



*Let the mind manage the body
Que l'esprit gère le corps*

Mauritius Examinations Syndicate

PSAC 2019

MATHEMATICS

Subject Code: P120

Examiners' Report

April 2020

MATHEMATICS

(Subject Code No. 120)

General Comments

The Primary School Achievement Certificate (PSAC) Assessment in Mathematics was conducted for the third time in 2019. In terms of the cognitive demand it put on the candidates, the assessment in Mathematics was, to a very large extent, akin to that of 2018.

The performance of candidates in the assessment also remained fairly comparable. 79.82 % of school candidates achieved numerical grade 5 or better in 2019, compared to 80.42 % in 2018.

Despite the slight drop of in the overall performance, from a quantitative point of view, these statistics look quite encouraging. However, it is important to highlight that, in terms of the quality of the results, much improvement is still warranted. An analysis of candidates' scripts during the marking and post-marking exercises showed that a considerable number of candidates did not develop firm mathematical understanding and confidence in solving mathematical problems at the end of Grade 6. The relatively low performance in solving common routine problems (**Qu. 13, Qu. 25, Qu. 30, Qu. 39**) bears testimony to this.

Another key issue to be highlighted in this year's report regards candidates' apparent lack of self-confidence or insecurity in using their mathematical knowledge and comprehension. It was quite common for candidates to offer multiple solutions to a given problem in 2019. It is to be noted that part marks were lost in most of these cases, even when one of the solutions provided was correct.

On a more positive note, most candidates showed good recall capacity and performed basic arithmetic operations involving whole numbers competently. Questions which were found most difficult to tackle were, by and large, those that involved fractions (such as **Q.28, Q. 30, Q.35, and Q. 41**).

The issue of messy presentation of work persisted in the assessment session 2019. The lack of clarity in their presentation of work made it difficult for a good number of candidates to articulate their thoughts in a systematic manner. This led to a non-negligible number of marks being lost.

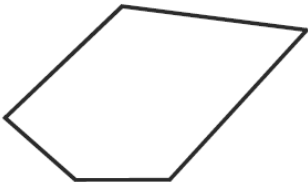
Comments on Specific Questions

Very-short Answer Questions

Questions 1 – 16 assessed candidates' knowledge and comprehension mainly. They were well-answered in general. The questions which posed the most difficulty in this series were Q.3, Q.10, Q.13, and Q.15.

Question 3

What is the name of the shape?



Answer: _____ [1]

Less than half of the cohort recognised that the shape was a pentagon. Among those who correctly identified the shape, quite many had difficulty to write 'pentagon' correctly.

Question 8

Find the **value** of 7^2 .

Answer: _____ [1]

This question was well-answered by the majority of candidates. However, an observation made concerns candidates who occasionally wrote $7 \times 7 = 14$.

Question 10

Fill in the blanks in the table below. An example is given.

In words	In figures
Example: Five hundred and thirty six	536
(a) _____	742
(b) One thousand three hundred and eight	_____

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In part (a), it was seen that a few candidates did not know how to write the word 'forty' correctly. Common misspellings included 'fouty' and 'fourty'. A few candidates even wrote 'fouy', with an 'r' superimposed on the 'u'. It is important to note that no mark is awarded in such cases as these questions test the ability of candidates to spell numbers correctly. Educators should be wary of common misspelling pupils tend to leave (forty and fourty, or ninety and ninty) so that emphasis can be laid on these at classroom level.

Question 13

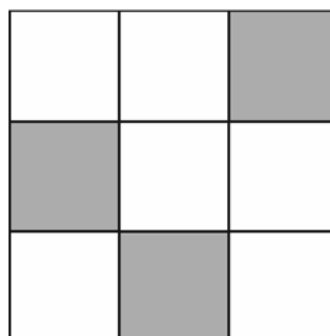
What is the Highest Common Factor (**H.C.F.**) of 24 and 36?

