 6$ **d** $0.8 \div 0.2$

correct method ✓   correct method ✓

.........10.35 dependent on..... [2]   ....4 dependent on.......... [2]
    working above ✓   working above ✓

24 Use a directed number to represent each of the following:

    a an increase of 15 kg

must have '+'

.............+15................. [1]

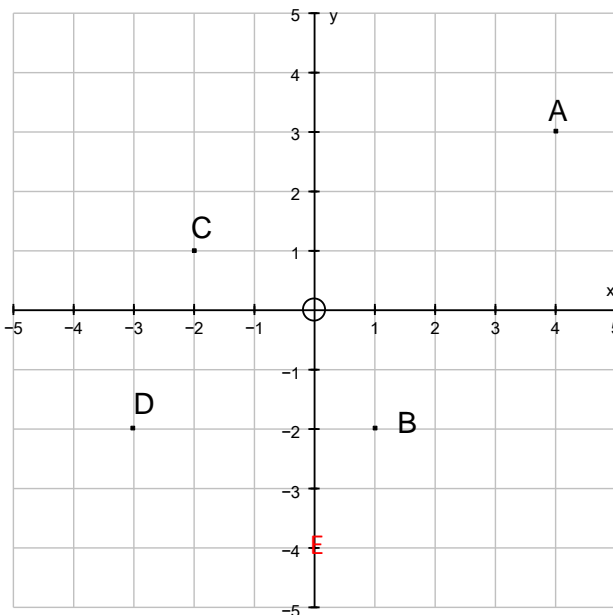   **b** 250 m below sea level

.............−250................ [1]

25 Write down the coordinates of each of the points plotted on the grid below.

    a

✓✓ all correct   ✓ two correct   lose 1 mark max. for missing brackets

.............A =(4, 3).................B = (1, -2)...............C = (-2, 1)...............D = (-3, -2)......... [2]

    b On the grid above plot the point $(0, -4)$. Label it with the letter E.

[1]

26 Arrange the following directed numbers in **descending** order.

$$-23, 15, -33, -25$$

....15, −23, −25, −33... [1]

2D and 3D Geometry

*In this section marks may be deducted for **incorrect spelling** of maths terms*

27 A plane shape with four straight sides is called a quadrilateral. Write down the names of **three** special types of quadrilaterals.

Any three of the following spelt correctly: rhombus, trapezium, parallelogram, kite, rectangle, square

....

[3]

28 Find the value of x in each of the following questions. Give a reason for each answer (the reason cannot be a calculation).

a
b
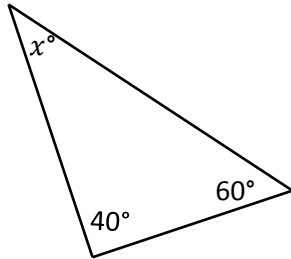
Angle: .... 80° ✔ ....

Reason: ... Angle sum of a triangle is 180° ✔ ....

[2]

c
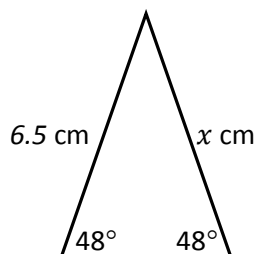
Side: .... 6.5 ✔ ....

Reason: .... Equal sides of an isosceles triangle ✔ ....

[2]

d
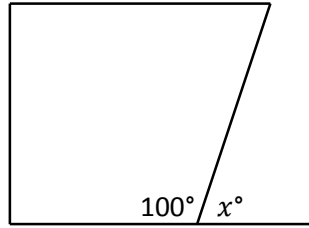
Angle: ......80° ✓....................

Reason: .Angles on a line sum to 180° ✓........................
                                                                    [2]

e
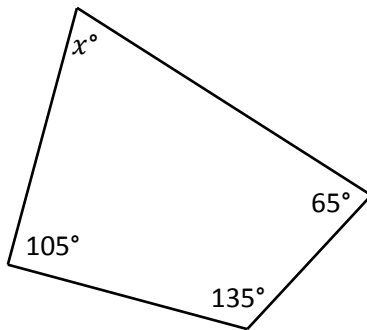
Angle: .55° ✓✓....................

