GOVERNMENT BILINGUAL HIGH SCHOOL YAOUNDE (LBY) Year: 2020/2021

Department of Mathematics Time allowed: 1H30MIN

Lower Sixth Promotion Examination

Pure Mathematics

SECTION A: MCQs Place dash (-) on the correct answer

1. Given that the polynomials $x^3 + 4x^2 - 2x + 1$ and $x^3 + 3x^2 - x + 7$ leave the same remainder when divided bgy $x - p$ the possible values of p are
   A $2, 3$
   B $-2, -3$
   C $-2, 3$
   D $2, -3$
2. The range of values for which $\frac{x+1}{(x-3)(x-2)} > 0$ is
   A $\{x: -1 < x < 2 \cup x > 3\}$
   B $\{x: x < -1 \cup 2 < x < 3\}$
   C $\{x: -1 < x < 2 \cup 2 < x < 3\}$
   D $\{x: x < -1 \cup x > 3\}$
3. Which of the following is **NOT** an equation of a circle
   A $x^2 + (y-2)^2 - 9 = 0$
   B $x^2 + y^2 + 2x + 3y = 4$
   C $x^2 + 2x + y^2 - 2y - 2 = 0$
   D $x^2 + 9 - 6x - 2y^2 - 8y = 3$
4. Given that α and β arethe roots of the equation $2x^2 - 4x + 1$, then the equation whose roots are α^2 and β^2 is
   A $4x^2 - 12x + 1 = 0$
   B $2x^2 - 4x + 1 = 0$
   C $4x^2 - 2x + 1 = 0$
   D $4x^2 - 3x + 1 = 0$
5. The numerical value of the term independent of x in the expansion of $(x + \frac{1}{x^2})^9$ is
   A 48
   B 64
   C 84
   D 504
6. Given that $2\log_y x + 2\log_x y = 5$, then the values of $\log_y x$ are
   A $\frac{1}{2}, 2$
   B $2, 4$
   C $5, \frac{1}{2}$
   D $2, -2$
7. If p is the statement 'Peter is eating' and q is the statement 'Peter is playing', then the proposition $\sim q \rightarrow p$ is
   A If Peter is eating then he is playing
   B If Peter is eating then he is not playing

C If Peter does not play then he will not eat

D If Peter is not playing then he is eating

8. The number of ways of forming a committee of six members from 2 girls and 4 boys is
   A 15
   B 14
   C 42
   D 1
9. $\frac{(r+1)!}{(r-1)!} =$
   A $\frac{(r+1)}{(r-1)}$
   B $(r+1)r$
   C $r+1$
   D $(r+1)r!$
10. The variables x and y are related by the law $y = a^2b^x$. Reducing this law to linear form gives
   A $\log y = x\log b + \log a$
   B $\log y = b\log x + + 2\log a$
   C $\log y = 2x\log b + \log a$
   D $\log y = x\log b + 2\log a$
11. $\sum_{r=1}^{k}(k+r) =$
   A $2k$
   B $\frac{k}{2}(3k+1)$
   C $k(k+1)$
   D $2k^2$
12. If $z = \frac{1+2i}{3-4i}$ in the form $a + bi$, then $z =$
   A $z = \frac{1}{5} + \frac{2}{5}i$
   B $z = -\frac{2}{5} + \frac{1}{5}i$
   C $z = -\frac{1}{5} - \frac{2}{5}i$
   D $z = -\frac{1}{5} + \frac{2}{5}i$

SECTION B: Provide logical solutions to the following Questions

1. Find the coordinate and center and the length of the radius of the circle:

   $S_1: x^2 + y^2 + 2x - 4y - 8 = 0.$

   Obtain an equation of the circle S_2 with center $(3, -4)$ and radius $\sqrt{13}$.

   Show that S_1 *and* S_2 touch each other externally and find the coordinates of the point of contact **T.**

Find the equation of the common tangent to the circle at T the point of contact. **(6marks)**

2. i) Given that $Z = \frac{5}{2-i}(3+2i)$, express Z in the form $x + iy$ where x and y are real numbers and find the values of $|Z^2|$ and $argZ^2$

   ii) Given that $\frac{Z}{1+2i} + \frac{Z-1}{5} = \frac{1}{1-2i}$,

   Find the real values of p and q such that $(p+iq)Z = 3 + 4i$ **(5marks)**