JANUARY 2020
EBS 102
COLLEGE ALGEBRA
35 MINUTES

Candidate's Index Number
Signature:

UNIVERSITY OF CAPE COAST
COLLEGE OF EDUCATION STUDIES
SCHOOL OF EDUCATIONAL DEVELOPMENT AND OUTREACH
INSTITUTE OF EDUCATION

COLLEGES OF EDUCATION
FOUR-YEAR BACHELOR OF EDUCATION
FIRST YEAR, FIRST SEMESTER MID SEMESTER QUIZ, JANUARY 2020

JANUARY 21, 2020 COLLEGE ALGEBRA 3:00 PM – 3:35 PM

Answer ALL the questions on the question paper

For items 1 to 20, each stem is followed by four options lettered A to D. Read each statement carefully and circle the letter that corresponds to the correct or best option.

1. Which of the following expressions is the reduced form of $\frac{x^2+4x-12}{3x-6}$?

   A. $\frac{1}{3}(x-6)$

   B. $\frac{1}{2}(x-6)$

   C. $\frac{1}{3}(x+6)$

   D. $\frac{1}{2}(x+6)$

2. Solve $\frac{3x}{5}+\frac{x}{3}=20$.

   A. $\frac{300}{7}$

   B. $\frac{300}{13}$

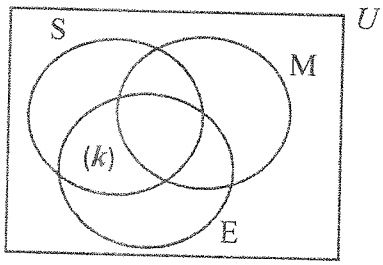
   C. $\frac{150}{7}$

   D. $\frac{15}{8}$

3. A binary operation is defined by $a * b = a^2 - b^2 + ab$, where a and b are real numbers. Evaluate $\sqrt{3} * 1$.

   A. $2 + \sqrt{3}$
   B. $2 - \sqrt{3}$
   C. $\sqrt{3} - 2$
   D. $\sqrt{3} + 1$

4. The Venn diagram below shows membership of students in Mathematics (M), Science (S) and English (E) clubs. Which of the following correctly describes the region labelled (k)?



   A. All students belonging to both English and Science clubs.
   B. All students who do not belong to the Mathematics club.
   C. Students belonging to English and Science clubs but not Mathematics club.
   D. Students who are members of the Science club but not the Mathematics club.

5. A binary operation, $*$, is defined on the set R of real numbers by $a * b = a + \frac{b}{a}$, where $a, b \in R$ and $a \neq 0, b \neq 0$. Evaluate $\sqrt{3} * \frac{4}{\sqrt{3}}$.

   A. $\frac{4\sqrt{3}}{3}$
   B. $\frac{2\sqrt{3}}{3}$
   C. $\frac{7\sqrt{3}}{3}$
   D. $\frac{7+\sqrt{3}}{3}$

6. Which one of the following expressions is a factor of the equation, $2x^2 + 9x + 7 = 3$?

   A. $x - 4$
   B. $x - \frac{1}{2}$
   C. $x - 1$
   D. $2x + 1$

7. The cost of producing x units of a certain commodity is given by $0.5x^2 + 15x + 5000$. How many units can a manufacturer produce at a cost of GH¢11,500.00.

   A. 90
   B. 100
   C. 115
   D. 130

8. Which of the following is/are **true** about solutions of quadratic equations of the form $ax^2 + bx + c = 0$?

   I. If $b^2 - 4ac > 0$, then the equation has two distinct real solutions
   II. If $b^2 - 4ac = 0$, then the equation has no real solutions
   III. If $b^2 - 4ac < 0$, then the equation has one repeated real solutions

   A. I only
   B. II only
   C. I & II only
   D. I, II & III

9. Solve the inequality, $1 - \frac{3t}{2} \geq t - 4$.

   A. $t \leq -2$
   B. $t \leq 2$
   C. $t \geq 2$
   D. $t \geq -2$

10. Which of the following inequalities is equivalent to $-1 < \frac{3-x}{2} \leq 1$?

    A. $-5 < x \leq 1$
    B. $-1 \leq x < 5$
    C. $1 < x \leq 5$
    D. $1 \leq x < 5$

11. What is the remainder when $3x^3 - 17x^2 + 15x - 25$ is divided by $(x - 5)$?

    A. -2
    B. -1
    C. 0
    D. 2

12. Given that $h(x) = 3x^3 + 5x^2 - 10x + 1$, evaluate $h(-2)$.

    A. -23
    B. 15
    C. 17
    D. 23

13. What is the quotient when the polynomial $h(x) = 2x^3 + 5x^2 - 4x - 3$ is divided by $(x+3)$?

A. $x^2 - x - 1$
B. $x^2 + x - 1$
C. $2x^2 - x - 1$
D. $2x^2 + x - 1$

14. What value of x satisfies the equation, $8x^3 - 27 = 0$?

A. $-\frac{3}{2}$
B. $\frac{-2}{3}$
C. $\frac{2}{3}$
D. $\frac{3}{2}$

15. The base of a triangle is $(x+3)$ cm long. If the area of the triangle is given by the expression, $(2x^2 + 10x + 12)\,\text{cm}^2$, which of the following represents the height of the triangle?

A. $2x + 4$ cm
B. $2x + 8$ cm
C. $4x + 4$ cm
D. $4x + 8$ cm

16. Which of the following statements is true about an operation, ∇, defined on the set $P = \{2, 4, 6, 10\}$ as $a \nabla b = \frac{a+b}{a}$?

I. ∇ is closed
II. ∇ is commutative

A. I only
B. II only
C. I & II
D. None of them

17. A binary operation, $*$, is defined on the set R, of real numbers by $a*b=\frac{a}{b}-\frac{b}{a}$ where $a, b \in R$ and $a, b \neq 0$. Evaluate $\sqrt{5}*\sqrt{3}$.

A. $\frac{\sqrt{3}}{15}$

B. $\frac{2\sqrt{3}}{15}$

C. $\frac{2\sqrt{15}}{15}$

D. $\frac{3\sqrt{15}}{15}$

18. The Venn diagram below shows three intersecting subsets A, B, and C of a universal set μ.

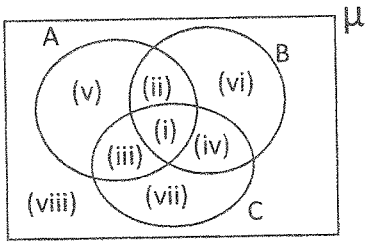
Which one of the following regions represents $A' \cap B \cap C'$?

A. (v)

B. (vi)

C. (vii)

D. (viii)



19. Subtracting a certain natural number from 182 gives the same result as squaring the number. Find the number.

A. 14

B. 13

C. 7

D. 6

Given that $g(x)=\frac{x^2-25}{5-x}$, evaluate g(9).

A. -16

B. -14

C. 14

D. 16