TAIDOB COLLEGE

# PRE-UTME PREPARATORY ASSESSMENT

Mathematics

1. In base ten, the number 101101(base 2 ) equals
   A. 15
   B. 4
   C. 45.
   D. 32
   E. 90
2. Calculate the distance between the points (6, 6) and (0, -1).
   A. $\sqrt{61}$
   B. $\sqrt{72}$
   C. $\sqrt{75}$
   D. $\sqrt{85}$
   E. $\sqrt{27}$
3. The number 25 when converted from the tens and units base to binary base (base two) is one of the following
   A. 10011
   B. 1111011
   C. 111000
   D. 11001
   E. 110011
4. The currency used in a country is called "matimalik" (M) and is base seven. A lady in the country bought 4 bags of rice at ₦56 per bag and 3 tins milk at M4per tin .what is the total cost of the items she bought?
   A. ~~M~~$245_{(7)}$
   B. M $242_{(7)}$
   C. ~~M~~ $236_{(7)}$
   D. M$341_{(7)}$
   E. ~~M~~ $338_{(7)}$
5. Find X if $(x_{base\ 4})^2$=$100100_{base2}$
   A. 6 B.
   B. 12 C.
   C. 100 D.
   D. 210
   E. E.10042
6. The angle of elevation of a point X on a hill from a point Y in the valley below is $42^0$. What is the angle of depression of Y from X?
   A. $0^0$
   B. $38^0$
   C. $42^0$
   D. $48^0$
   E. $82^0$
7. A trader in a country where their currency 'MONT' (M) is in base five bought $103_{(5)}$ oranges at $M14_{(5)}$each .If he sold the oranges at $M24_{(5)}$each, what will be his gain ?
   A. $M103_{(5)}$
   B. $MJ030_{(5)}$
   C. $M102_{(5)}$
   D. $M2002_{(5)}$
   E. $M3032_{(5)}$
8. In the equation below, solve for X If all the numbers are in base2? $\frac{11}{x} = \frac{1000}{(+101)}$
   A. 101

B. 11
C. 110
D. 111
E. 10

9. Evaluate :$(212)_3 - (121)_3 + (222)_3$
   A. $(313)_3$
   B. $(1000)_3$
   C. $(1020)_3$
   D. $(1222)_3$
   E. $(122)_3$
10. Covert 241 in base 5 to base 8
   A. $71_8$
   B. $107_8$
   C. $176_8$
   D. $241_8$
   E. $421_8$
11. If 22547 is the result of subtracting 4577 from 7056 in base n, find n.
   A. 8
   B. 9
   C. 10
   D. 11
   E. 12
12. Find n if 34n =$10011_2$
   A. 5
   B. 6
   C. 7
   D. 8
   E. 9
13. Find the coordinate of the midpoint of x and y intercepts of the line 2y = 4x – 8.
   A. (1, -2)
   B. (2, 0)
   C. (-1, -2)
   D. (1, 2)
   E. (0, 0)
14. If $(1PO3)_4$= $(115)_{10}$, find P.
   A. 0
   B. 1
   C. 2
   D. 3
   E. 4
15. If $1011_2 + x_7$,= $25_{10}$ solve for X
   A. 14
   B. 20
   C. 24
   D. 25
   E. 52
16. If $2_9$ x $(Y3)_9$= $3_5$ x $(Y3)_5$. Find the value of y
   A. 4
   B. 3
   C. 2

