

**2009 COWBELL NATIONAL  
SECONDARY SCHOOLS  
MATHEMATICS COMPETITION**



**DATE:**

MONDAY , MAY 18, 2009

**TIME:**

10.00AM

**VENUE:**

AIRPORT HOTEL, IKEJA, LAGOS.

**EXAMINATION DURATION:**

1 HOUR

**INSTRUCTIONS**

1. THIS PAPER IS IN TWO PARTS (I & II).
2. ANSWER ALL QUESTIONS IN BOTH PARTS.
3. USE HB PENCIL THROUGHOUT FOR THE MULTIPLE CHOICE QUESTIONS.
4. THE USE OF CALCULATOR IS NOT ALLOWED.
5. SHADE THE CORRECT OPTION IN THE SPACE PROVIDED IN THE ANSWER SHEET.
6. PLEASE WRITE YOUR NAMES IN CAPITAL LETTERS.
7. CANDIDATES WHO DO NOT SHADE THEIR CORRECT CATEGORIES WILL BE DISQUALIFIED.
8. EACH MULTIPLE CHOICE QUESTION ATTRACTS 1 MARK
9. PART II ATTRACTS 50 MARKS.

**JUNIOR CATEGORY**

Use this information to answer questions 1, 2, and 3.

A father and his son are walking through the beach. The father's foot prints are 5 metres apart, the son's footprints are 4 metres apart.

If the son steps in the father's first foot print,

1. how many steps will his son take before the prints match again?  
A. 3 B. 4 C. 5 D. 6 E. 7
2. how many steps will the father take before the prints match again?  
A. 3 B. 4 C. 5 D. 6 E. 7
3. What is the distance between the first and the third matching prints.  
A. 20m B. 24m C. 30m D. 40m E. 44m
4. Light travels at a speed of  $3.0 \times 10^8$  metres per second. If the distance from Earth to the Sun is approximately  $1.5 \times 10^8$  km, how long does it take the sun's light to reach the Earth?  
A. 5minutes B. 6minutes  
C. 6 minutes 10 seconds  
D. 7 minutes 25 seconds  
E. 8 minutes 20 seconds
5. The wing-span of a Boeing 747 is 59.6m. A model of the aircraft has a wing-span of 29.8cm. To what scale was the model made?  
A. 2:3 B. 1:50 C. 1: 100 D. 1:200  
E. 1: 250
6. The number of diagonals  $D$  of a polygon with  $n$  sides is given by the formula:  $D = \frac{1}{2}n(n-3)$ . Find  $n$  if  $D = 20$   
A. 4 B. 6 C. 8 D. 10 E. 12
7. One side of a rectangle is 3cm longer than the other side. The area is twice its perimeter. Find the length of the longer side to the nearest whole cm.  
A. 6cm B. 8cm C. 10cm D. 12cm E. 14cm
8. The average of fifty -seven numbers is 85. What number must be added to increase this to 87?  
A. 56 B. 89. C. 114. D. 172 E. 201
9. In how many ways can 16 be expressed as a product of two factors?  
A. 1 B. 2 C. 3 D. 4 E. 8
10. Three lighthouses flash at intervals of 6 minutes, 10 minutes and 12 minutes. They flash together at 10.30am. When next will they flash together again?  
A. 11.30am B. 11.45am C. 11.50am  
D. 12.30p.m E. 12.40pm
11. By how much is 3.5074 corrected to 2 decimal places greater than correcting same number to 3 decimal places?  
A. 0.001 B. 0.02 C. 0.002 D. 0.3  
E. 0.003
12. A right prism of length 10cm has as its cross section an equilateral triangle of side 6cm. Find its volume.  
A.  $48\text{cm}^3$  B.  $74\text{cm}^3$  C.  $86\text{cm}^3$   
D.  $156\text{cm}^3$  E.  $180\text{cm}^3$
13. If the four interior angles of a quadrilateral are  $(x+10)^\circ$ ,  $(x-30)^\circ$ ,  $(2x-45)^\circ$  and  $(x+15)^\circ$ , then  $x$  is  
A.  $125^\circ$  B.  $82^\circ$  C.  $135^\circ$  D.  $105^\circ$  E.  $60^\circ$
14. A square cardboard is taped at the perimeter by a piece of ribbon 20cm long. What is the area of the cardboard?  
A.  $20\text{cm}^2$  B.  $25\text{cm}^2$  C.  $36\text{cm}^2$   
D.  $100\text{cm}^2$  E.  $16\text{cm}^2$ .
15. For the set of numbers 2, 3, 5, 6, 7, 7, 8  
A. the median is greater than the mode  
B. the mean is greater than the mode  
C. the mean is greater than the median  
D. the median is equal to the mean  
E. the mean is less than the median
16. The difference between the length and width of a rectangle is 6cm and the area is  $135\text{cm}^2$ . What is the length?  
A. 25cm B. 18cm C. 15cm  
D. 24cm E. 27cm

