1 Problems public WAEC math 2020 By cheetahwaec.com

Problem 1

Evaluate and correct to two decimal places: 75.0785-34.624+9.83. Possible answers: A. 30.60;B. 50.29:C. 50.28:D. 30.63

Problem 2

If $X = \{x : x < 7\}$ and $Y = \{y : y \text{ is a factor of } 24\}$ are subsets of $\mu = \{1, 2, 3 \dots 10\}$, find $X \cap Y$. Possible answers: A. {2, 3, 4, 6}; B. {1, 2, 3, 4, 6}; C. {2, 3, 4, 6, 8}; D. {1, 2, 3, 4, 6, 8}

Problem 3

Simplify $\left[\left(\frac{16}{9}\right)^{-\frac{3}{2}} \times 16^{-\frac{3}{4}}\right]^{\frac{1}{3}}$. Possible answers: A. $\frac{3}{4}$; B. $\frac{9}{16}$; C. $\frac{3}{8}$; D. $\frac{1}{4}$

Problem 4

Express $1 + 2log_{10}3$ in the form of $log_{10}x$. Possible answers: A. $log_{10}90$; B. $log_{10}19$; C. $log_{10}9$; D. $log_{10}6$

Problem 5

If $101_{two} + 21_{y} = 33_{five}$, find the value of y. Possible answers: A. 8;B. 7;C. 6;D. 5

Problem 6

An amount of N 550,000.00 was realized when a principal, x was saved at 2% simple interest for 5 years. Find the value of x. Possible answers: A. N470, 000.00;B. N480, 000.00;C. N490, 000.00;D. N500,000.00

Problem 7

Given that $\frac{\sqrt{3}+\sqrt{5}}{\sqrt{5}} = x + y\sqrt{15}$, find the value of (x+y). Possible answers: A. $1\frac{3}{5}$; B. $1\frac{2}{5}$; C. $1\frac{1}{5}$; D.

Problem 8

Problem 8 If x = 3 and y = -1, evaluate $2(x^2 - y^3)$. Possible answers: A. 24;B. 22;C. 20;D. 16 Problem 9

Solve 3x - 2y = 10 and x + 3y = 7 simultaneously. Possible answers: A. x = -4 and y = 1;B. x = -1 and y = -4; C. x = 1 and y = 4; D. x = 4 and y = 1

Problem 10

The implication $x \to y$ is equivalent to? Possible answers: A. $\sim y \to \sim x; B. y \to \sim x; C.$ $\sim x \rightarrow \sim y; D. y \rightarrow x$

Problem 11

The first term of a geometric progression is 3 and the 5th term is 48. Find the common ratio. Possible answers: A. 2;B. 4;C. 8;D. 16

Problem 12

Solve $\frac{1}{3}(5-3x) < \frac{2}{5}(3-7x)$. Possible answers: A. $x > \frac{7}{22}$; B. $x < \frac{7}{22}$; C. $x > -\frac{7}{27}$; D. $x < -\frac{7}{27}$; Problem 13

Make *m* the subject of the relation $k = \sqrt{\frac{m-y}{m+1}}$. Possible answers: A. $m = \frac{y+k^2}{k^2+1}$; B. $m = \frac{y+k^2}{1-k^2}$; C. $m = \frac{y-k^2}{k^2+1}$;D. $m = \frac{y-k^2}{1-k^2}$ Problem 14

Find the quadratic equation whose roots are $\frac{1}{2}$ and $-\frac{1}{3}$. Possible answers: A. $3x^2 + x + 1 = 0$;B. $6x^2 + x - 1 = 0$;C. $3x^2 + x - 1 = 0$;D. $6x^2 - x - 1 = 0$ Problem 15

Given that x is directly proportional to y and inversely proportional to z, x = 15 when y = 10and z = 4, find the equation connecting x, y and z. Possible answers: A. $x = \frac{6y}{z}$; B. $x = \frac{12y}{z}$; C. $x = \frac{3y}{z}$; D. $x = \frac{3y}{2z}$

