

TEACHERS COLLEGE OF JAMAICA

BACHELLOR OF EDUCATION

MAY 2017 EXAMINATIONS

COMMON PAPER

MATHEMATICS

FOUNDATION CONCEPTS IN MATHEMATICS 2

[MT 020SEB]

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

2. The cost price of a shirt is \$40 and the selling price is \$50. The percentage profit on the cost price is
 - a) 50%.
 - b) 40%.
 - c) 25%.
 - d) 20%.

3. The *total amount paid* on an investment of \$8000 at the end of 2 years at the rate of 7.5% per annum is
 - a) \$9200.
 - b) \$1200.
 - c) \$12000.
 - d) \$8540.

4. The cash price of a table is \$420; the hire purchase price is \$648. The deposit is \$168 and the balance is paid in 12 equal monthly installments. Each monthly installment is
 - a) \$103.
 - b) \$68.
 - c) \$40.
 - d) \$54.

5. 15 men took 6 days to pick apples. How long will 10 men take to pick the same amount of fruit, working at the same rate?
 - a) 4 days
 - b) 9 days
 - c) 11 days
 - d) 25 days

6. 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
7. All of the following are measures of central tendency EXCEPT
- a) mode.
 - b) interquartile Range.
 - c) median.
 - d) mean.
8. What is the median for the set of values: 11, 12, 12, 12, 13, 14, 15, 17, 19, 20, 20?
- a) 12.
 - b) 13.
 - c) 14.
 - d) 15.
9. The *mean* of 11 numbers is 9. One of the numbers (19) is deleted. What is the new *mean*?
- a) 8.5
 - b) 6.1
 - c) 7
 - d) 8
10. A bag contains 12 balls, 5 of which are yellow. A yellow ball is drawn from the bag and is not replaced. What is the probability that the second ball drawn will be yellow?
- a) $\frac{5}{12}$
 - b) $\frac{1}{3}$
 - c) $\frac{4}{11}$
 - d) $\frac{4}{5}$

11. The simplified form of the rational expression $\frac{5x+15}{5x-15}$ is

a) $\frac{x+3}{x-3}$

b) $\frac{x+1}{x-1}$

c) $\frac{x+15}{x-15}$

d) $\frac{5x-3}{5x+3}$

12. The simplified form of the rational expression $\frac{-4x^3}{x^3-2x^4}$ is

a) $\frac{1-2x}{4x}$

b) $\frac{-4x}{1-2x}$

c) $\frac{-4}{1-2x}$

d) $\frac{-4}{2x-1}$

13. The solution set for $2x - 5 < x - 2$ is

a) $x > 3.$

b) $x < 3.$

c) $x > -5.$

d) $x < 2.$

14. If $3(x + 4) = 2x - 1$, then $x =$

- a) $11/5$.
- b) -13 .
- b) $-5/3$.
- c) $13/5$.

15. If $\frac{x}{2} + \frac{x-1}{3} = 3$ then $x =$

- a) 1.
- b) 1.4.
- c) 2.
- d) 4.

16. If $2(x+4) = 6$, then $x =$

- a) -2 .
- b) -1 .
- c) -1 .
- d) 2.

17. What are the possible solutions for the pair of simultaneous equation shown below?

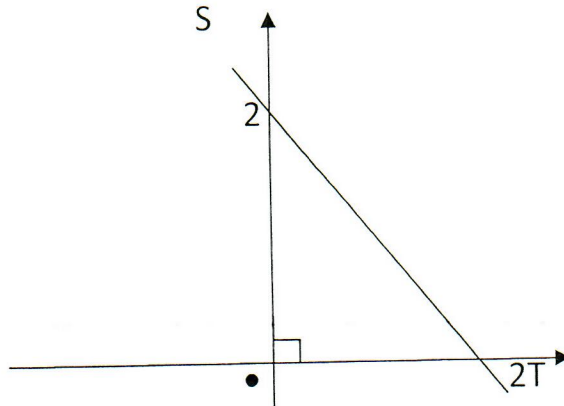
$$3x + y = 18$$

$$2x - y = 7$$

- a) $x = 6, y = 0$
- b) $x = 7, y = 7$
- c) $x = 3, y = 9$
- d) $x = 5, y = 3$

CONTINUE ON TO NEXT PAGE

Use the figure below to answer question 18.



