

PRIMARY SCHOOL
CHALLENGE 2019

LEVEL 1 CHALLENGE
GRADE 4 AND 5 ROUND TWO

INSTRUCTIONS

1. The time allocated for this paper is $1\frac{1}{2}$ hours.
All participants must remain for the full allocated time.
Under no circumstances may extra time be given.
2. This paper consists of two sections.
Section A consists of 10 multiple choice questions.
Section B consists of 5 questions where working out must be shown.
3. Question 1 – 10 are worth 2 marks each.
Question 11 – 15 are worth 4 marks each.
4. Negative marking will not be applied.
5. Calculators (and other calculating devices) and geometry instruments are not allowed.
6. Figures are not necessarily drawn to scale.
7. Answer all questions on the answer sheet provided.
8. Circle the letter you have chosen as your answer in pen for Section A (Questions 1 – 10).
Should you wish to change an answer, put a cross over the letter and then circle your new chosen letter.
9. For Section B (Questions 11 – 15), full working must be shown in the space provided.
Your final answer must be written in the allocated space.
10. Paper may be used for rough working.

SECTION A

1. What is the sum of the three question marks (?) in the equations below?

$$\frac{1}{3} = \frac{?}{12} \quad ; \quad \frac{5}{4} = \frac{?}{12} \quad ; \quad 2\frac{1}{6} = \frac{?}{12}$$

$$\frac{1}{3} = \frac{4}{12} \quad ; \quad \frac{5}{4} = \frac{15}{12} \quad ; \quad 2\frac{1}{6} = \frac{13}{6} = \frac{26}{12} \quad \rightarrow 4 + 15 + 26 = 45$$

- A. 32 **B.** 45 C. 38 D. 50 E. 44

2. What is the 22nd term in the sequence 1, 2, 2, 3, 3, 3, 4, ?

$$1 + 2 + 3 + 4 + 5 + 6 = 21 \rightarrow 22^{\text{nd}} \text{ term} = 7$$

- A. 21 B. 6 C. 22 **D.** 7 E. 8

3. In the given sum, A, B, C, D, and E each are different single units, and C is even. What is the value of $A + B + C + D + E$?

$$\begin{array}{r} A \\ BB \\ + \underline{CDDE} \\ \hline 2019 \end{array}$$

$$C = 2 \text{ and } D = 0 \rightarrow B = 1 \rightarrow A = 3/5 \text{ and } E = 5/3 \rightarrow 3 + 1 + 2 + 0 + 5 = 11$$

- A.** 11 B. 8 C. 10 D. 12 E. 9

4. A builder knows that he can cut a long piece of wood into 6 pieces in 15 minutes. In a new job, the builder needs to cut a similar piece of wood into 10 pieces. He works at the same rate as before. If he starts cutting at 10:45am, what time will he complete the job?

$$6 \text{ pieces} = 5 \text{ cuts} \rightarrow 3 \text{ minutes per cut} \rightarrow 10 \text{ pieces} = 9 \text{ cuts} \rightarrow 3 \times 9 = 27 \text{ minutes}$$

$$10:45\text{am} + 0:27 = 11:12\text{am}$$

$$\text{OR, Direct Proportion: } 5 : 15 = 9 : T \rightarrow 5T = 135 \rightarrow T = 27 \text{ minutes} \rightarrow \text{Etc}$$

- A. 11:08am **B.** 11:12am C. 11:00am D. 11:10am E. 11:15am

5. In the diagram, what is the value of P?

- A. 8 **Rows add to 31**
 B. 12 $3P + 19 = 31 \rightarrow P = 4$
C. 4 **Or**
 D. 10 $2P + 23 = 31 \rightarrow P = 4$
 E. 6

31				
3P	19			
7	21	3		
17	1	8	5	
4	9	10	0	2P

6. A grasshopper jumps six times in a straight line. The first jump is 16 metres. Each of the next five jumps are half the distance of the previous jump. How far is the grasshopper from its starting point after the six jumps?

$$16 + 8 + 4 + 2 + 1 + \frac{1}{2} = 31\frac{1}{2}$$

- A. 32,5 m B. 33 m **C.** 31,5 m D. 30,5 m E. 30 m

7. If $\otimes + \otimes + \otimes = 36$ and $\triangle \times \triangle \times \triangle = 27$, what is the value of $\otimes \div \triangle$? (\otimes and \triangle are whole numbers)

$$\frac{36}{3} = 12 \rightarrow \otimes = 12 \text{ and } \sqrt[3]{27} = 3 \rightarrow \triangle = 3 \text{ therefore } \otimes \div \triangle = \frac{12}{3} = 4$$

- A.** 4 B. 9 C. $\frac{4}{3}$ D. 3 E. $\frac{1}{4}$

8. A class of pupils lined up one behind the other. Brian was standing 7th from the front. Penny was standing 7 places behind Brian, and 20th from the back. How many pupils were in the queue?

Penny is standing 14th from front $\rightarrow 14 + 19 = 33$ (there are 19 pupils behind her)

- A. 34 B. 38 C. 31 **D. 33** E. 32

9. Brenda has exactly enough money to buy 4 pens and 10 pencils, or to buy 6 pens and 6 pencils. She decides to use all her money to only buy pencils. How many pencils can she buy?

