MATHEMATICS

6131
Paper 1

General Comments

Although there were some learners who performed exceptionally well, there were also those who performed very poorly. Marks ranged from 0 to 80. Most learners has shown their wrong working on the space below the question and wrote the answers in the spaces provided. Learners should be encouraged to show all the working in spaces provided. A correct method can score a mark, even if an answer is wrong. There are some learners who are writing their methods with a pencil and erase them afterwards, learners should be discouraged to erase their working. If an answer is exact, learners do not need to round it to 3 significant figures. Learners should be encouraged to write the full calculator display before attempt to round it to 3 significant figures. For the questions where units are not provided on the answer space, learners should indicate the unit used with the answer.

There are some topics that proved to be difficult to the learners: **Logarithms, Linear programming, Vectors, Functions, Reverse Percentage, Estimation/rounding off, Variation, Mensuration, Cumulative frequency**. The questions based on these topics were mostly answered wrong or even left unanswered.

Comments on specific questions

1 This question was fairly answered, although some learner's lost marks because they did not follow the instruction within the question itself, to give the full calculator display. Some learners work out $\sqrt{15}$ first, but rounded the answer to 3 significant figures, which affect their final answer, learners should be discouraged from doing this premature rounding. There are some learners who are writing a number with space instead of a decimal point which is wrong i.e. 1285 423302. Some learners are still writing a comma for a thousand separator as a point, which the learners should be discouraged to do. i.e. 1.285.423302.

1	1285.423302	2	B1 for 1285.4 or 1290 or rounded to 3 or more significant figures

2 This question was well answered although few learners did not follow the instruction to write the fraction in its simplest form. There were few learners who are writing the fraction without a division line which made them to lose a mark. For part (b), some learners wrote a common wrong answer of 0.6% or 0.6 or $\frac{60}{100}$.

2 (a)	$\frac{9}{25}$	1	c.a.o
(b)	60(%)	1	c.a.o

3 This question was well answered although few learners gave the list of odd numbers as their prime numbers in part (a).

3 (a)	13 or 109	1	c.a.o
(b)	49	1	c.a.o

4 This question was poorly answered as some learners failed to add the decimal point to the answer and gave the wrong answer of 000052. Some learners wrote the answer as a common fraction.

4	0.00052	1	c.a.o

5 This question was fairly answered. Learners should be encouraged to convert the given numbers to decimal fractions, or to percentage or writing them with the common denominator on the working space before arranging them. Some learners arrange the numbers in descending order instead of ascending. Only the original given numbers should be used.

5	$\frac{17}{30} < \frac{7}{12} < \frac{3}{5}$	2	M1 for any two correct conversion to decimal 0.566666666666,0.58333333333, 0.6 or to percentage 56.7%, 58.3%,60% or to fractions with common denominator i.e. $\frac{36}{60}, \frac{34}{60}, \frac{35}{60}$ SC1 for reverse ordering

6 For part (a), many learners could find the prime factors but failed to write them as a product. Some learners wrongly added 1 as a prime factor to their product. Part (b) was poorly answered. Some learners managed to write 114 as product of its prime factors but failed to find the highest common factor.

6 (a)	$2 \times 2 \times 5 \times 19$	2	B1 for listing 2, 2, 5, 19 or $1 \times 2 \times 2 \times 5 \times 19$ or M1 for prime factors listed on the tree diagram.
(b)	38	2	B1 for listing **all** the factors of 114 or $114 = 2 \times 3 \times 19$

7 This question was poorly answered as most learners calculated only 80% of 900 and failed to subtract the answer from 900. Learners should be encouraged to read the question thoroughly before attempt to answer it.

7	180	2	M1 for $\frac{20}{100} \times 900$ Or 900 – 720

8 This question was fairly answered although some learners do not know the difference between time notation and duration of time. The unit (minutes) was very important in this case.

8	50 minutes	1	c.a.o

9 This question was fairly answered as most learners used their calculator to work it out. This question was a demanding question, most learners failed to show their working.

9	$2\frac{7}{20}$ or $\frac{47}{20}$ or 2.35	2	M1 for $\frac{52}{20} - \frac{5}{20}$ or o.e

10 This question was fairly answered as most learners recall the formula of the compound interest. Some learners managed to work out the total amount but spoilt the answer by adding 3500 again. Some learners lost a mark because of rounding off. Some learners calculated the simple interest.

