

TEACHERS COLLEGE OF JAMAICA

BACHELLOR OF EDUCATION

MAY 2016 EXAMINATIONS

COMMON PAPER

MATHEMATICS

FOUNDATION CONCEPTS IN MATHEMATICS

[MATH0002]

YEAR 1
SECONDARY

TIME: 2½ HOURS

INSTRUCTIONS: This paper consists of TWO sections. Candidates are required to answer ALL questions in Sections A and B

Electronic calculators are allowed. Graphic calculators are prohibited.

DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO.

SECTION A

Answer ALL questions in this section

Circle the correct answer

1. After an increase of 10%, a teacher's salary was \$1260. What would have been the teacher's salary if she was given a 15% increase instead?
 - a. \$1145
 - b. \$1400
 - c. \$1316.75
 - d. \$1386

2. A discount of 20% is offered on articles at a sale. What is the sale price of an article priced at \$560?
 - a. \$448
 - b. \$540
 - c. \$504
 - e. \$672

3. If eight books which originally cost \$15 each are sold in a sale for \$90, how much is the loss percent?
 - a. 30%
 - b. 50%
 - c. 20%
 - d. 25%

4. If a car travels at 180 km on 18 litres of petrol, how far would it travel on 40 litres of petrol
 - a. 198 km.
 - b. 360 km.
 - c. 400 km.
 - d. 720 km.

5. If \$105.00 is divided among three friends in the ratio 3:5:7, how much is the largest share?
 - a. \$21
 - b. \$49
 - c. \$35
 - d. \$63

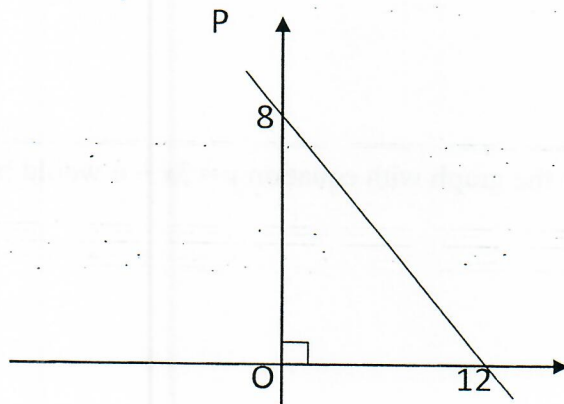
6. The mean of 11 numbers is 9. The number 15 is deleted. What is the mean of the remaining numbers?
- 5
 - 8.4
 - 17
 - 9.2
7. A basket contains apples and oranges. If there are 9 apples in the basket and the probability of drawing an apple is $\frac{3}{8}$, then the number of oranges in the basket is
- 5.
 - 8.
 - 15.
 - 24.
8. Which of the following is **NOT** a measure of central tendency?
- Mode
 - Range
 - Median
 - Mean
9. What is the median for the set of values: 19, 3, 7, 17, 10, 9, 15?
- 9
 - 3
 - 17
 - 10
10. Which of the following is a measure of dispersion?
- Mode
 - Median
 - Variance
 - Arithmetic mean
11. The following scores were obtained in a shooting competition: 2, 5, 9, 8, 7, 6, 5, 4, 1, 5. What is the modal score?
- 5
 - 0
 - 8
 - 2

12. In a class of 120 students, 100 are girls. What is the probability that a student chosen at random is a boy?
- $\frac{1}{6}$
 - $\frac{1}{5}$
 - $\frac{5}{6}$
 - $\frac{1}{2}$
13. The mean of 11 numbers is 9. One of the numbers 19 is deleted. What is the new mean?
- 8.5
 - 6.1
 - 7
 - 8
14. The simplified form of $4x - 3(x + 5)$ is
- $7x - 15$.
 - $x + 15$.
 - $x - 15$.
 - $7x + 15$.
15. Evaluate $5x - 2y - z$ If $x = 3$, $y = 4$ and $z = -2$.
- 5
 - 9
 - 10
 - 25
16. When expanded and simplified the expression $2(2x - 3) + 5(x - 4) =$
- $9x + 26$.
 - $9x - 7$.
 - $9x - 26$.
 - $9x - 14$.
17. The product of five times p and four times q is
- $5p + 4q$.
 - $20 pq$.
 - $20(p + q)$.
 - $9pq$.

18. If $x = 8$, and $y = -16$ then $x - y =$
- a. -8.
 - b. -24.
 - c. 8.
 - d. 24.

19. If $\frac{3x-5}{3} = 12$ then $x =$
- a. 3.
 - b. 5.
 - c. $-\frac{1}{3}$.
 - d. $13\frac{2}{3}$.

Use the figure below to answer questions 20 and 21.