Problem 16

Two buses start from the same station at 9.00 am and travel in opposite directions along the

same straight road. The first bus travel at a speed of 72 km/h and the second at 48 km/h. At what time will they be 240 km apart? Possible answers: A. 1:00 pm; B. 12:00 noon; C.11:00 am;D. 10:00 am

Problem 17

A solid cuboid has a length of 7 cm, a width of 5 cm, and a height of 4 cm. Calculate its total surface area. Possible answers: A. 280 cm²;B. 166 cm²;C. 140 cm²;D. 83 cm² Problem 18



In the diagram, PQ||SR. Find the value of x. Possible answers: A. 34;B. 46;C. 57;D. 68 Problem 19

Find the equation of the line parallel to 2y = 3(x - 2) and passes through the point (2,3). Possible answers: A. $y = \frac{2}{3}x - 3$; B. $y = \frac{2}{3}x - 2$; C. $y = \frac{3}{2}x$; D. $y = -\frac{2}{3}x$ Problem 20

Problem 20

The expression $\frac{5x+3}{6x(x+1)}$ will be undefined when x equals:. Possible answers: A. $\{0,1\}$; B. $\{0,-1\}$; C. $\{-3, -11\}; D. \{-3, 0\}$

Problem 21

A man is five times as old as his son. In four years' time, the product of their ages would be 340. If the son's age is y, express the product of their ages in terms of y. Possible answers: A. $5y^2 - 16y - 380 = 0$; B. $5y^2 - 24y - 380 = 0$; C. $5y^2 - 16y - 330 = 0$; D. $5y^2 + 24y - 324 = 0$ Problem 22

Simplify $\frac{a}{b} - \frac{b}{a} - \frac{c}{b}$. Possible answers: A. $\frac{a-b+c}{ab}$; B. $\frac{ab-bc-ac}{ab}$; C. $\frac{a2-b2+ac}{ab}$; D. $\frac{a2-b2-ac}{ab}$; Problem 23



In the diagram, XYZ is an equilateral triangle of side 6 cm and Y is the midpoint of XY. Find tan($\angle XZT$). Possible answers: A. $\frac{1}{\sqrt{3}}$; B. $\frac{\sqrt{3}}{2}$; C. $\sqrt{3}$; D. $\frac{1}{2}$ Problem 24

A fence 2.4 *m* tall, is 10 *m* away from a tree of height 16 *m*. Calculate the angle of elevation of the top of the tree from the top of the fence. Possible answers: A. 76.11°; B. 53.67°; C. 52.40°; D. 51.32°

Problem 25

Fati buys milk at x per tin sells each at a profit of y. If she sells 10 tins of milk, how much does she receives from the sales? Possible answers: A.(xy + 10);B. (x + 10y);C. (10x + y);D. 10(x + y)

Problem 26

If $\tan y$ is positive and $\sin y$ is negative, in which quadrant would y lie? Possible answers: A. First and third only;B. First and second only;C. Third only;D. Second only

Problem 27

The dimension of a rectangular base of a right pyramid is 9 cm by 5 cm. If the volume of the pyramid is 105 cm^3 , how high is the pyramid? Possible answers: A. 10 cm;B. 6 cm;C. 8 cm;D. 7 cm

Problem 28

Each interior angle of a regular polygon is 168° . Find the number of sides of the polygon. Possible answers: A. 30;B. 36;C. 24;D. 18

Problem 29

M



In the diagram, $\overline{MN} || \overline{PQ}, \angle MNP = 2x$, and $\angle NPQ = (3x - 50)^{\circ}$. Find the value of $\angle NPQ$. Possible answers: A. 200°;B. 100°;C. 120°;D. 90°

Problem 30

The length of an arc of a circle of radius 3.5 cm is $1\frac{19}{36}$ cm. Calculate, correct to the nearest degree, the angle substended by the centre of the circle. [Take $\pi = \frac{22}{7}$] Possible answers: A. 55°;B. 36°;C. 25°;D. 22°

