

**TEACHERS COLLEGES OF JAMAICA
BACHELOR OF EDUCATION
JANUARY 2021 EXAMINATIONS
COMMON PAPER
MATHEMATICS
FOUNDATION CONCEPTS IN MATHEMATICS**

**YEAR 1
SECONDARY**

TIME: 2 HOURS

INSTRUCTIONS: Candidates are required to answer ALL questions.

Write ALL answers in the answer booklet.

Where a numerical result is not exact, give your answer correct to three significant figures if the degree of accuracy is not stated, and solution is not the size of an angle.

**Electronic calculators are allowed.
Graphic calculators are prohibited.**

Show ALL workings.

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

SECTION A

Answer ALL questions.

1. If $X = \{2,4, 6,8\}$, $Y = \{5, 6, 7, 8\}$ and $Z = \{2,3,7,9\}$, then $X \cap Y \cap Z =$
 - a. $\{9\}$
 - b. $\{5\}$
 - c. $\{ \}$
 - d. $\{6,8\}$
2. All the elements outside of a set are called the sets'
 - a. Subset.
 - b. Union.
 - c. Complement.
 - d. Intersection.
3. Given the set $S = \{1, 2, 3\}$ what are the possible number of subsets that can be obtained from the set?
 - a. 8
 - b. 12
 - c. 15
 - d. 6
4. If set $B = \{1, 2, 3,4\}$ and Set $A = \{a, b, c, d\}$ then set A and B are:
 - a. Equal sets.
 - b. Equivalent sets.
 - c. Infinite set.
 - d. Finite sets.
5. What is the highest common factor of 12 and 24?
 - a. 6
 - b. 3
 - c. 12
 - d. 2
6. The number property that is used in writing $(4 + 5) + 6$ as $4 + (5 + 6)$ is the
 - a. Identity.
 - b. Distributive law.
 - c. Commutative law.
 - d. Associative law.

7. By the distributive law $15 \times 28 + 7 \times 15 =$
- 28×30
 - 30×15
 - $35 + 15$
 - 15×35
8. The number 26725 written correct to 4 significant figures is?
- 2672
 - 26730
 - 26720
 - 2673
9. 0.003768 expressed in standard form is?
- 3.768×10^3
 - 3.768×10^{-3}
 - $3,768 \times 10^2$
 - 3.768×10^{-2}
10. Find the value of $\frac{2}{5} + \frac{2}{3} \times \frac{1}{3}$
- $\frac{28}{45}$
 - $\frac{4}{15}$
 - $\frac{4}{5}$
 - $\frac{4}{5}$
11. \$100 is divided among three (3) friends in the ratio 2:3:5. The largest share is?
- \$80.00
 - \$60.00
 - \$75.00
 - \$50.00
12. $a(x + y) - b(x + y) =$
- $a - b(x + y)$
 - $(ax - by)^2$
 - $ax - by$
 - $(a - b)(x + y)$

13. Josh is x years older than John. If John is 27-year-old, then Josh's age in years is:
- $27 + x$
 - $x - 27$
 - $27x$
 - $27 - x$
14. What will be the perimeter of a rectangle whose width is x meters and length is six meters greater than its width?
- $2x + 6$
 - $12 + 4x$
 - $72 + 12x$
 - $6x + 36$
15. If $5x = 9$, then $x =$
- 45
 - $\frac{9}{5}$
 - $\frac{5}{9}$
 - 14
16. If $45 - 2x = 2x - 3$, then $x =$
- 7
 - 12
 - 0
 - 24
17. Find the value of the algebraic expression $a^2 + 2ab + b^2$, when $a = -2$ and $b = 3$
- 1
 - 25
 - 17
 - 7
18. Factorize the following $9x^2 - 1$
- $(3x+1)(3x-1)$
 - $(3x-1)(3x-1)$
 - $(9x+1)(x-1)$
 - $(9x-1)(x+1)$
19. $2^0 =$
- 1
 - 2
 - 0
 - $\frac{0}{2}$