Reason: .Angle sum of a quadrilateral is 360° ✓.................
                                                                    [3]

29

a Name the following solids.
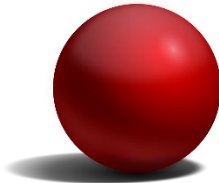
Must be spelt correctly to gain the mark

Note: this solid has a triangular base
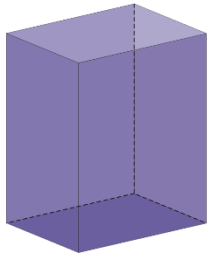
A
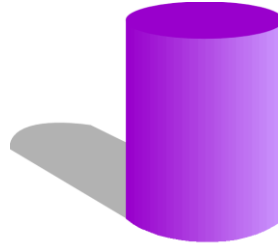
B

C

.... Cuboid .... [1]   .... Cylinder .... [1]   ...Tetrahedron/triangular [1]
based pyramid

Note: all of the faces are square

D

E
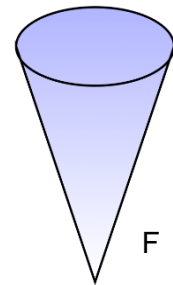
F

.... Sphere .... [1]   .... Cube .... [1]   .... Cone .... [1]

b Which of the solids above are prisms?

.... A, B and E ✓✓ all correct ...... ✓ two correct and no extras .... [2]

c Which of the solids above are pyramids?

.... C and F ✓ both correct .... [1]

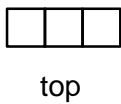**30** Draw the net of the following solid on the grid paper below.
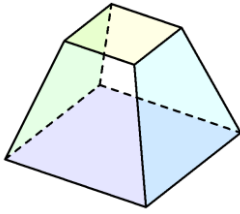
✓ ✓ correct and neatly drawn using a pencil and ruler
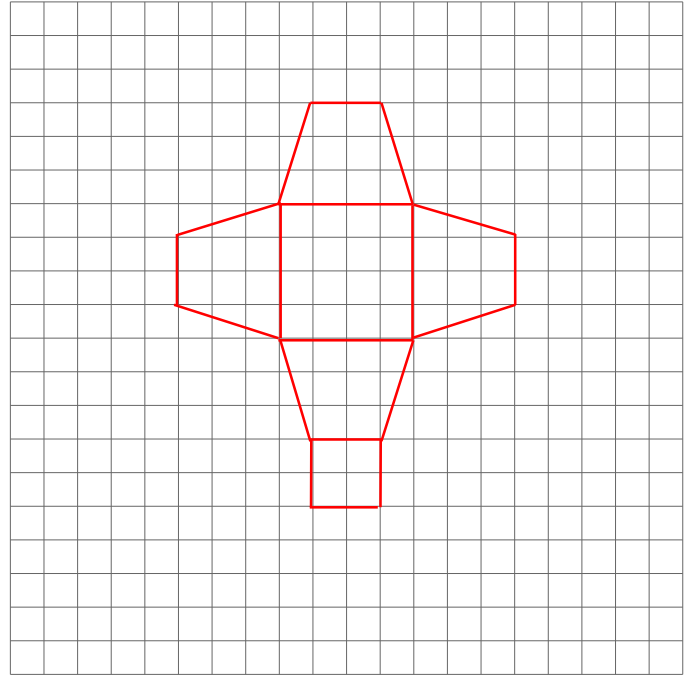
✓ mostly correct

[2]