D. 1
E. 5

17. Find the value of $\alpha$ if the line 2y - $\alpha x$ + 4 = 0 is perpendicular to the line y + $\frac{1}{4}x$ – 7 = 0
    A. 8
    B. 4
    C. -4
    D. -8
    E. 9
18. If $P344_6$ - $23P2_6$=$2PP2_6$, find the value of digit P.
    A. 5
    B. 4
    C. 3
    D. 2
    E. 1
19. Simplify : $213_4$ x $23_4$
    A. $10321_4$
    B. $12231_4$
    C. $13221_4$
    D. $10311_4$
    E. $10003_4$
20. A straight line passes through the points (5, 3) and (1, 4). Find its gradient
    A. -4.00
    B. -2.00
    C. -1.60
    D. -0.25
    E. 4.00
21. The number of telephone calls N between two cities A and B varies directly and inversely as the population PA ,PB, in a A and B respectively and inversely as the square of the distance D between A and B. which of the following equations represents this relation?
    A. N = $\frac{KP_A}{D^2} + \frac{CP_B}{D^2}$
    B. $\frac{KP_A P_B}{D^2}$
    C. $N = KDP_AP_A$
    D. $N = KDP_A + CDP_B$
    E. N =$KD^2P_AP_B$
22. X is directly proportional to y and inversely proportional to z. If x = 9 when y =24 and z = 8, what is the value of x when y + 5 and z = 6?
    A. $\frac{5}{6}$
    B. 11
    C. $3\frac{3}{5}$
    D. $2\frac{1}{2}$
    E. $1\frac{1}{5}$
23. If x varies inversely as y , and y varies directly as the square root of z and z varies directly as $\frac{1}{w^2}$ ,write down in words how x varies with W .
    A. x varies inversely as $w^2$
    B. x varies directly as $w^2$
    C. x varies directly as w
    D. x varies inversely as w
    E. x varies directly as square root of $w^2$

24. If x varies inversely as y and y varies directly as the square of t and x = 1 when t=3 .find x when t = $\frac{1}{3}$
    A. 81
    B. 27
    C. $\frac{1}{9}$
    D. $\frac{1}{27}$
    E. $\frac{1}{81}$

25. Solve for x ,if $\frac{2}{\frac{x}{\frac{1}{p^2}+\frac{1}{q^2}}}$ =m
    A. $\frac{2pq}{m(p+q)}$
    B. $\frac{2p^2q^2}{2(p^2+q^2)}$
    C. $\frac{4pq}{m}$
    D. $\frac{2}{m(p^2+q^2)}$
    E. $\frac{2}{m(p^2-q^2)}$

26. If M represents the median and D the mode of the measurements 5, 9, 3, 5, 8 then (M,D) is
    A. (6,5)
    B. (5,8)
    C. (5,7)
    D. (5,5)
    E. (7,5)

27. A construction company is owned by two partners X and Y and it is agreed that their profit will be divided inthe ratio 4:5. at the end of the year. Y received #5,000 more than x. What is the total profit of the company for the year?
    A. #20,000.00
    B. #25,000.00
    C. #30,000.00
    D. #15,000.00
    E. #45,000.00

28. Find the equation of the line joining the points (0, 0) and (2, 4).
    A. y = 2x
    B. y = x + 2
    C. y = x
    D. y = ¼ x
    E. y = 4x

29. The line y = mx + 4 passes through the points (-5, -6). Find the value of m.
    A. -2
    B. 2
    C. -1/2
    D. 3/2
    E. 3

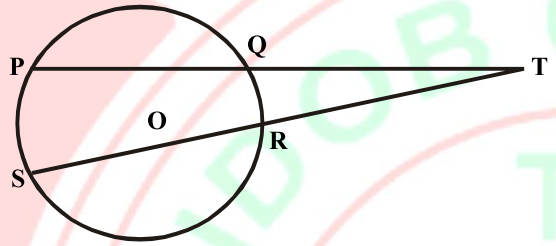
30. A geometric progression (G.P) has 9 terms. If its first term and the last terms are 0.3 and 76.8 respectively, find the common ratio.
    A. 0.2
    B. 1.5
    C. 2.0
    D. 4.0
    E. 3.0

31. Find the sum of the sequence -5, -1, 3, ……., 115.

A. 1705
B. 1650
C. 1112
D. 1031
E. 1123

32. A glass cylinder has a curved surface area of 440 $cm^2$. If the diameter of the glass is 10 cm, calculate its height. (Take $\pi = 22/7$).
A. 20 cm
B. 28 cm
C. 48 cm
D. 56 cm
E. 29 cm

33. In the diagram below, PQ and RS are chords of a circle centre O which meet at T outside the circle. If TP = 24cm, TQ = 8cm and TS = 12cm, find TR.




A. 16cm
B. 14cm
C. 12cm
D. 8cm
E. 6 cm

34. The angle of elevation of the top of a vertical tower 50 metres high from a point X on the ground is $30^0$. From a point Y on the opposite side of the tower, the angle of elevation of the top of the tower is $60^0$. find the distance between the points X and Y.