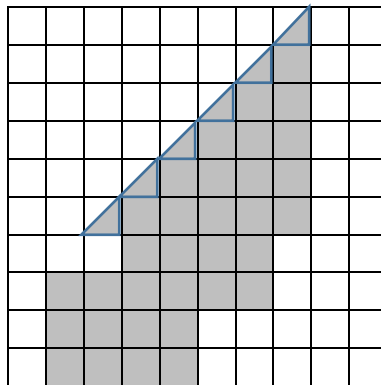
(cost) 4 pens + 10 pencils = 6 pens + 6 pencils $\rightarrow 2$ pens = 4 pencils $\rightarrow 4$ pens = 8 pencils

Therefore she can buy 8 + 10 = 18 pencils

- A. 16 **B. 18** C. 15 D. 20 E. 14

10. In the figure, the large square is filled with small squares. If the area of the large square is 100 cm², what is the area of the shaded area in cm²?

- A. 34
B. 32
C. 54
D. 38
E. **36**



$\sqrt{100} = 10 \rightarrow$ small square = $1 \times 1 = 1\text{cm}^2$

Area = $4 \times 3 + 2 \times 1 + 4 \times 1 + \frac{1}{2} \times 6 \times 6 = 36\text{cm}^2$

(3 rectangles and a triangle)

OR, count the whole squares (33) and the half squares (6) = 33+3=36

SECTION B

NB : Show all working and write your final answer in the allocated space.

11. Amy invites 11 friends to her 11th birthday party. Her mother baked three cakes. Amy's mother cut the first cake into 12 slices, and the second cake into 14 slices. What is the least (smallest) number of slices she needs to cut the last cake into such that all the children at the party receive an equal number of slices of cake?

There are $11 + 1 = 12$ children at the party.

$12 + 14 = 26$ slices and we require the first multiple of 12 greater than 26

$3 \times 12 = 36 \rightarrow 36 - 26 = 10$ slices

SCORING GUIDELINES: Correct answer only \rightarrow 1 mark. Using 11 children at the party and showing all working to give an answer of $3 \times 11 - 26 = 7 \rightarrow$ 2 marks. Correctly calculating number of slices from first two cakes with no further working \rightarrow 1 mark. Full solution with single arithmetic mistake \rightarrow 2 marks. Full detailed correct solution \rightarrow 4 marks.

12. Four apples cost R2.00. Five oranges cost R2.50. Six bananas cost R3.50. You wish to make up teams at your school and give each team a packet containing 4 apples, 5 oranges, and 6 bananas. What is the greatest number of teams you can make up if you have R150.00 to spend?

Cost per packet = $R2 + R2.50 + R3.50 = R8.00$

$\frac{150}{8} = 18\frac{3}{4}$, therefore a maximum of 18 teams are possible.

SCORING GUIDELINES: Correct answer only \rightarrow 1 mark. Correct calculation of the cost of a packet only \rightarrow 1 mark. Correct cost of a packet and showing $150/8$ only \rightarrow 2 marks. All correct except giving an answer of 19 \rightarrow 2 marks. Full detailed correct solution \rightarrow 4 marks.

13. The diagram shows a whole number N which has the following operations applied to it in order left to right: $\div 2$ then $+2$ then $\times 2$ then -2 . After these operations on N, its value has been changed to 42. What is the value of N?

$$\boxed{N} \xrightarrow{\div 2} \boxed{} \xrightarrow{+2} \boxed{} \xrightarrow{\times 2} \boxed{} \xrightarrow{-2} \boxed{42}$$

In reverse : $42 + 2 = 44 \div 2 = 22 - 2 = 20 \times 2 = 40$

SCORING GUIDELINES: Correct answer only → 1 mark. Correctly showing calculation of 44 → 1 mark, 44 and 22 → 2 marks, 44 and 22 and 20 with incorrect final answer → 3 marks. Full detailed correct solution → 4 marks.

14. A number is divisible by another number if there is no remainder.
 A number is divisible by 8 if its last three digits are divisible by 8.
 A number is divisible by 9 if the sum of its digits is divisible by 9.
 M and N are single digits in the number 47M25N.
 If this number is divisible by both 8 and 9, what is the value of M+N?

$\frac{25N}{8} \Rightarrow N = 6$ (since $2 \times 8 = 16$) Then the number is 47M256. Sum of digits is $24 + M$ and therefore $M = 3$ since 27 is divisible by 9. Therefore $M + N = 3 + 6 = 9$.

SCORING GUIDELINES: Correct answer only → 1 mark. Correct calculation of $N=6$ only → 1 mark. Correct $N = 6$ and showing the addition of the numbers with mistake in addition therefore the value of $M \rightarrow 2$ marks. Correct N and M with all working and not summing the two for final answer → 1 mark. Full detailed correct solution → 4 marks.

15. At a school fundraising day, juices sell for R9 each, chocolates sell for R3 each, and buns sell for R5 each. You have R50 to spend. What is the maximum (most) number of these items you can buy if you receive no change and buy at least one of each?

Need to maximize the cheaper item (R3) and have a remainder of at least 14 (R9 + R5) over. Such remainder must be able to be made up of a combination of 9 and 5.

Try $14 \times 3 = 42 \rightarrow$ Rem 8 (no). Try $13 \times 3 = 39 \rightarrow$ Rem 11 (no). Try $12 \times 3 = 36 \rightarrow$ Rem 14 (yes since $14 = 9 + 5$). So maximum number of items = $12 + 1 + 1 = 14$.

SCORING GUIDELINES: Correct answer only → 1 mark. At least 1 mark for showing understanding of maximizing the cheapest item. All working showing understanding of maximizing the cheapest item, but giving an answer of 12 → 2 marks. Full detailed correct solution → 4 marks.