10	N$ 3 822.(0875)	3	M2 for $3500\left(1+\frac{4.5}{100}\right)^2$ or $\frac{104.5}{100}\times$ 3657.50 or $3500\ (1.045)^2$ or 164.5875 M1 for **3657.50 seen**

11 This question was poorly answered. Most learners could not round off to 1 significant correctly. Some learners are spoiling their answers by adding a zero i.e. 0. 500. Rounding off to significant figures need to be emphasised. For part (b), learners struggled because of calculator skills.

11 (a)	$\frac{0.5 \times 3000}{10+20}$	2	B1 for any two correct
(b)	50	1	F.T

12 This question was poorly answered as many learners divided 180 into a given ratio instead of using a method of given a ratio with one outcome.

12	120	2	M1 for $\frac{180}{3} \times 2$ o.e or 60 × 2 or $3x = 360$

13 This question was fairly answered although the correct answer was rounded incorrectly by some learners.

Money can be rounded to two decimal places. Some learners multiply 5 500 with 19.60 instead of dividing $\frac{5500}{19.60}$.

13	280.6(122449) 281	2	M1 for $\frac{5500}{19.60}$ o.e

14 This question was poorly answered. Most of the learners had no idea on how to convert between SI units. Some learners managed to convert 108 km to metres but failed to divide the answer by 3600 seconds.

14	30 m/s	2	M1 for $\frac{108\times1000}{3600}$ o.e or $\frac{108}{3.6}$

15 This question was fairly answered. Most learners managed to calculate the actual distance of 1 344000 cm but failed to convert it to kilometres. Conversion of units need to be displayed in the classroom where learners can see them daily.

15	13.4(4)	2	M1 for 4.8 × 280 000 or **1 344 000seen** **Or** ÷ 100000 **seen**

16 This question was poorly answered. Reverse percentage seems to be a big problem to many learners. Teachers should teach the reverse percentage together with normal percentage so that the learners may learn how to differentiate between them. Most learners calculated 25% of 950 and added the answer to 950.

16	760	3	B1 for **125% seen** M1 for $\frac{100}{125}\times950$ o.e. or $\frac{125}{100}\times x=950$

17 This question was well answered. Some learners used logarithms to solve this question and got a wrong answer.

17	0.8 / $\frac{8}{10}$ / $\frac{4}{5}$	1	c.a.o

18 This question was well answered. Some learners managed to get the correct answer but spoilt it by attempting to subtract the unlike terms.

18	12a – 30	1	c.a.o

19 This question was well answered. Some learners manage to get the correct answer but spoiled it by subtracting the unlike terms. The common wrong answer was 3fg.

19	12f – 9g	2	B1 for 12f or - 9g

20 This question was poorly answered. Many learners could not apply the laws of logarithm.

20	log2 + 3log$x$	2	M1 for log2 + log x^3

21 Although majority of learners could collect like terms correctly, many failed to recognize the division by a negative number need to change the inequality sign. Some changed the inequality to an equation. This should be discouraged.

21	$p \leq$ -3 or -3 ≥ p	2	M1 for 3p – 7p ≥ 2 + 10 or -4p ≥ 12

22 This question was poorly answered. Many learners wrote the next term in the sequence instead of finding the nth term. Some learners use the general formula for arithmetic sequence correctly but started solving it again.

22	8n – 11 Accept: -3 + 8(n – 1)	2	B1 for $8n+C$ or $8(n-1)+C$ on the answer space

23 For part (a), many learners knew that $g(\text{-}3) = (-3)^2$, but failed because of calculator skills. The common wrong answer was -9. Part(b) was poorly answered as many learners managed to exchange y and x but failed to make y the subject of the formula. Part (c) was poorly answered. Some learners managed to recognize that $gf(x) = (3-3x)^2$, but failed to expa**nd it.**

23 (a)	9	1	c.a.o
(b)	$\frac{x-3}{-3}$ or $\frac{3-x}{3}$ or $1-\frac{x}{3}$	2	M1 for $x - 3 = -3y$ or $3y = 3 - x$
(c)	$9x^2 - 18x + 9$	2	M1 for $(3x - 3x)^2$ or $(3 - 3x)(3 - 3x)$ or $9 - 9x - 9x + 9x^2$

24 Part (a) was well answered. Some learners factorized it as difference between two squares. Part (b) was poorly answered as many learners solved the expression instead of factorizing it. Some learners managed to identify the factors but with wrong signs. The common wrong answer was $(x + 13)(x + 3)$.