17. The volume of a sphere is  $280\text{cm}^3$ . What is its radius to the nearest whole number?  
A. 2cm B. 3cm C. 4cm D. 5cm E. 6cm
18. What is the size of an exterior angle of a regular pentagon?  
A.  $36^\circ$  B.  $60^\circ$  C.  $72^\circ$  D.  $120^\circ$  E.  $360^\circ$
19. A side of a rhombus is 2cm in length. An angle of the rhombus is  $60^\circ$ . What is the length of the diagonal facing this angle?  
A. 2cm B. 4cm C. 8cm  
D. 12cm E. 16cm
20. A variable  $y$  is inversely proportional to  $x^2$ , when  $y = 10$ ,  $x = 2$ . What is  $y$  when  $x = 10$ ?  
A. 2 B. 4 C. 100 D. 0.4 E. 0.1
21. Wale gives one third of his money to Biola who had N105.00. He then finds that his money is reduced to one-fourth of what Biola now has. Find how much money Wale had at first.  
A. N45.00 B. N48.00 C. N52.00  
D. N58.00 E. N60.0
22. A girl walks 45 metres in the direction  $050^\circ$  from a point Q to a point X. She then walks 24 metres in the direction  $140^\circ$  from X to a point Y. How far is she then from Q?  
A. 4m B. 7cm C. 51m D. 21m E. 18m
23. Reduce each number to two significant figures and then evaluate  $(0.021741 \times 1.2047) / 0.023789$ .  
A. 0.8 B. 0.9 C. 1.1 D. 1.2 E. 2.1
24. Three angles of a nonagon are equal and the sum of six other angles is  $1110^\circ$ . Calculate the size of one of the equal angles.  
A.  $210^\circ$  B.  $150^\circ$  C.  $105^\circ$  D.  $50^\circ$  E.  $48^\circ$
25. Find the probability of selecting a figure which is a parallelogram from a square, a rectangle, a rhombus, a kite and a trapezium.  
A.  $3/5$  B.  $2/5$  C.  $4/5$  D.  $1/5$  E. 1
26. If  $x$  is the addition of the prime numbers between 1 and 6, and  $y$  the H.C.F of 6, 9, 15, find the product of  $x$  and  $y$ .  
A. 27 B. 30 C. 33 D. 90 E. 110
27. A box contains green, black and blue balls in the ratio 5:2:1. If there are 10 blue balls, find the corresponding new ratio when 10 green and 10 black balls are removed from the box?  
A. 1:1:1 B. 4:1:1 C. 4:2:1  
D. 5:1:1 E. 3:1:2
28. In a class of 150 students, the sector in a pie chart representing the students offering statistics has angle  $12^\circ$ . How many students are offering statistics to the nearest whole number.  
A. 4 B. 5 C. 10 D. 15 E. 18
29. If  $a$  and  $b$  represent the mean and the median respectively of the following set of numbers 11, 12, 13, 14, 15, 16, 17, 18, 19, 21. Find  $a/b$  correct to one decimal place.  
A. 1.0 B. 1.1 C. 1.2 D. 1.4 E. 1.6
30. What is the difference between 0.007685 correct to three significant figures and 0.007685 correct to four places of decimal?  
A.  $10^{-5}$  B.  $2.1 \times 10^{-4}$  C.  $8 \times 10^{-5}$   
D.  $10^{-6}$  E.  $10^{-4}$
31. A Square tile has side 30cm. How many of these tiles will cover a rectangular floor of length 7.2m and width 4.2m?  
A. 326 B. 336 C. 420 D. 576 E. 720
32. Find the gradient of the line passing through the points  $(-2, 0)$  and  $(0, -4)$ .  
A. 1 B. -2 C. 2 D. 4 E. -4
33. Express in standard form  $\frac{0.0275 \times 10^5}{0.25 \times 10^{-3}}$   
A.  $1.1 \times 10^5$  B.  $1.1 \times 10^7$  C.  $1.1 \times 10^8$   
D.  $1.1 \times 10^9$  E.  $1.1 \times 10^6$