Problem 31



In the diagram, PU||SR, PS||TR, QS||UR, $|UR| = 15 \ cm$, $|SR| = 8 \ cm$, $|PS| = 10 \ cm$ and the area of the triangle SUR is $24 \ cm^2$. Calculate the area of PTRS. Possible answers: A. $40 \ cm^2$;B. $48 \ cm^2$;C. $80 \ cm^2$;D. $120 \ cm^2$ **Problem 32**



In the diagram, there is a circle with center O. If $\angle OPQ = 48^\circ$, find the value of m. Possible answers: A. 96°;B. 90°;C. 68°;D. 42°



The pie chart shows the population of men, women, and children in a city. If the population of the city is 1,800,000, how many men are in the city? Possible answers: A. 845,000;B. 600,000;C. 355,000;D. 250,000

Problem 34

The mean of the numbers 15, 21, 17, 26, 18 and 29 is 21. Calculate the standard deviation. Possible answers: A. 9;B. 6;C. 5;D. 0

Problem 35

Find the sum of the interior angle of a pentagon. Possible answers: A. $340^\circ; B.~350^\circ; C.~540^\circ; D.~550^\circ;$

Problem 36

The diameter of a sphere is 12*cm*. Calculate, correct of the nearest cm³, the volume of the sphere. [Take $\pi = \frac{22}{7}$] Possible answers: A. 903 cm³;B. 904 cm³;C. 905 cm³;D. 906 cm³ **Problem 37**

A box contains 12 identical balls of which 5 are red, 4 blue, and the rest are green. If a ball is selected at random from the box, what is the probability that it is green? Possible answers: A. $\frac{3}{4}$; B. $\frac{1}{2}$; C. $\frac{1}{3}$; D. $\frac{1}{4}$

Problem 38

A box contains 12 identical balls of which 5 are red, 4 blue, and the rest are green. If two balls are selected at random one after the other with replacement, what is the probability that both are red? Possible answers: A. $\frac{25}{144}$; B. $\frac{5}{33}$; C. $\frac{5}{6}$; D. $\frac{103}{132}$

Problem 39



In the diagram, PQ is a straight line. If $m = \frac{1}{2}(x + y + z)$, find value of m. Possible answers: A. 45°;B. 60°;C. 90°;D. 100°



The points on a linear graph are as shown in the table. Find the gradient (slope) of the line. Possible answers: A. $2\frac{1}{2}$;B. 2;C. 1;D. $\frac{1}{2}$

Problem 41



In the diagram below, O is the center of the circle. PQ and RS are tangents to the circle. Find the value of $(m + n)^{\circ}$. Possible answers: A. 120°;B. 90°;C. 75°;D. 60° **Problem 42** Which of the following is not a sufficient condition for two triangles to be congruent? Possible answers: A. AAS;B. SSS;C. SAS;D. SSA

Problem 43

A woman received a discount of 20% on a piece of cloth she purchased from a shop. If she paid \$525.00, what was the original price? Possible answers: A. \$675.25;B. \$660.25;C. \$656.25;D. \$616.25

Problem 44

The interquartile range of distribution is 7. If the 25th percentile is 16, find the upper quartile. Possible answers: A. 35;B. 30;C. 23;D. 9

Problem 45



The graph of the equations y = 2x + 5 and y = 2x2 + x - 1 are shown. Use the information above to find the points of intersection of the two graphs. Possible answers: A. (2.0, 9.0) and (-1.5, 2.0);B. (2.0, 8.5) and (-1.5, 2.0);C. (2.0, 8.0) and (-1.5, 2.5);D. (2.0, 7.5) and (-1.5, 2.5) **Problem 46**