31 The given diagram shows different views of the same shape. Draw the 3-dimensional object on the isometric grid paper.
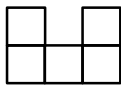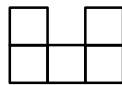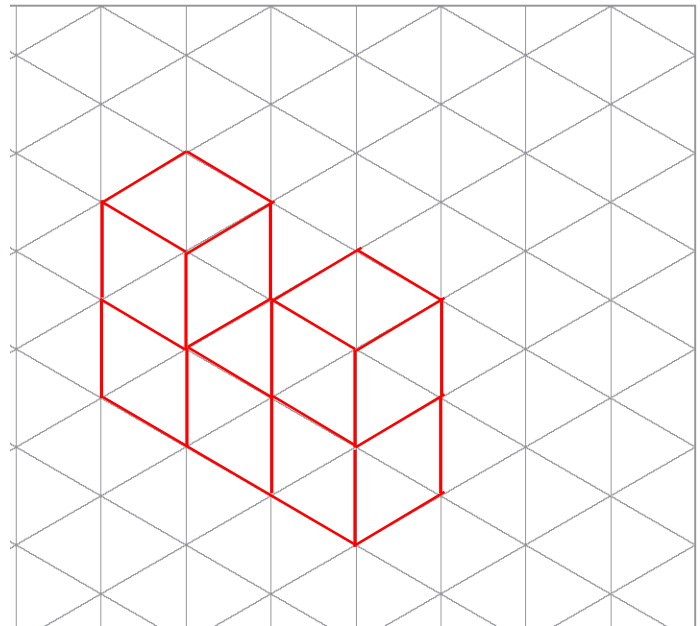
top

left   right

front   back

✓ ✓ correct and neatly drawn using a pencil and ruler

✓ mostly correct

[2]

Measurement
Marks may be lost for missing or incorrect units shown in your answers

32 Complete the conversions in the table below.

a 80 cm = …800… mm

b 6 km = .6000… m

c 9 L = .9000. mL

d 15 mL = …15… cm³

e 5000 cm³ = ….5… L

[5]

33 Calculate the perimeter of the figure below.

Deduct a max of 2 marks overall for incorrect or missing units in questions 33 - 35
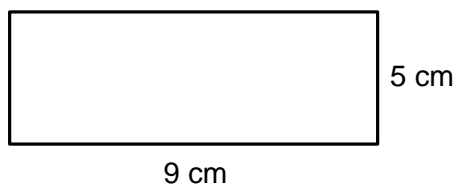
12.8 cm

4.6 cm

15.4 cm
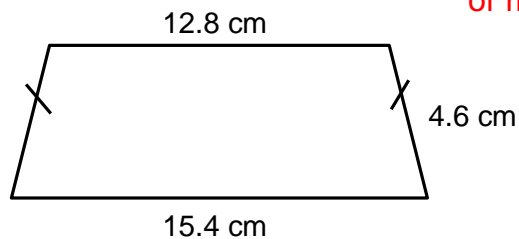
$$12.8 + 4.6 + 4.6 + 15.4$$

………37.4 cm✓………… [1]

34 Calculate the area of the following shapes.

a

5 cm

9 cm

$$9 \times 5$$

………45 cm²✓………… [1]

b

3 cm

15

5 cm
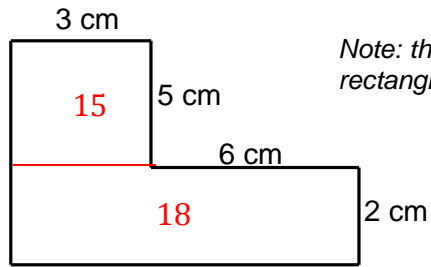
Note: this shape is made up of rectangles

6 cm

18

2 cm

✓ correct method

$33\,cm^2$ ✓ .... [2]

c

60 mm

80 mm

$\frac{1}{2} \times 80 \times 60$ ✓

$2400\,mm^2$ ✓ .... [2]

d

8 m
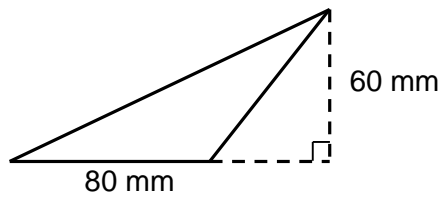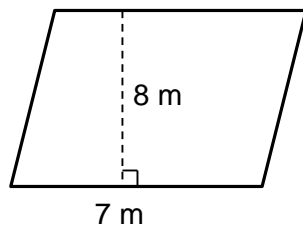
Note: this shape is a parallelogram

7 × 8 ✓

7 m

$56\,m^2$ ✓ .... [2]