20. Simplify the following leaving your answer in index form: $2 \times 2 \times 4 \times 5 \times 5$
- $4^2 \times 5^2$
 - 16×5^2
 - $2^4 \times 5^2$
 - $2^2 \times 4 \times 5^2$
21. $2a^2 + (3a)^2 =$
- $5a^2$
 - $2a^3$
 - $11a^2$
 - $8a^2$
22. x^9 divide by x^4 gives
- x^{13}
 - $x^{9/4}$
 - x^5
 - $x^{4/9}$
23. The algebraic expression for three times a number 'a' less a third the number 'b' is?
- $3a - \frac{b}{3}$
 - $3a < \frac{b}{3}$
 - $\frac{1}{3}b < 3a$
 - $3a + \frac{b}{3}$
24. $\frac{2}{3x} - \frac{1}{2y} =$
- $\frac{4y - 3x}{6xy}$
 - $\frac{1}{6xy}$
 - $\frac{3x - 2y}{6}$
 - $\frac{1}{3x + 2y}$
25. Order the set of integers from least to greatest; -9, 0, -1, -19
- 19, -9, -1, 0
 - 0, -19, -9, -1
 - 0, -1, -9, -19
 - 19, -1, -9, 0

Section B

Answer ALL questions.

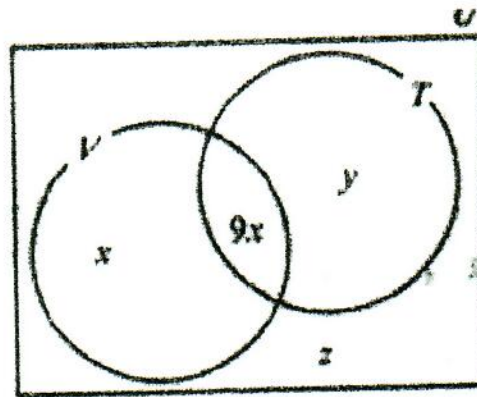
1. a. Using the numeral 420:
- i) list its first ten factors prime. [1 mark]
- ii) rewrite as a product of its prime factors. [1 mark]
- b. Given 15, 35 and 60, determine the:
- i. H.C.F. [1 mark]
- ii. L.C.M. [2 mark]
2. Given that $a = -2$, $b = 4$ and $c = -5$, evaluate:
- a) $a - c$ [1 mark]
- b) $(c + b) c$ [1 mark]
- c) $2a - 3c$ [1 mark]
- d) $4(c-a) \div (b-a)$ [2 marks]
3. Simplify the following:
- a. $\frac{3^4 \times 5^3 \times 7^2}{3^2 \times 5^2 \times 7}$ [2 marks]
- b. $5(x+y) - (5x-3y) + 2(2x+y)$ [3 marks]
4. Solve the following:
- a. $5x - 3 = 3x + 11$ [2 marks]
- b. $\frac{2x-1}{5} = \frac{5x-11}{4}$ [3 marks]

5. In a survey of 36 students, it was found that:
- 30 play tennis,
- x play volleyball ONLY
- $9x$ play BOTH tennis and volleyball
- 4 play neither tennis nor volleyball
- Given the :

U - {students in the survey}

V - {students who play volleyball}

T - {students who play tennis}



- a. Copy the Venn diagram above, showing the value of y in terms of x and the value of z . [2 marks]
- b. Write an expression in x to represent the TOTAL number of students on the survey. [1 mark]
- c. Write an equation in x to represent the total number of students in the survey and hence solve for x . [2 marks]
6. Jenny is 'y' years old. Her father Paul is four times her age and her mother Kerry-Ann is two years younger than her father.
- a. Write an algebraic expression for Kerry-Ann's age. [2 marks]
- b. If the sum of their ages is 115, determine Kerry-Ann's age. [3 Marks]
7. A sum of money is to be divided among John, Berry and Carl in the ratio 2: 4: 5. The largest share amounts to \$250. Calculate
- a. the total sum of money to be shared. [2 marks]
- b. John's share. [1 mark]
- c. the percentage of the total that Berry's receives. [2 Marks]
8. A bag has 4 green marbles, 3 red marbles and 3 yellow marbles.
- a. What is the probability that a yellow marble is picked from the bag? [1 mark]
- b. If 2 of the green marbles were removed from the bag. What is the probability of picking
- i) a red marble? [2 Marks]
- ii) a green marble? [2 marks]
9. For the in-equation $5(3x - 2) > 3(4x - 1)$
- a. determine the solution set. [3 marks]
- b. represent the solution set on a number line. [2 marks]
10. a. State the quadratic formulae. [1 mark]
- b. Use the quadratic formulae to solve the equation $x^2 - 4x + 3 = 0$ [4 marks]

END OF EXAMINATION

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