Answer: _____

H.C.F. and **L.C.M.** remain abstract concepts for a significant number of candidates. More than half of the population was not able to answer this question although quite many were able to find the prime factors of 24 and 36.

Question 15

The figure below has **only one** line of symmetry. **Draw** the line of symmetry.



This was the least well-answered question in the series. Similar to **Question 22** which was set in 2017, candidates seem to have skim read the question. In 2017, candidates were required to shade an additional small square in the diagram such that the resulting figure would have only

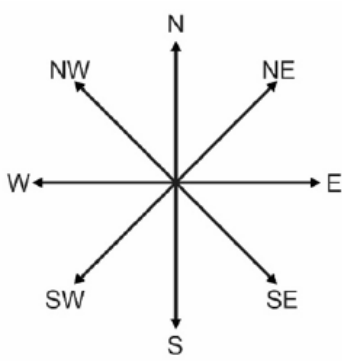
one line of symmetry. Incidentally, in 2019, a considerable number of candidates shaded an additional small square when they were required to draw the line of symmetry instead. Only a handful of candidates correctly identified and drew the line of symmetry. Stressing on the need for pupils to read questions carefully till the end before they attempt a question is strongly recommended.

Multiple-Choice Questions

The Multiple-Choice questions which were found to be most difficult by candidates were **Q. 22**, **Q. 25** and **Q. 28**.

Question 22

Paul is facing **South-West**.
He turns 135° **anti-clockwise**. What direction is Paul facing now?



A North
B East
C South
D West

Quite many candidates, including those from the higher ability group, did not realise that to turn 135° was equivalent to turning through 45° three times. The most popular distractor was **Option A** which suggest that either candidates did not read the question carefully and overlooked the

term 'anti-clockwise' or that they could not distinguish between clockwise and anticlockwise directions.

Question 25

$23\,4000 \div \boxed{} = 234 \times 100$

The **missing** number is

A 10
B 100
C 1000
D 10000

This is a common question. Nevertheless, less than a quarter of the candidates were able to answer the question correctly. It turned out to be the least well-answered multiple-choice question. **Option C** attracted the majority of candidates. This again suggests that candidates may have read the question only in part or too hastily, ignoring '× 100' at the end of the given equation.

Question 28

28. In which of the following are the masses arranged in **ascending** order (starting with the **lightest**)?

	lightest		heaviest
A	8 kg 105 g	$8\frac{1}{5}$ kg	8.15 kg
B	$8\frac{1}{5}$ kg	8 kg 105 g	8.15 kg
C	8 kg 105 g	8.15 kg	$8\frac{1}{5}$ kg
D	$8\frac{1}{5}$ kg	8.15 kg	8 kg 105 g

This question assessed candidates' ability to '*break down and interpret multifaceted information and data*' as per the Assessment Objective 'Analysis' (AO3 in the *Annual Programme for the Primary School Achievement Certificate Assessment (PSAC)*). Reordering the masses in ascending order proved difficult for many average-ability candidates and above average ability candidates alike. **Option D** was a powerful distractor in this case.

Short Answer Questions

These questions generally carry a maximum of 3 marks and may assess any of the Assessment Objectives (AOs). Common mistakes identified are detailed below.

Question 30

Work out $\frac{7}{15} \div \frac{4}{5}$, giving your answer in the **lowest form**.

Answer: _____

Many misconceptions related to the division of fractions were revealed in this question. The following were the most common mistakes which candidates made in working out the division:

- They calculated $\frac{7}{15} \times \frac{4}{5}$, omitting to take the reciprocal of the second fraction.
- They calculated $\frac{15}{7} \times \frac{4}{5}$, taking the reciprocal of the first fraction instead of the second one.

- They presented incoherent workings such as $\frac{7}{15} \times \frac{4}{5} = \frac{60}{35} = \frac{35}{60} = \frac{7}{12}$ when $\frac{60}{35}$ is clearly not equal to $\frac{35}{60}$.