35 Find the volume of the solid below.

15 m

9 m

20 m
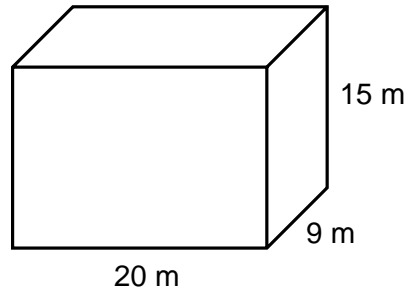
$20 \times 9 \times 15 \checkmark$

....................$2700 \ m^3 \ \checkmark$....................... [2]

Percentages

36 Complete the table below. Write fractions in their **simplest form**.

Percentage	Fraction	Decimal
34%	$\dfrac{17}{50}$	0.34
88%	$\dfrac{22}{25}$	0.88
4.5%	$\dfrac{9}{200}$	0.045

[6]

37 Find 24% of $900.

$$0.24 \times 900 ✔$$

.............$216 ✔........... [2]

38 Write as a percentage 32 min of 1 hour. Round your answer to the nearest whole number.

$$\frac{32}{60} \times 100 ✔$$

...........53% ✔............... [2]

39 An airline offers a special 30% off normal prices during its off peak time flights to Melbourne. If its normal price is $800 return, what is the special price?

$$0.7 \times 800 \checkmark$$

............$560 \checkmark............ [2]

40 In a small country town of 280 households 45% mainly used a wood burning fire to warm their home, 30% used electricity, 15% gas and the rest mainly used oil or kerosene. How many households mainly used gas, oil or kerosene?

$$15\% + 10\% = 25\% \checkmark$$

$$0.25 \times 280 \checkmark$$

......70 $\checkmark$.................... [3]

Probability

**41** Order the following events **A**, **B** and **C** from least likely to most likely.

A A dice is rolled. The result will be either a 2, a 4 or a 6.
B A student chosen at random from your tutor class will have a birthday in December.
C Your birthday next year will fall on a week day.

.... **B, A, C** ✓✓all correct   ✓ for **B** only correct .... [2]

42

a List all the possible outcomes when a coin is tossed **and** the spinner shown below is spun.
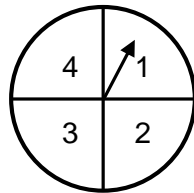
.... H1, H2, H3, H4, T1, T2, T3, T4 ✓✓✓ all correct ....

.... ✓✓ six correct .... ✓ two correct ....
[3]

b Use your list to calculate the probability that:
   I a head and a 3 results

$\dfrac{1}{8}$ .... [1]

   II a tail and a 1 or 2 results

$\dfrac{2}{8}$ .... [1]

   III a prime number appears in the outcome

$\dfrac{4}{8}$ .... [1]

   IV a head and a number greater than 1 results.

$\dfrac{3}{8}$ .... [1]

43 A hat contains 4 red, 3 white and 2 grey discs and one disc is randomly selected from it. Find the probability that it is:
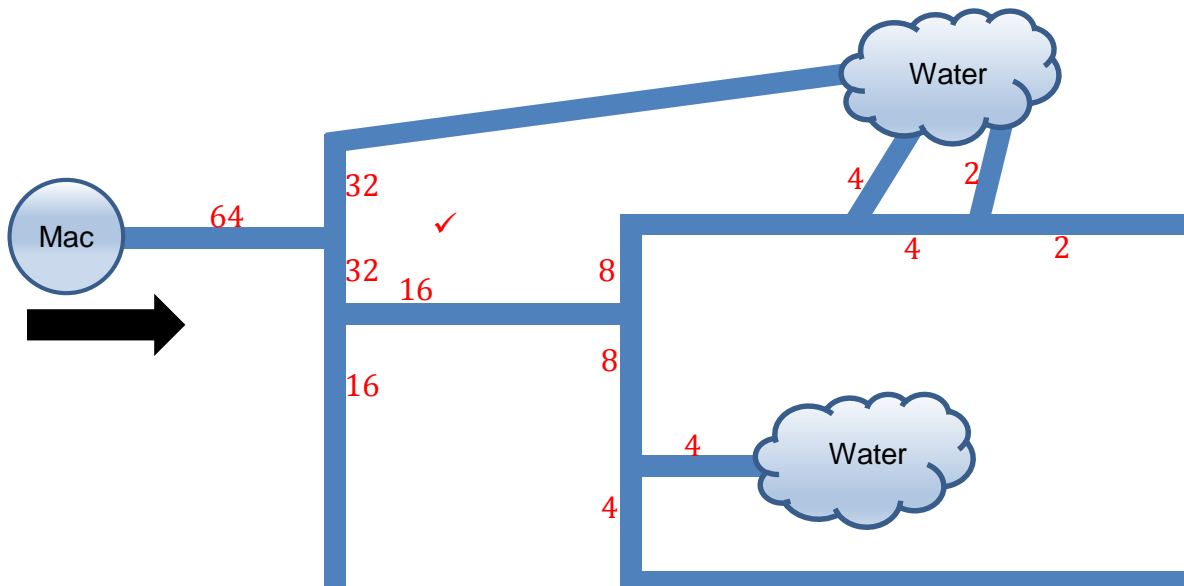
a white