The graph of the equations y = 2x+5 and $y = 2x^2 + x - 1$ are shown. Use the information above to answer this question. If x = -2.5, what is the value of y on the curve? Possible answers: A. y = 8.0;B. y = 8.5;C. y = 9.0;D. y = 9.5

Problem 47

If (x+2) is a factor of $x^2 + px - 10$, find the value of p. Possible answers: A. 3;B. -3;C. 7;D. -7 **Problem 48**



In the diagram, O is the centre of the circle. If $\angle NLM = 74^{\circ}$, $\angle LMN = 39^{\circ}$ and $\angle LOM = x$, find the value of x. Possible answers: A. 134° ; B. 126° ; C. 113° ; D. 106°

Problem 49

Find the least value of x which satisfies the equation $4x = 7 \pmod{9}$. Possible answers: A. 7;B. 6;C. 5;D. 4

Problem 50

(a) If $A = \{ \text{ multiples of } 2 \}, B = \{ \text{ multiples of } 3 \}$ and $C = \{ \text{ factors of } 6 \}$ are subsets of $\mu = \{x : 1 \le x \le 10\}, \text{ find } A' \cap B' \cap C'. \text{ (b) Tickets for a movie premiere cost $18.50 each while}$ the bulk purchase price for 5 tickets is \$80.00. If 4 gentlemen decide to get a fifth person to join them so that they can share the bulk purchase price equally, how much would each person save?

Problem 51 (a) Given that $P = \left(\frac{rk}{Q} - ms\right)^{\frac{2}{3}}$, (i) make Q the subject of the relation, represent the answer as $Q = \frac{rk}{p^{\frac{6}{5}} + cms}$, write the answer as a, b, c, where a, b, c are integers. (ii) find, correct to two decimal places, the value of Q when P = 3, m = 15, s = 0.2, k = 4 and 10

r = 10.

(b) Given that $\frac{x+2y}{5} = x - 2y$, find x : y.

Problem 52



A. In the diagram, O is the centre of the circle, |BC| = |CD| and $\angle BCD = 108^{\circ}$. Find $\angle CDE$. B. Given that $\tan x = \sqrt{3}, 0^{\circ} \le x \le 90^{\circ}$, evaluate $\frac{(\cos x)^2 - \sin x}{(\sin x)^2 + \cos x}$. Represent the answer as $\frac{a+b\sqrt{3}}{c}$, where a, b, c are integers, write down the answer as a, b, c.

Problem 53

The total surface area of a cone of slant height $L \ cm$ and base radius $R \ cm$ is $224\pi \ cm^2$. If R: L = 2:5, find: A. Correct to one decimal place, the value of R. B. Correct to the nearest whole number, the volume of the cone. [Take $\pi = \frac{22}{7}$]

Problem 54

A die was rolled a number of times. The outcomes are as shown in the table.



If the probability of obtaining 2 is 0.15, find: A. The value of m. B. The number of times the die was rolled. C. The probability of obtaining an even number, give the answer as a decimal number.

Problem 55

I I

A. Complete the table of values for the relation $y = 3 \sin 2x$. Write the answer as a sequence of missing values for y coresponding to the values of x from 15° to 135° .

x	0°	15°	30°	45°	60°	75°	90°	105°	120°	135°	150°
У	0.0					1.5					-2.6

B. Using a scale of 2 cm to 15° on the x-axis and 2 cm to 1 unit on the y-axis, draw the graph of $y = 3 \sin 2x$ for $0^{\circ} \le x \le 150^{\circ}$.

C. Use the graph to find the truth set of: (i) $3\sin 2x + 2 = 0$; (ii) $\frac{3}{2}\sin 2x = 0.25$.

Problem 56



(a) The diagram below shows a wooden structure in the form of a cone, mounted on a hemispherical base. The vertical height of the cone is 48 m and the base radius is 14 m. Calculate, correct to three significant figures, the surface area of the structure. [Take $\pi = \frac{22}{7}$] (b) Five years ago, Musah was twice as old as Sesay. If the sum of their ages is 100, find Sesay's present age.