It is important to discourage pupils' reliance on the use of such 'short cuts' when teaching fundamental concepts in Mathematics in the early years. These may lead to pupils missing out valuable opportunities to make important connections between the different concepts learnt and, thus, thwart deeper understanding.

Regularly practising and reinforcing procedural rules related to adding, subtracting, multiplying and dividing fractions in classroom activities are likely to improve pupils' ability to perform these operations more confidently in the future.

Question 31

The **total** mass of Sara and Tony is the **same** as that of Max.

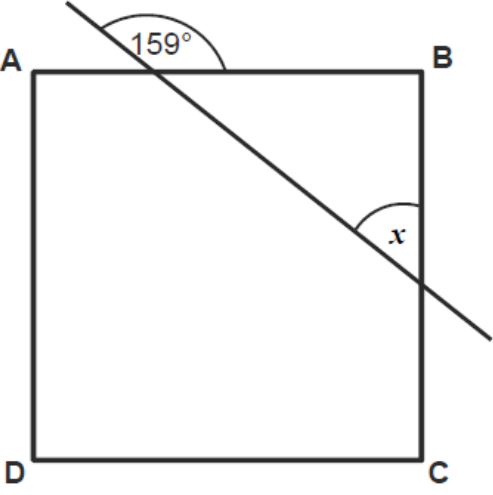
Given that the mass of Max is 90 kg, find the **average** mass of Sara, Tony and Max.

This question was wrongly interpreted by a considerable number of candidates. The word 'total' in the first sentence was often overlooked despite the emphasis laid. Thus, the masses of Sara and Tony were each taken to be 90 kg (same as that of Max) in many cases. Consequently, a common mistake was to calculate the total mass of Sara, Tony and Max as $(90 + 90 + 90) \text{ kg} = 270 \text{ kg}$.

Question 33

ABCD is a square.

Not to scale

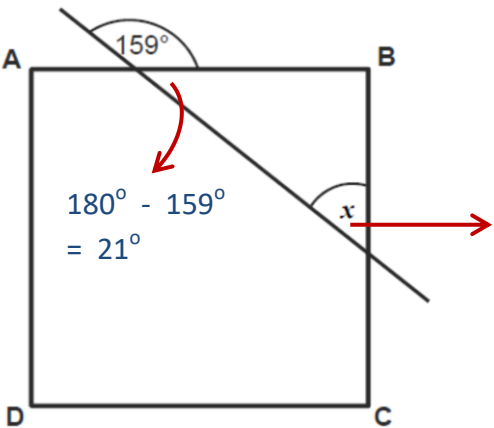


Find the size of angle x .

Candidates did not perform well in this question in general. The main difficulty encountered was to interpret the implicit information provided in the diagram. Few recognised that the triangle formed by the straight line and the square had to be right-angled. Quite often calculations were seen all over the working space without clearly indicating which unknown angle of the diagram was being determined. It is felt that candidates could have scored partial marks had they presented their work more intelligibly.

Training pupils to present their work in coherent ways builds up pupils' ability to remain focused and guards against possible mistakes.

Solution:

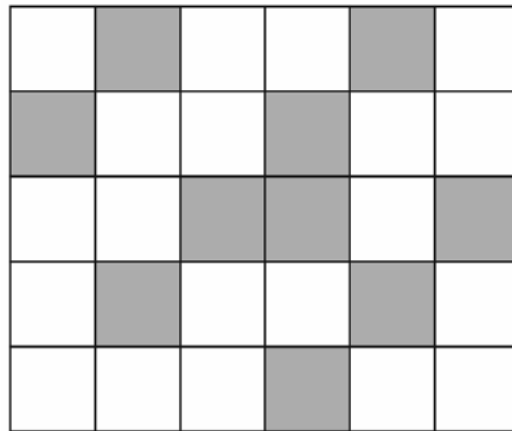


$180^\circ - 159^\circ = 21^\circ$

$180^\circ - (21^\circ + 90^\circ)$
OR $90^\circ - 21^\circ$
 $= 69^\circ$

Question 34

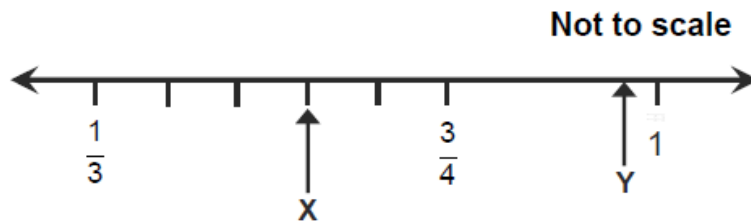
The figure below shows 30 small squares arranged in a rectangular shape.
 How many **more** small squares must be shaded so that 60% of the figure is shaded?



good number of candidates also lost partial marks because they did not read the question carefully. While they readily acknowledged that 60 % of the figure represented 18 small squares (60 % of 30 small squares), they overlooked the emboldened word ‘more’ in the question and, thus, gave 18 as their answer.

Question 35

The diagram below shows the positions of two numbers, labelled X and Y, on a number line.



(i) 1. Can Y be equal to $\frac{25}{24}$? Tick (✓) the correct box below.

Yes

No

[1]

2. Give a reason for your answer in part 1.

..... [1]

(ii) Find the value of X.

As mentioned at the beginning of this report, candidates tend to struggle when faced with questions involving fractions. **Question 35** was one of the least-well answered questions in 2019.

Notwithstanding the fact that candidates usually face serious difficulties in expressing their reasoning in writing, quite many were able to score full or partial marks in part (i). Many rightly realised that, given its position on the number line, **Y** could not be equal to $\frac{25}{24}$ as it is an improper fraction.

Conversely, in part (ii), very few were able to deduce that **X** would be equal to $\frac{7}{12}$ considering that $\frac{1}{3}$ is equivalent to $\frac{4}{12}$ and $\frac{3}{4}$ is equivalent to $\frac{9}{12}$. A common wrong answer was $\frac{1}{4}$.

Question 37

PQRS is a rectangle.
PRT is a triangle with **QT = 3 cm**.

Calculate the **area** of the shaded region shown.

Although the context was familiar to candidates, more than two thirds of the cohort could not answer this question successfully. Many assigned values to the unknown sides of triangle PRT arbitrarily and used these incorrect values to calculate the area.

Question 37 is yet another question where candidates faced difficulties in inferring the implicit information provided. Quite many also got lost in their own calculations because of inappropriate presentation of their work.

Solution:

$$\begin{aligned}\text{Length of PT} &= (8 - 3) \text{ cm} \\ &= 5 \text{ cm}\end{aligned}$$

$$\begin{aligned}\text{Shaded area} &= \text{area of triangle TRP} \\ &= (5 \times 6)/2 \\ &= 15 \text{ cm}^2\end{aligned}$$

Question 38

Jay has Rs 64 and Rani has Rs 104.

Rani gives some of her money to Jay.

The **ratio** of the amount of money which Jay and Rani now have is 5 : 3 .

How much money did Rani **give** to Jay?

A good number of candidates obtained part marks in **Q. 38** but the question was successfully answered by a few only. It seemed that a lot of confusion arose from disorganised presentation of work. For example, a considerable number of candidates mixed up who had which amount of money at which point in time. It is strongly felt that such difficulties could be addressed by insisting that pupils present their work in a more systematic way. Of particular interest, pupils should be encouraged to write down what they are after rather than just doing the calculations.