$\frac{3}{9}$ .... [1]

b not red

$\frac{5}{9}$ .... [1]

c pink

................0................ [1]

44 Starting with 64 life chances, work out Mac's percentage change of survival for the following tracks. At each fork in the track, the life chances must be shared equally among the new tracks. Round your answer to 1 decimal place.

$\frac{42}{64}$ ✓ seen

Mac has a ...65.6.✓........ % chance of survival. [3]

Statistics

45 What is the meaning of the word *random* when used within a statistics context?

Choosing at random means that each possible result is as likely to be chosen as any other.

[1]

46 What is the difference between a *survey* and a *census*?

A census is gathering information on the entire population.✓ A survey examines a much smaller sample of the population. ✓

[2]

47 Explain why a survey of **only** the Year 9 students at ACG Parnell College about changes to the school uniform may result in a biased set of results.

There is an age bias.✓; the opinions of older or younger students will have not been considered.✓ o.e.

[2]

48 A sample of students were asked to say how many brothers and sisters they had. Here are the results:

2, 1, 4, 5, 2, 3, 1, 6, 3, 4, 2, 3, 2, 3, 4, 3, 3, 2, 1, 1, 3, 1, 6, 4, 2, 1, 1, 3, 2, 7, 0

    a Complete the frequency distribution table below for this data.

Number of brothers and sisters	Tally	Frequency
0	||	1
1	⫲⫲ |	7
2	⫲⫲ ||	7
3	⫲⫲ |||	8
4	||||	4
5	|	1
6	||	2
7	|	1

✓✓✓ all correct

✓first column correct

[3]

allow FT on columns two and three

b Write down the mode.

...............3............... [1]

49 The following results show the distance (to the nearest metre) that students in 7MPF were able to throw a stuffed toy.

12, 24, 15, 9, 18, 34, 42, 26, 37, 14, 18, 22, 26, 41, 7, 12, 18, 15, 25, 30

a Illustrate the data above in an **ordered** stem-and-leaf plot.

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

✓✓✓ all correct and ordered

✓✓ all correct but unordered

✓ correct stems

✓ at least one row correct

[3]

b Find the median.

✓ for finding average of 18 and 22

median = ...20 ✓.................... [2]

c Calculate the mean. *Round your answer to the nearest whole number.*

$$\frac{445}{20} ✓$$

mean = ...22 ✓............... [2]

