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Mathematics, 2013 EC, common, entrance exam

Grade 12 · Mathematics · 2013 E.C.

Time allowed: 120 minutes | **Questions:** 20 | **Total marks:** 20

Name _____ Grade _____ ID No. _____ Date _____

1. What is the determinant of the matrix: (1)

$$\begin{pmatrix} 1 & -7 \\ 6 & 5 \end{pmatrix}$$

A. 47
B. 37
C. -37
D. -47

2. The additive inverse of the complex number 3 - 4i is (1)

A. 3 - 4i
B. -3 + 4i
C. 3 + 4i
D. -3 - 4i

3. What is the modulus of the complex number -6 + 8i? (1)

A. 10
B. 8
C. 5
D. 2

4. Given two vectors u = (1 , 3) and v= (-3, 5) in the plane. Then 6u + 2v is equal to (1)

A. (2, 28)
B. (0, 28)
C. (0,18)
D. (3, 3)

5. Which one of the following is the standard form of the equation ofthe circle centered at (2, -3) and radius 5? (1)

A. (x - 2)^(2) + (y + 3)^(2) = 5
B. (x + 2)^(2) + (y + 3)^(2) = 25
C. (x - 2)^(2) + (y + 3)^(2) = 25
D. (x - 2)^(2) + (y - 3)^(2) = 25

6. Which of the following defines the equation of a sphere whose centeris at (0, -1, 2) and radius 6 units? (1)

A. x^2 + (y + 1)^2 + (z - 2)^2 = 12
B. x^2 + (y + 1)^2 + (z + 2)^2 = 36
C. x^2 + (y + 1)^2 + (z - 2)^2 = 36
D. x^2 + (y - 1)^2 + (z - 2)^2 = 36

7. Which of the following represents the vector (3, -5, 7) in the spaceusing the standard unit vectors i, j and k ? (1)

A. 3i - 5j + 7k
B. -3i - 5j - 7k
C. 3i - 51 - 7k
D. 3i + 5j + 7k

8. What are the domain and range of the function $f(x) = 2x^{3/4}$ respectively? (1)

A. [0, ∞) and R
B. [0, ∞) and [0, ∞)
C. R and [0, ∞)
D. [0, ∞) and (0, ∞)

9. Which one of the following defines a one-to-one function? (1)

A. f(x) = {(x, y): y = x^2 + 1}
B. f(x) = {(x, y): y is a father of x}
C. f(x) = {(x, y): y is a sister of x}
D. f(x) = {(x, y): y = 3x - 1}

10. The equation of a circle is given by $(x - 3)^2 + (y + 2)^2 = 9$. What arethe center and the radius of the circle representatively? (1)

A. (3,-2) and 9
B. (3,2) and 9
C. (3,-2) and 3
D. (3,2) and 3

11. Which of the following sentences has a truth value? (1)

A. Man is mortal
B. Tomorrow is a beautiful day
C. Man is selfish
D. We shall win!

12. Which one of the following is the standard form of the equation ofthe parabola with vertex (4, 6) and focus (-8, 6)? (1)

A. (y - 6)^2 = 48(x - 4)
B. (y - 6)^2 = -48(x - 4)
C. (x - 4)^2 = -12(y - 6)
D. (x - 4)2 = 12(y - 6)

13. Which of the following is true about the hyperbola given by $(x^{2/4}) - y^2 = 1$? (1)

A. Its center is at (2, 1).
B. An asymptote to the hyperbola is y = 2x
C. Its foci are at (-5, 0) and (5, 0).
D. Its vertices are at (-2, 0) and (2, 0).

14. Two statements P and q are given by: (1)

p: 22/7 is an irrational number.
q: The sum of two odd integers is odd.

Then which of the following has truth value T?

A. ¬p ∧ q
B. p ∧ q
C. p ∧ ¬q
D. ¬q ∨ p

15. Which one of the following is the contrapositive of the statement: lf 21 is a prime number, then 4 is an odd number? (1)

A. If 4 is not an odd number, then 21 is not a prime number.
B. If 21 is not a prime number, then 4 is an even number.
C. If 4 is an odd number, then 21 is not a prime number.
D. If 4 is an odd number, then 21 is a prime number.

16. In a certain health center there are 3 doctors, 8 nurses and 2 physicians. In how many ways one can form a group of 5 members consisting of 1 doctor, 3 nurses and 1 physician? (1)

A. 336
B. 330
C. 168
D. 112

17. Which one of the following forms represents an exhaustive set of events if a die is thrown once? (1)

A. {1, 2}, {2}, {4, 5}, {5, 6}
B. {1, 2}, {4}, {4, 5, 6}
C. {1, 2, 3}, {3, 4}, {6}
D. {1, 2, 3}, {4, 5}, {6}

18. A bag contains 2 red, 3 yellow and 5 green balls. One ball is drawn at random. What is the probability that the drawn ball is NOT yellow? (1)

A. 4/5
B. 7/10
C. 3/10
D. 1/5

19. Which one of the following is NOT true about the determinant of a given square matrix A ? (1)

A. The determinant of A is equal to the determinant of its transpose.

B. Interchanging two rows of A gives the same determinant.

C. If A contains a row of zeros, then its determinant is zero.

D. If A has identical rows, then its determinant is zero.

20. If f is a continuous function on [a, b] and F is its anti-derivative, then which of the following is true? (1)

 Question Diagram

A. A

B. B

C. C

D. D

— END OF EXAMINATION —