Solution:

$$\text{Total shares} = (5 + 3) = 8$$

$$\begin{aligned}\text{Total amount of money at first} &= \text{Rs. } (64 + 104) \\ &= \text{Rs. } 168\end{aligned}$$

$$\begin{aligned}8 \text{ shares} &\longrightarrow \text{Rs. } 168 \\ 5 \text{ shares} &\longrightarrow \text{Rs. } \frac{168}{8} \times 5 \\ &= \text{Rs. } 105\end{aligned}$$

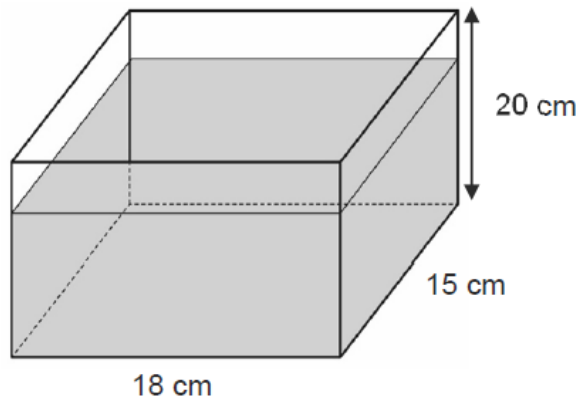
Therefore,
amount of money Rani gave to Jay = Rs. $(105 - 64)$
= Rs. 41

Question 39

The diagram below shows a rectangular tank containing water.

The base of the tank has length 18 cm and width 15 cm. Its height is 20 cm.

The tank is $\frac{3}{4}$ filled with water.



Find

- (i) the **height** of water in the tank.
- (ii) the **volume** of water in the tank.

Question 39 was expected to be fairly accessible but performance in this question remained low. Many started by working out part (ii) before attempting part (i), which was far less straightforward. Thus, the volume of the tank was first calculated. Candidates then reasoned that $\frac{3}{4}$ of that volume would be equivalent to the volume of water in the tank. To get the height of water, they divided the volume of water they obtained by the area of base of the tank, quite often leaving slips in intermediate workings.

A good number of candidates did not read the question carefully enough. They gave the height of water as 20 cm and, subsequently, calculated the volume of tank instead of that of water in part (ii).

Solution:

$$\begin{aligned} \text{(i) Height of water} &= \frac{3}{4} \times 20 \\ &= 15 \text{ cm} \end{aligned}$$

$$\begin{aligned} \text{(ii) Volume of water} &= \frac{3}{4} (18 \times 15 \times 20) \\ &= 4050 \text{ cm}^3 \end{aligned}$$

Question 41

On a farm, $\frac{5}{9}$ of the animals are chickens, $\frac{1}{4}$ of the **remaining** animals are goats and the rest are ducks.

If there are 27 ducks, find the **total** number of animals on the farm.

This was the second least well-answered question in 2019, closely following **Q. 35 (ii)**. Both of these questions involved fractions.

A common misinterpretation of the question led to many candidates taking the fraction representing goats to be equal to $\frac{1}{4}$. In fact, the fraction representing goats had to be calculated.

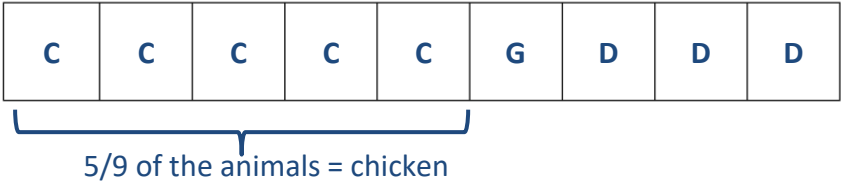
Some candidates rightly acknowledged that the fraction of goats would be given by $\frac{1}{4}$ of $\frac{4}{9}$ but

calculated $\frac{4}{9} - \frac{1}{4}$ instead.

The use of bar modelling as a problem-solving strategy in this question was appropriate and often led to candidates scoring partial or full marks. It provided a visual picture of the number of animals on the farm and helped candidates to organise their thoughts in a logical manner.