50 A survey of eye colour in a class of 30 students revealed the following results:

Eye Colour	Blue	Brown	Green	Grey
Frequency	2	12	9	7

Illustrate these results on a pie chart.
Show your method for working out your angles in the space below.
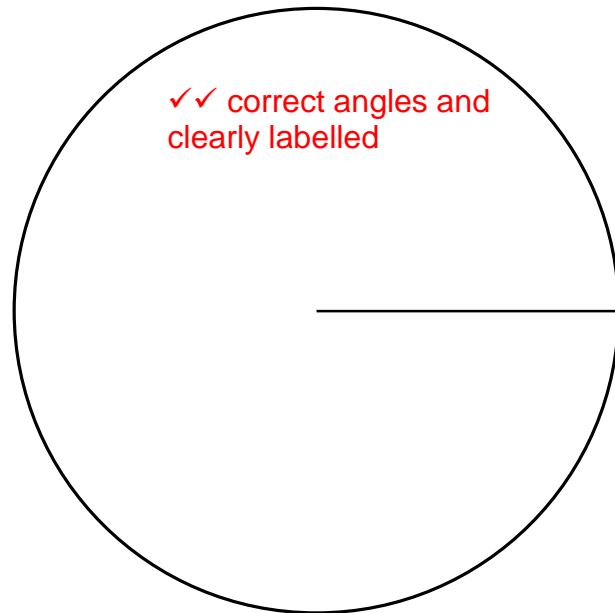
Method:

$$\frac{2}{30} \times 360 = 24$$

✓✓ correct method

$$\frac{12}{30} \times 360 = 144$$

Eye Colour

✓✓ correct angles and clearly labelled

$$\frac{9}{30} \times 360 = 108$$

$$\frac{7}{30} \times 360 = 84$$

[4]

Fractions

51 Simplify (work out) each of the following. Show your method clearly. *Leave your answer as a mixed number in its simplest form where appropriate.*

a $\dfrac{2}{5} + \dfrac{3}{4}$

$= \dfrac{8}{20} + \dfrac{15}{20}$ ✓

$1\dfrac{3}{20}$ ✓

.... [2]

b $5\dfrac{9}{10} - 2\dfrac{3}{5}$

$5 - 2 = 3$ ✓

$\dfrac{9}{10} - \dfrac{6}{10} = \dfrac{3}{10}$ ✓

$3\dfrac{3}{10}$ ✓

.... [3]

52 Simplify each of the following. Show your method clearly.

a $1\dfrac{3}{4} \times \dfrac{8}{15}$

$= \dfrac{7}{4} \times \dfrac{8}{15}$ ✓

$= \dfrac{8}{4} \times \dfrac{7}{15}$ ✓

$\dfrac{14}{15}$ ✓

.... [3]

b $\dfrac{5}{8} \div \dfrac{3}{7}$

$= \dfrac{5}{8} \times \dfrac{7}{3}$ ✓

$= \dfrac{35}{24}$ ✓

$1\dfrac{11}{24}$ ✓

.... [3]

c $6\dfrac{3}{5} \div 4\dfrac{1}{10}$

$= \dfrac{33}{5} \times \dfrac{10}{41}$ ✓

$= \dfrac{66}{41}$ ✓

$1\dfrac{25}{41}$ ✓

.... [3]

53 A disaster relief team consists of engineers and doctors in the ratio 2 : 5. If there were 18 engineers, find the number of doctors.

$$\frac{18 \times 5}{2} ✓✓$$

..............45✓.............. [3]

54 A bag of 20 marbles is divided between Jill and John in the ratio 2:3.

    a what **fraction** does Jill receive?

$$\frac{2}{5} ✓$$

.... [1]

    b how many marbles does John receive?

$$\frac{3}{5} \times 20 ✓$$

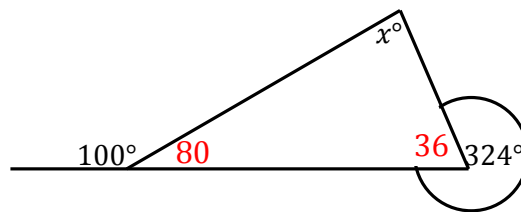..............12✓.............. [2]

Problem Solving

The answers in this section must be supported by clear and accurate method shown in order to gain full marks for each question.