20. What is the y intercept?
- a. 8
 - b. 12
 - c. 0
 - d. 4

21. What is the x intercept?
- a. 8
 - b. 12
 - c. 0
 - d. -4
22. Given the co-ordinates of a line AB is A(1,2) and B(5,5) then the midpoint of AB is
- a. (9, 16).
 - b. (4, 3).
 - c. (4, 4.5).
 - d. (3, 3.5).
23. The equation of the straight line passing through the point (2,5) with gradient -3 can be represented by the equation
- a. $y = -3x + 11$.
 - b. $y = -3x + 1$.
 - c. $y = -3x - 11$.
 - d. $y = -3x - 1$.
24. The x and y intercepts of the graph with equation $y = 3x - 6$ would be
- a. $x = -2$ and $y = -6$.
 - b. $x = 2$ and $y = -6$.
 - c. $x = -2$ and $y = 6$.
 - d. $x = 2$ and $y = 6$.
25. The gradient of the straight line $3x + 2y = 5$ is
- a. $5/2$.
 - b. $2/3$.
 - c. $-3/2$.
 - d. $-2/5$.

26. If $f(x) = 5x - 4$ then $f^{-1}(x) =$

- a. $5x + 4$
- b. $4 - 5x$
- c. $\frac{x - 4}{5}$
- d. $\frac{x + 4}{5}$

27. $A = \begin{pmatrix} a & f & g \\ b & e & h \end{pmatrix}$. The order of the matrix A is

- a. 3×2
- b. 2×3
- c. 6×1
- d. 1×6

28. The matrix $B = \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$ is known as

- a. a Function matrix.
- b. the Inverse matrix.
- c. a Singular matrix.
- d. the Identity matrix.

29. If $A = \begin{pmatrix} 3 & 2 \\ -3 & 1 \end{pmatrix}$ and $B = \begin{pmatrix} 1 & -2 \\ -3 & 0 \end{pmatrix}$, then $A + B =$

- a. $\begin{pmatrix} 4 & 0 \\ -6 & 1 \end{pmatrix}$
- b. $\begin{pmatrix} 4 & 4 \\ 0 & 1 \end{pmatrix}$
- c. $\begin{pmatrix} 4 & 0 \\ 6 & 1 \end{pmatrix}$
- d. $\begin{pmatrix} 4 & -6 \\ 0 & 1 \end{pmatrix}$

30. The determinant of the matrix $A = \begin{pmatrix} e & f \\ g & h \end{pmatrix}$ is given by

- a. $e + f + g + h$.
- b. $eh + fg$.
- c. $eh - fg$.
- d. $e - f + g - h$.

SECTION B

Answer **ALL** questions

[50 marks]

1. Given the following data: 21, 23, 45, 36, 23, 51, 47, 62, 18, 36

- a) State the class of data [1 mark]
- b) Find the mean [2 marks]
- c) Find the median [2 marks]
- d) Find the mode(s) [2 marks]
- e) What is the range? [2 marks]

2. a) A bag contains 60 balls, 45 green and 15 red.

- i) What is the probability of drawing a green ball from the bag? [1 mark]
- ii) What is the probability of drawing a red ball from the bag? [1 mark]
- iii) If 15 green balls are removed from the bag, what is now the probability of drawing a green ball? [3 marks]
- iv) What is the probability of drawing either a green or red ball? [1 mark]

b) A businessman bought a refrigerator for \$1209, and sold it at a profit of 11%.

- i) Calculate the selling price of the refrigerator. [3 marks]
- ii) The refrigerator was damaged in transporting it to the customer. Find the selling price of the refrigerator if he incurred a loss of 8% on the cost price. State your answers correct to the nearest cent. [2 marks]

3. Given $A = \begin{pmatrix} 2 & -4 \\ -3 & 2 \end{pmatrix}$ and $B = \begin{pmatrix} 5 & 0 \\ -3 & 2 \end{pmatrix}$

Calculate the:

- a) matrix $(A + B)$ [2 marks]
- b) matrix $A \times B$ [3 marks]
- c) determinant of A (i.e. $\det A$) [2 marks]
- d) inverse matrix A^{-1} [3 marks]

4. a) If 12 men can produce 700 Samsung Tablets in 9 working days, how long will it take 17 men to produce the same number of tablets? [2 marks]

b) A sum of money was shared among three persons A, B and C, in the ratio 2: 3:5 respectively. C received \$120 more than B, Determine:

- i) The total sum of money shared [3 marks]
- ii) The amount that A received [2 marks]
- iii) What percentage of the total is C's share [3 marks]

5. a) Functions f and g are defined as: $f : x \rightarrow x - 3$ and $g : x \rightarrow 3x + 1$

Find:

- i) $fg(2)$ [2 marks]
- ii) $f^{-1}g(x)$ [3 marks]

b) Draw a graph for the equation $y = x^2 + 2x$ $-2 \leq x \leq 3$ state the co-ordinates of the x and y intercepts [5 marks]

END OF EXAMINATION