Solution:

$\frac{1}{4}$ of the remaining animals = goat



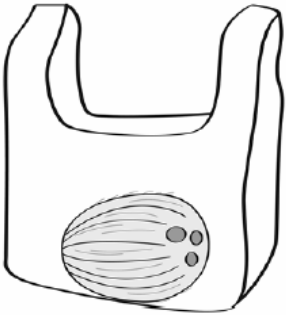
3 shares 27 animals
 1 share $27 \div 3 = 9$ animals

Therefore,
 The total no. of animals on the farm = 9×9
 = 81

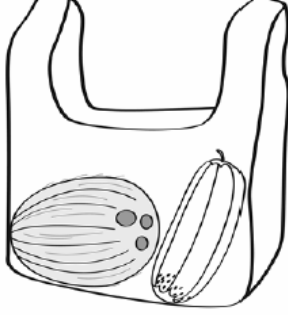
Question 43

The **total** mass of a bag containing a coconut is 2.6 kg.

When a cucumber is added to the bag, the **total** mass of the bag becomes 3 kg 190 g.



2.6 kg



3 kg 190 g

(i) Find the mass of the **cucumber** in grams.
 (ii) Given the coconut is **four times** as heavy as the cucumber, find the mass of the **bag** in grams.

This question on mass was found to be problematic for the large majority. In part (i), converting mass from one unit to another was particularly hard. More specifically, candidates had trouble to recognise the place values of the figures. For example, 2.6 kg was sometimes converted to 26 g or 2006 g or 2 kg 006 g.

In part (ii), it appeared that a considerable number of candidates did not read the question with due diligence. Thus, many stopped at calculating the mass of the coconut overlooking the fact that the question required them to find the mass of the bag instead.

Solution:

$$\begin{aligned} \text{(i) Mass of coconut and bag} &= 2.6 \text{ kg} \\ &= 2600 \text{ g} \end{aligned}$$

$$\begin{aligned} \text{Mass of cucumber} &= (3190 - 2600) \text{ g} \\ &= 590 \text{ g} \end{aligned}$$

$$\begin{aligned} \text{(ii) Mass of coconut} &= (590 \times 4) \text{ g} \\ &= 2360 \text{ g} \end{aligned}$$

Hence,

$$\begin{aligned} \text{Mass of bag} &= (2600 - 2360) \text{ g} \\ &= 240 \text{ g} \end{aligned}$$

Question 44

A taxi leaves Curepipe at 10.30 a.m. to go to Port Louis.

(i) It travels at an average speed of 42 km/h and reaches Port Louis at 11.00 a.m.
Calculate the **distance** covered by the taxi.

(ii) After spending 20 minutes in Port Louis, the taxi goes back to Curepipe by the **same route**. Its speed is now 7 km/h **less** than when it travelled to Port Louis.

At what **time** does it reach Curepipe?

Part (i) was fairly straight-forward. However, a recurring mistake was for candidates to calculate the distance by multiplying 42 km/h by 2 instead of multiplying by $\frac{1}{2}$ (the time taken to travel from Curepipe to Port-Louis being half hour). Another frequent error identified was for candidates to calculate the distance by multiplying 42 km/h by 30 min and to leave their answer as 1260 km, not realising that it was an irrational answer.

In part (ii), candidates often scored intermediate marks for recognising that the distance remained unchanged while the speed decreased to 35 km/h. It is important to note that a considerable number of candidates lost marks in calculating the time taken to return to Curepipe by writing $\frac{35}{21} = 36$ minutes when 36 min was a correct intermediate answer.

Solution:

- (iii) Time taken to travel from Curepipe to Port-Louis
= 11.00 a.m. - 10.30 a.m.
= 30 minutes
= $\frac{1}{2}$ hour

$$\begin{aligned}\text{Distance covered} &= \frac{1}{2} \times 42 \\ &= 21 \text{ km}\end{aligned}$$

- (iv) New speed = $(42 - 7)$ km/h
= 35 km/h

$$\begin{aligned}\text{Time taken to reach Curepipe} &= (21 \div 35) \text{ h} \\ &= \frac{3}{5} \text{ h} \\ &= 36 \text{ minutes}\end{aligned}$$

Therefore,

$$\begin{aligned}\text{Taxi reaches Curepipe at } &11.00 \text{ a.m.} + 20 \text{ min} + 36 \text{ min.} \\ &= 11.56 \text{ a.m.}\end{aligned}$$