55 What is the largest prime number that divides exactly into the number equal to $2 + 3 + 5 \times 7$?

$= 40$ ✓

……… 5.✓ ………………… [2]

56 In the diagram below, what is the value of x?

✓ *both angles*

$x°$

$100°$ 80

36 $324°$

……… 64✓ ……………… [2]

57 If ▲+ ▲ = ■ and ■ + ▲ = ● and ♦ = ● + ■ +▲, how many ▲'s are equal to ♦?

▲+ ▲ + ▲= ●   ♦ = 3▲ + 2▲ +▲   good strategy ✓

…… 6▲ .✓ ……………… [2]

58 At Spuds-R-Us, a 2.5 kg bag of potatoes costs $1.25. How much would one tonne of potatoes cost?

$1kg = \$0.5$ ✓

$\$0.5 \times 1000kg$ ✓

…………500 ✓………………… [3]

59 The diagram shows a single floor tile in which the outer square has side 8 cm and the inner square has side 6 cm. If Adam Ant walks once around the perimeter of the inner square and Annabel Ant walks once around the perimeter of the outer square, how much further does Annabel walk than Adam?
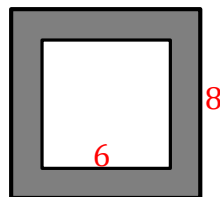
$8 \times 4 - 6 \times 4$ ✓✓

…………………$8cm$ ✓………………… [3]

60 King Harry's arm is twice as long as his forearm, which is twice as long as his hand, which is twice as long as his middle finger, which is twice as long as his thumb. His new bed is as long as four arms. How many thumbs length is that?
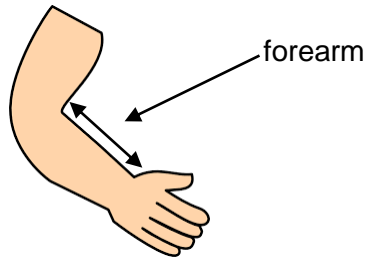
forearm

1 arm = 2 forearms = 4 hands = 8 middle fingers = 16 thumbs ✓

∴ 4 arms = 4 × 16 ✓

................64 ✓............... [3]

61 In this *Multiplication Magic Square*, the **product** of the three numbers in each row, each column and each of the diagonals is 1. What is the value of $r + s$?

p	q	r
s	1	t
u	4	$\frac{1}{8}$

$u = 2$ ✓

$r = \frac{1}{2}$ ✓

................$\frac{9}{16}$ ✓............... [3]

62 A newspaper headline read 'Hamilton tortoise recaptured 1.8 km from home after 8 months on the run'. Assuming the tortoise travelled in a straight line and that each month has 30 days, roughly how many minutes did the tortoise take on average to 'run' one metre?

$1.8 \ km = 1800 \ m$

$8 \ months = 30 \times 24 \times 60 \times 8 = 43200 \ min$ ✓

$= \dfrac{43200}{1800}$ ✓

..... 24 $minutes$ ✓ .... [3]

63 Gill is now 27 and has moved into a new flat. She has four pictures to hang in a horizontal row on a wall which is 4800 mm wide. The pictures are identical in size and are 420 mm wide. Gill hangs the first two pictures so that one is on the extreme left of the wall and one is on the extreme right of the wall. She wants to hang the remaining two pictures so that all four pictures are equally spaced.

How far should Gill place the centre of each of the two remaining pictures from a vertical line down the centre of the wall?
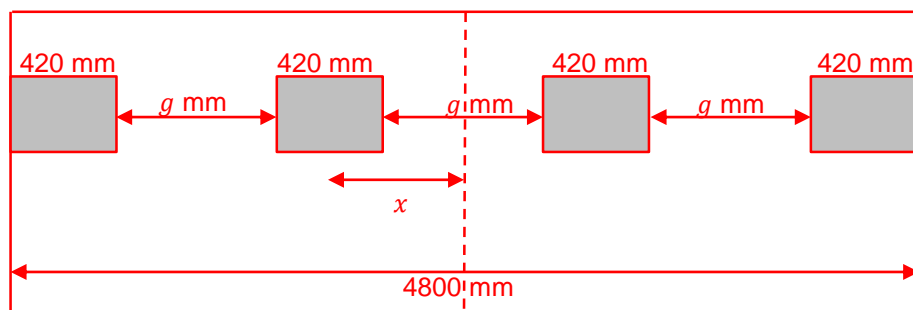
Clear diagram ✓

Working ✓✓

$4 \times 420 + 3g = 4800$

$1680 + 3g = 4800$

$g = 1040$

$x = 210 + \frac{1}{2}g = 730$

.... 730mm ✓ .... [4]

THE END

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