34. If  $-2x + 6 > 4$  then  $x$  is  
 A. less than  $-1$  B. greater than  $-1$   
 C. greater than  $1$  D. less than  $1$  E. equal to  $1$

35. If  $532 - 264 = 235$ , find the base of the numbers.  
 A. 7 B. 8 C. 9 D. 10 E. 12

36. What number is one half of one quarter of one tenth of  $800$ ?  
 A. 2 B. 5 C. 8 D. 10 E. 20

37. Ade is facing South-East. He turns  $180^\circ$  in the clockwise direction. Which direction is he facing now?  
 A. East B. West C. North  
 D. South-West E. North-West

38. A girl calculated the mean of 5 numbers as  $45.3$ . While cross-checking, she discovered that her total was short by  $20.5$ . What is the correct mean of the 5 numbers?  
 A. 45.8 B. 47.4 C. 49.4 D. 50.8  
 E. 52.4

39. Mrs. Ojo deposits N3,000 into a bank which pays interest at  $15\%$  compounded yearly. What will the deposit amount to in 5 years?  
 A. N6034 B. N5620 C. N5024  
 D. N4360 E. N4006

40. Make  $y$  the subject of the formula

$$r = \frac{x - y}{s}$$

- A.  $y = x - rs$  B.  $y = x + rs$   
 C.  $y = xr - s$  D.  $y = xr + s$   
 E.  $y = r + xs$
41.  $x$  varies partly as  $y$  and partly as  $y^2$ . When  $y = 4$ ,  $x = 52.8$  and when  $y = 5$ ,  $x = 81$ . Find  $x$  when  $y = 6$  to the nearest whole number.  
 A. 76 B. 94 C. 100 D. 105 E. 115
42. The length of a side of a rhombus is  $5\text{cm}$ . One of its diagonals is  $8\text{cm}$  long. What is the area of the rhombus in  $\text{cm}^2$ ?  
 A. 20 B. 24 C. 30 D. 40 E. 48

43. Which one of the following statements is false?  
 A. All rhombuses are parallelograms.  
 B. All trapeziums are parallelograms.  
 C. All squares are kites.  
 D. All squares are rectangles.  
 E. All rectangles are trapeziums.

44. The sum of 4 of the angles of a heptagon is  $600^\circ$ . The other 3 angles are of the size  $4x^\circ$ ,  $5x^\circ$ , and  $6x^\circ$ . Find the value of  $x$ .  
 A.  $15^\circ$  B.  $20^\circ$  C.  $30^\circ$  D.  $300^\circ$  E.  $900^\circ$

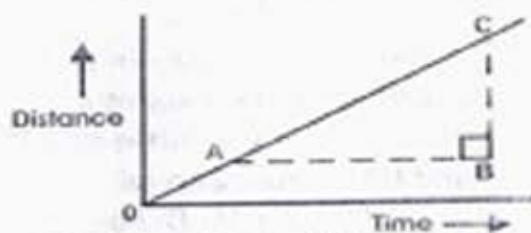
45. Simplify  $(a + (-a)) + b$   
 A.  $2b$  B.  $b$  C.  $2a$  D.  $2a - b$  E.  $2a + b$

46. Solve the equation  
 $\frac{3x - 2}{6} - \frac{2x + 7}{9} = 0$   
 A. 1 B. 2 C. 3 D. 4 E. 6

47.  $\frac{1}{5}$  of an even number added to  $\frac{1}{6}$  of the next even number makes a total of  $15$ . Find the two numbers.  
 A. 30, 32 B. 34, 36 C. 38, 40  
 D. 40, 42 E. 42, 44

48. It has rained on 5th June 18 times in the last 20 years. What is the probability that it will rain on 5th June next year?  
 A.  $\frac{1}{10}$  B.  $\frac{2}{5}$  C.  $\frac{3}{10}$   
 D.  $\frac{7}{10}$  E.  $\frac{9}{10}$

49. The probability of making at least one mistake in this maths competition is  $\frac{3}{10}$ . What is the probability that all is correct?  
 A. 0 B. 1 C.  $\frac{1}{2}$  D.  $\frac{2}{5}$  E.  $\frac{7}{10}$



50. From the above distance-time graph of a car, what does the value  $\frac{BC}{AB}$  represent?  
 A. time taken by the car.  
 B. the distance the car travels  
 C. the average speed of the car.  
 D. the time the car was not moving.  
 E. the distance between A and C