

JIMCOBSA - Pre-2026 Participation Assignment

2026 Grade 6 to 12 Learners (Grade 5 to 11 in 2025)

These questions require you to show your methods and reasons for your answer. Each question is worth 10 marks. Please note that we don't expect you to necessarily solve all questions. Go to our website jimcobsa.co.za to submit your solutions.

1. An *arithmetic* sequence is a sequence in which each term after the first is obtained from the previous term by adding a constant, called the common difference.
For example 2, 5, 8, 11, 14 are the first five terms of an arithmetic sequence with a common difference of 3.
 - (a) Determine the 6th and 7th terms of the sequence given above.
 - (b) What is the 31st term in this sequence?
 - (c) If the last term in this sequence was 110, how many terms was there in the sequence?
 - (d) If this sequence is continued, does 2026 appear in the sequence? Explain why.
2. Emily sets up a lemonade stand. She has set-up costs of R12.00 and each cup of lemonade costs her R0.15 to make. She sells each cup of lemonade for R0.75.
 - (a) What is the total cost, including the set-up, for her to make 100 cups of lemonade?
 - (b) What is her profit (money earned minus total cost) if she sells 100 cups of lemonade?
 - (c) What is the number of cups that she must sell to break even (have a profit of R0)?
 - (d) Why is it not possible for her to make a profit of exactly R17.00?
3. A *palindrome* is a positive integer that is the same when read forwards or backwards. For example, three palindromes are 7, 121 and 7739377.
 - (a) Determine the number of palindromes less than 1000.
 - (b) Determine the number of palindromes with 7 digits.
 - (c) If the palindromes in part (b) are written in increasing order, determine the 2026th palindrome in the list.
4.
 - (a) How many of the positive integers from 1 to 100 do not contain the digit 7?
 - (b) How many of the positive integers from 1 to 2000 do not contain the digit 7?
 - (c) Determine the sum of all of the positive integers from 1 to 2000, inclusive, that do not contain the digit 7. Explain how you got your answer.
5.
 - (a) Determine the average of the integers 71, 72, 73, 74, 75.
 - (b) Suppose that $n, n + 1, n + 2, n + 3, n + 4$ are five consecutive integers.
 - (i) Determine a simplified expression for the sum of these five consecutive integers.
 - (ii) If the average of these five consecutive integers is an odd integer, explain why n must be an odd integer.
 - (c) Six consecutive integers can be represented by $n, n + 1, n + 2, n + 3, n + 4, n + 5$, where n is an integer. Explain why their average is never an integer.

JIMCOBSA - Pre-2026 Deelname Werksopdrag

2026 Graad 6 tot 12 Leerders (Graad 5 tot 11 in 2025)

Hierdie vrae benodig metodes en redes vir jou antwoord. Elke vraag is 10 punte werd. Let asseblief op dat ons nie verwag dat alle vrae noodwendig opgelos word nie. Gaan na ons website jimcobsa.co.za toe om jou oplossings in te handig.

1. 'n *Rekenkundige* ry is 'n ry waarin elke term na die eerste een verkry word vanaf die vorige term deur 'n konstante, genoem die gemeenskaplike verskil, by te tel.
Byvoorbeeld 2, 5, 8, 11, 14 is die eerste vyf terme van 'n rekenkundige ry met 'n gemeenskaplike verskil van 3.
 - (a) Bepaal die 6de en 7de terme van die ry soos hierbo gegee.
 - (b) Wat is die 31ste term in hierdie ry?
 - (c) As die laaste term in hierdie ry 110 is, hoeveel terme sal daar in die ry wees?
 - (d) As hierdie ry voortgesit word, sal 2026 in hierdie ry verskyn? Verduidelik hoekom.
2. Emily begin 'n limonade stalletjie. Haar beginkoste is R12.00 en elke beker limonade kos haar R0.15 om te maak. Sy verkoop elke beker limonade teen R0.75.
 - (a) Wat is die totale koste, insluitend beginkoste, om 100 bekere limonade te maak?
 - (b) Wat is haar wins (geld verdien minus totale koste) as sy 100 bekere limonade verkoop?
 - (c) Wat is die getal bekere wat sy moet verkoop om gelyk te breek (R0 wins te maak)?
 - (d) Hoekom is dit nie moontlik vir haar om presies R17.00 wins te maak nie?
3. 'n *Palindroom* is 'n positiewe heelgetal wat dieselfde is wanneer dit van voor na agter en van agter na voor gelees word. Byvoorbeeld, drie palindrome is 7, 121 en 7739377.
 - (a) Bepaal die aantal palindrome kleiner as 1000.
 - (b) Bepaal die aantal palindrome met 7 syfers.
 - (c) As die palindrome in deel (b) geskryf word in stygende volgorde, bepaal die 2026ste palindroom in die lys.
4.
 - (a) Hoeveel van die positiewe heelgetalle van 1 tot 100 bevat nie die syfer 7 nie?
 - (b) Hoeveel van die positiewe heelgetalle van 1 tot 2000 bevat nie die syfer 7 nie?
 - (c) Bepaal die som van al die positiewe heelgetalle van 1 tot 2000, insluitend, wat nie die syfer 7 bevat nie. Verduidelik hoe jy jou antwoord gekry het.
5.
 - (a) Bepaal die gemiddelde van die heelgetalle 71, 72, 73, 74, 75.
 - (b) Veronderstel dat $n, n + 1, n + 2, n + 3, n + 4$ vyf opeenvolgende heelgetalle is.
 - (i) Bepaal 'n vereenvoudigde uitdrukking vir die som van hierdie vyf opeenvolgende heelgetalle.
 - (ii) As die gemiddelde van hierdie vyf opeenvolgende heelgetalle 'n onewe heelgetal is, verduidelik waarom n 'n onewe heelgetal moet wees.
 - (c) Ses opeenvolgende heelgetalle kan as $n, n + 1, n + 2, n + 3, n + 4, n + 5$, waar n 'n heelgetal is, verteenwoordig word. Verduidelik waarom die gemiddelde van ses opeenvolgende heelgetalle nooit 'n heelgetal is nie.