24 (a)	$x(x - 16)$	1	c.a.o
(b)	$(x - 13)(x - 3)$	2	B1 for $(x - 13)$ or $(x - 3)$

24 This question was poorly answered. Most learners do not know that to find the distance is to calculate the area underneath the graph. Some learners have been calculating the acceleration of each line and add them up which is wrong. Many learners were getting 60 with the wrong method. There is no mark for wrong method with a correct answer.

25	60	2	M1 for $\frac{1}{2}[1+3]\times 30$ or $\frac{1}{2} \times 4$ x 30 or $\frac{1}{2} \times 1 \times 30 + 1 \times 30 + \frac{1}{2} \times 1 \times 30$

26 This question was poorly answered. Many learners could not recognize that this question is based on a variation. Many learners did not find the constant first, and instead of taking a square root of n, they squared it. Variation should also be taught using a table.

26 (a)	$[s =] 4.5$, $[t =] 324$	3	B2 for $[s =] 4.5$ or $[t =] 324$ Or M1 for t **= 1.5 seen**

27 Learners should be encouraged to shade clearly the unwanted regions. Many learners just shaded part of the unwanted regions, while others did very faint shading that was difficult to see. This topic needs to be emphasised.

27	Regions shaded correctly and correct label	2	B1 for one region shaded correctly for one line

28 This question was fairly answered. Some learners used the formula of finding the interior angle. Many learners took 24 as the number of sides and wrongly calculate it as $\frac{(24-2)\times 180}{24}$.

28	15	2	M1 for $\frac{360}{24}$ o.e

29 For part **(a)**, many learners recognized the type of transformation but failed to describe it fully. To describe fully the rotation, you have to give the centre of rotation and angle with direction. For part **(b)**, some learners managed to enlarge the shape but used the wrong centre. Some learners were drawing the shape without a ruler, learners should be encouraged to draw the shapes with a pencil and a ruler at all times.

29 (a)	Rotation 90º clockwise(-90º) or 270º anticlockwise (+270º) centre (3,4)	3	B1 for rotation or 90º clockwise or 270º anticlockwise or centre (3,4)
(b)	Correct enlargement with vertices (9,3) (12,3) (9,6) (12,6)	2	SC1 for correct enlargement with the wrong centre

30 This question was poorly answered as many learners calculated the volume of a sphere and failed to divide it by 2. Wrong formula of the volume of a cylinder is seen mostly. Learners failed to recognize that the shape was made up by two shapes, a hemisphere and a cylinder. Learners should be encouraged to memorize the formula of volumes and surface areas of different shape.

30	a.r.t 198	3	M1 for $\frac{2}{3}\pi\,(3)^3$ or $\pi\,(3)^2\,(5)$ B1 for 56.54866776 or 141.3716694

31 Part **(a)(i)** was well answered, few learners wrote vectors as fraction. Part **(a)(ii)** was poorly answered as many learners had no idea on how to calculate the magnitude of a vector. Part **(b)** was poorly answered as well as many learners did not understand the vectors in the diagram. Some learners tried to write their answers as column vectors. Many learners could not understand what the position vector is.

31 (a) (i)	$\begin{pmatrix}2\\6\end{pmatrix}$	1	c.a.o
(ii)	5	1	c.a.o
(b) (i)	**-d** + **e**	1	c.a.o
(ii)	$\frac{1}{3}$**d** + $\frac{2}{3}$**e**	2	M1 for **d** + $\frac{2}{3}$(**-d** + **e**)Or **d** – $\frac{2}{3}$**d** + $\frac{2}{3}$**e** **Or** $e-\frac{1}{3}(e-d)$ **or** $e-\frac{1}{3}\ e+\frac{1}{3}$ **F.T to the method**

32 This question was fairly answered. The most common wrong answer was 0.55. Many learners failed to recognize that they need to subtract 0.3 and 0.25 from 1 to get the probability of orange. Part **(b)** was poorly answered with wrong common answer of 0.45.

32 (a)	0.45	1	Accept $\frac{9}{20}$ or 45%
(b)	0.55	**1** **F.T**	**Accept 55% or** $\frac{11}{20}$ **F.T** $1-their(a)$

33 This question was poorly answered as most learners do not know how to read the cumulative frequency curve. Many learners failed to determine the scale used on the graph. For part **(a)** , the common wrong answer was 3.4. Part **(b)**, many learners had no idea how to calculate the interquartile range as many calculated the average mass with a common wrong answer of 3.8.

33 (a)	3.37	B1	Accepts answers from 3.37 to 3.38
(b)	0.26 Accepts 0.25 to 0.29	2	M1 for 3.52 or 3.25 Accepts upper quartile as 3.51 to 3.52 Or lower quartile 3.24 to 3.26