A. 14.43 m B. 57.73 m
C. 101.03 m D. 115.47 m E. 100.5 m

35. An arc of circle of radius 6cm is 8cm long. Find the area of the sector.
A. $5^1/$ $cm^2$ B. $24cm^2$
C. $36cm^2$ D. $48cm^2$

3

36. A girl walks 45 metres in the direction $050^0$ from a point Q to a point X. She then walks 24metres in the direction $140^0$ from X to a point Y. How far is she then from Q?

A. 69 m B. 57 m C. 51m D. 21m E. 31 m

37. Calculate the surface area of a sphere of radius 4 cm, correct to 1 decimal place.

A. 16.8 $cm^2$ B. 50.2 $cm^2$ C. 50.3 $cm^2$ D. 67.1 $cm^2$ E. 32.5 $cm^2$

38. From two points X and Y, 8m apart, and in line with a pole, the angle of elevation of the top of the pole are $30^0$ and $60^0$ respectively. Find the height of the pole, assuming that X, Y and the foot of the pole are on the same horizontal plane.
A. 4m B. $8\sqrt{3}/2$m C. $4\sqrt{3}$m D. $8\sqrt{3}$m E. 12 m

39. A room is 12m long. 9m wide and 8m high. Find the cosine of the angle which a diagonal of the room makes with the floor of the room
A. 15/17 B. 8/17 C. 8/15 D. 12/17 E. 3/4

40. What is the circumference of radius of the earth?
A. R cos q B. 2p R cos q
C. R sin q D. 2p R sin q E. R tan q

41. The base of a pyramid is a square of side 8cm. If its vertex is directly above the centre, find the height, given that the edge is 4.3cm.
A. 6cm B. 5cm
C. 4cm D. 3cm E. 2 cm

42. What is the locus of the mid-points of all chords of length 6cm within a circle of radius 5cm and with centre O?
A. A circle of radius 4cm and with centre O.
B. The perpendicular bisector of the chords
C. A straight line passing through center O
D. A circle of radius 6cm and with centre O
E. All of the above

43. Taking the period of daylight on a certain day to be from 5.30a.m to 7.00p.m, calculate the period of daylight and of darkness on that day
A. $187^0 30' 172^0 30'$ B. $135^0 225'$
C. $202^0 30' 157^0 30'$ D. $195^0 165'$ E. $125^0$

44. The goals scored by 40 football teams from three league divisions are recorded below

| Number of goals | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|---|
| Frequency | 4 | 3 | 15 | 16 | 1 | 0 | 1 |

What is the total number of goals scored by all the teams?
A. 21 B. 40
C. 91 D. 96 E. 85

45. The numbers 3,2,8,5,7,12,9 and 14 are the marks scored by a group of students in a class test. If P is the mean and Q the median then P + Q is
A. 18 B. 17½
C. 16 D. 15

46. Below are the scores of a group of students in a music test

| Scores | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|
| No . of students | 3 | 6 | 10 | 8 | 6 | 5 | 2 | 4 | 12 |

If CF(x) is the number of students with scores less than or equal to x, find CF(6)
A. 40 B. 38 C. 33 D. 5

47. M and N are two subsets of the universal set (U). If n(U) = 48, n(M) = 20, n(N) = 30 and n(M U N) = 40, find $n(M \cap N)^1$.
A. 18 B. 20 C. 30 D. 38

48. A ship sails from a port Q on a bearing of $315^0$ to port P. If P is 8 km West of O, and O is due North of Q, calculate /PQ/.
A. 5.66 km B. 8.00 km C. 10.00km D. 11.31km

49. If $\tan y = \frac{8}{15}$ $and$ $0^0 < y < 90^0$, find the value of cos y.
A. 15/17 B. 13/15 C. 13/17 D. 7/15 E. 9/10

50. From the top of a building 10m high, the angle of depression of a stone lying on the horizontal ground is $60^0$. Calculate, correct to 1 decimal place, the distance of the stone from the foot of the building.
A. 3.6m B. 3.8m C. 6.0m D. 9.3m E. 26.1m