Problem 57

(a) Ms. Maureen spent $\frac{1}{4}$ of her monthly income at a shopping mall, $\frac{1}{3}$ at an open market and $\frac{2}{5}$ of the remaining amount at a Mechanic workshop. If she had N 225,000.00 left, find: (i) Her monthly income. (ii) The amount spent at the open market. (b) The third term of an arithmetic progression is 4m - 2n. If the ninth term of the progression is 2m - 8n, find the common difference in terms of m and n. Represent the answer as $\frac{am+bn}{c}$, where a, b, c are integers, wrire down the answer as a, b, c.

Problem 58

Two cyclists X and Y leave town Q at the same time. Cyclist X travels at the rate of 5 km/h on a bearing of 049° and cyclist Y travels at the rate of 9 km/h on a bearing of 319°. A. Illustrate the information on a diagram.

B. After travelling for two hours, calculate, correct to the nearest whole number:

- (i) the distance between cyclist X and Y.
- (ii) the bearing of cyclist X from Y.

C. If after 2 hours Y will stop and X will travel directly towards it, find the average speed at which cyclist X will get to Y in 4 hours.

Problem 59

The table below shows the distribution of marks obtained by students in an examination.

2^* Marks (%)	0-	10-	20 -	30-	40-	50-	60-	70-	80-	90-
	9	19	29	39	49	59	69	79	89	99
								•	Į.	
Frequency	7	11	17	20	29	34	30	25	21	6
			ı				1	1	1	

A. Construct a cumulative frequency table for the distribution.

B. Draw the cumulative frequency curve for the distribution.

C. Using the curve, find correct to one decimal place:

(i) the median mark, round to an integer.

(ii) the lowest mark, round to an integer, for the distinction if 5% of the students passed with distinction.

Problem 60



(a) In the diagram, there is a circle with centre O, |MN| = |NP| and $\angle OMN = 50^{\circ}$. A. Find $\angle MNP$. B. Find $\angle POQ$. (b) Find the equation of the line which has the same gradient as 8y + 4xy = 24 and passes through the point (-8, 12). Represent the answer as ay = bx + c, where a, b, c are integers, write down the answer as a, b, c.

Problem 61



A. In the diagram, AB is a tangent to the circle with centre O, and COB is a straight line. If CD||AB and $\angle ABE = 40^{\circ}$, find $\angle ODE$. B. ABCD is a parallelogram in which |CD| = 7cm, |AD| = 5cm and $\angle ADC = 125^{\circ}$.

(i) Illustrate the information in a diagram.

(ii) Find, correct to one decimal place, the area of the parallelogram.

C. If $x = \frac{1}{2}(1 - \sqrt{2})$. Evaluate $(2x^2 - 2x)$. Represent the answer as $a + b\sqrt{2}$, where a, b are decimal numbers, write down the answer as a, b.

Problem 62

Tickets for a movie premiere cost \$18.50 each while the bulk purchase price for 5 tickets is \$80.00. If 4 gentlemen decide to get a fifth person to join them so that they can share the bulk purchase price equally, how much would each person save?

Problem 63

Five years ago, Musah was twice as old as Sesay. If the sum of their ages is 100, find Sesay's present age.

Problem 64

The third term of an arithmetic progression is 4m - 2n. If the ninth term of the progression is 2m - 8n, find the common difference in terms of m and n. Represent the answer as $\frac{am+bn}{c}$, where a, b, c are integers, write down the answer as a, b, c.

Problem 65

Find the equation of the line which has the same gradient as 8y + 4x = 24 and passes through the point (-8, 12). Represent the answer as ay = bx + c, where a, b, c are integers, write down the answer as a, b, c.

Problem 66

If $x = \frac{1}{2}(1 - \sqrt{2})$. Evaluate $(2x^2 - 2x)$. Represent the answer as $a + b\sqrt{2}$, where a, b are decimal numbers, write down the answer as a, b.