18. What is the equation of the line ST?

- a) $y = -x + 2$
- b) $y = -x$
- c) $y = x + 2$
- d) $y = x$

19. The gradient of the line $3x + 2y = 4$ is

- a) -3.
- b) $-3/2$.
- c) $2/3$.
- d) 3.

20. The gradient of a line which passes through the points $(2, -1)$ and $(-2, 5)$ is

- a) 1.
- b) 0.
- c) $-3/2$.
- d) $2/3$.

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

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

22. Given that $g(x) = x^2 + 1$, then $g(3) =$
- a) -8.
 - b) -4.
 - c) 8.
 - d) 10.
23. Given that $g(x) = x^2 + 1$ and $h(x) = 2x$, $hog(x)$ is
- a) $2x + 2$.
 - b) $2x^2 + 1$.
 - c) $2x^2$.
 - d) $2x^2 + 2$.
24. $a(x + y) - b(x + y) =$
- a) $(x+y)(a-b)$.
 - b) $ax-by$.
 - c) $(x-y)(a-b)$.
 - d) $(ax-by)^2$.
25. $x^2 - 16$ can be expressed as
- a) $(x + 4)(x - 4)$
 - b) $(x + 8)(x + 2)$
 - c) $(x - 16)(x + 1)$
 - d) $(x - 16)(x + 16)$
26. $x^2 - 4x + 4$ can be expressed as
- a) $(x - 2)(x - 2)$.
 - b) $(x + 2)(x - 2)$.
 - c) $(x + 1)(x + 4)$.
 - c) $(x - 1)(x - 4)$.
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 from this section.

[50 marks]

1. Solve the following inequation and place the solution set on a graph:

$$\frac{4x+1}{5} - \frac{x-3}{4} \geq x$$

[3 + 2 marks]

2. Solve the equations for the variable x :

i) $2(x-1) = 14$ [2 marks]

ii) $\frac{3(2x-1)}{4} - \frac{2(x+2)}{3} = 1$ [3 marks]

3. Functions f , h and g are defined as: $f : x \rightarrow \frac{2x}{3}$, $h : x \rightarrow \frac{2x+1}{3}$ and $g : x \rightarrow 2x-1$

Find:

i) $fg(2)$ [3 marks]

ii) $(fh(x))^{-1}$ [3 marks]

iii) $h^{-1}(-1)$ [3 marks]

4. A businessman bought a stove for \$1209; he sold it at a profit of 11%.

a) Calculate the selling price of the stove [3 marks]

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

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

Calculate the:

- a) inverse of matrix $(A + B)$. [3 marks]
 b) matrix $A \times B$. [3 marks]

6. Solve the pair of simultaneous equations

$$\begin{aligned} 5x + 2y &= 16 \\ -3x + 4y &= -7 \end{aligned}$$

[5 marks]

7. A bag contains 60 balls, 35 blue, 15 green and 10 white.

- a) What is the probability of drawing a green ball from the bag? [1 mark]
 b) What is the probability of drawing a white ball from the bag? [1 mark]
 c) If 15 blue balls are removed from the bag, what is the now the probability of drawing a green ball? [1 mark]
 d) What is the probability of drawing either a green or white ball? [2 marks]

8. The table shows how many pupils in a form were absent for various numbers of sessions during a certain school week.

Number of sessions absent	0	1	2	3	4	5	6	7	8	9	10
Frequency of students	15	3	1	4	7	2	0	2	0	1	1

- a) Draw a histogram to show this information. [3 marks]

Find the:

- b) Mean [3 marks]
 c) Median [3 marks]
 d) mode [1 mark]

END OF EXAMINATION