

Mathematics, 2014 EC, common, entrance exam

Grade 12 · Mathematics · 2014 E.C.

Time allowed: 120 minutes

Questions: 30

Total marks: 30

Name _____ Grade _____ ID No. _____ Date _____

1. what are the quotient and remainder respectively, when 75 divided by 20 ? (1)

A. 15 and 3

B. 2 and 19

C. 3 and 15

D. 4 and 5
2. Which of the following is the measure of an exterior angle of a 10 sided regular polygons? (1)

A. 72°

B. 144°

C. 180°

D. 36°
3. The radian measure of an angle of 120° is equal to: (1)

A. $2\pi / 3$

B. $\pi / 4$

C. $\pi / 2$

D. $\pi / 8$
4. What is the dot (scalar) product of the vectors $u = i + 2j$ and $v = -2i + 4j$? (1)

A. -8

B. 5

C. 6

D. 7
5. If $f(x) = x^2 + px + 1$ where $f(0)$ and $f(1)$ have opposite signs so that f has a root in $(0, 1)$, then which one of the following number is a possible value P ? (1)

A. 3

B. 2

C. -2

D. -3
6. item Which one of the following quantities represents a vector? (1)

A. Weight of an object

B. Volume of a box

C. Speed of a motorbike

D. The width of your bedroom
7. What is the surface area of a sphere with radius 6 cm ? (1)

A. $144\pi \text{ cm}^2$

B. $48\pi \text{ cm}^2$

C. $36\pi \text{ cm}^2$

D. $24\pi \text{ cm}^2$
8. If the volume of a right circular cone is $64\pi \text{ cm}^3$ and the diameter of it base is 8 cm, what is the height of the cone? (1)

A. 3cm

B. 8cm

C. 12cm

D. 4cm
9. Which one of the following is the derivative of $f(x) = \tan(x) + 3^x$? (1)

A. $\sec^2(x) + 3^x \ln(3)$

B. $-\csc^2(x) + 3^x \ln(x)$

C. $-\tan(x) + 3^x \ln(x)$

D. $\sec^2(x) + 3^x \ln(x)$

10. In rolling a fair die, what is the probability of obtaining 3 or 5 ? (1)
- A. $\frac{1}{3}$ B. $\frac{1}{4}$
C. $\frac{1}{6}$ D. $\frac{1}{2}$
-
11. What is the locus all points in the plane in which the sum of the distances from two fixed points is constant? (1)
- A. Circle B. Ellipse
C. Parabola D. Hyperbola
-
12. The simplified form of the expression $(6\sqrt{20} - 3\sqrt{45}) / (3\sqrt{75})$ is: (1)
- A. $\sqrt{5}$ B. $\sqrt{15}/15$
C. $\frac{1}{5}$ D. 5
-
13. In $\triangle ABC$, if $AB = 10$ units, $BC = 14$ units and $AC = 8$ units, then the area of the triangle is (1)
- A. $16\sqrt{2}$ square unit B. $16\sqrt{6}$ square unit
C. $16\sqrt{3}$ square unit D. $4\sqrt{6}$ square unit
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14. Which one of the following sets is the symmetric difference, $A \Delta B$, of the sets $A = \{1,3,5,6,8,10\}$ $B = \{2,5,8,11\}$? (1)
- A. $\{1,3,6,10\}$ B. $\{1,2,3,6,10,11\}$
C. $\{2,11\}$ D. $\{1,2,3,5,6,8,10,11\}$
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15. The solution set of the equation given by $\log(x^2 - 3) = 2 \log(x - 1)$ is: (1)
- A. $\{1/2\}$ B. $\{2\}$
C. $\{4\}$ D. $\emptyset$
-
16. What is the product of the two complex number $z = 2 - 3i$ and $w = 5 + 2i$? (1)
- A. 29 B. $16 - 11i$
C. $4 - 11i$ D. $16 + 11i$
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17. Which one of the following is an onto functional from on to $[0, \infty]$? (1)
- A. $f(x) = 2^x$ B. $f(x) = |x| + 2$
C. $f(x) = x^2 + 1$ D. $f(x) = \sqrt{x^2}$
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18. Which one of the following interval is the solution set of the inequality $x^2 - 5x + 6 \leq 0$? (1)
- A. $[0, 2]$ B. $[2, 3]$
C. $[\infty, 3]$ D. $[-\infty, 2]$
-
19. What is the seventh term of an arithmetic sequence whose third term is -4 and common difference is 5 ? (1)
- A. 15 B. -15
C. 16 D. -16
-
20. Which one of the following trigonometric values is correct? (1)
- A. $\tan(-120^\circ) = -1$ B. $\cos(-60^\circ) = \sqrt{3}/3$
C. $\sin(-120^\circ) = -0.5$ D. $\cos(-120^\circ) = -0.5$
-
21. What are the coordinates of a point that divides the line segment with end points $P(0, 1)$ and $Q(5, 6)$ in the ratio 2 (1)
from P?
- A. $(0,3)$ B. $(3,2)$
C. $(0,2)$ D. $(2,3)$

22. The distance from the point P (3, 4) to the line L with equation: $3x + 4y - 5 = 0$ is (1)

A. 5 units
B. 6 units
C. 4 units
D. 7 units

23. Which of the following is true about the trigonometric values of the given of angles? (1)

A. $\sin(120^\circ) = \sin(60^\circ)$
B. $\sin(75^\circ) = \cos(105^\circ)$
C. $\cos(120^\circ) = \cos(60^\circ)$
D. $\tan(75^\circ) = \tan(105^\circ)$

24. A line segment chord in an ellipse which passes through the center and perpendicular to (1)

A. Latus rectum
B. Eccentricity
C. Minor axis
D. Semi - major axis

25. which of the following is true about bounded sequence? (1)

A. Every bounded sequence is convergent.
B. every increasing bounded sequence converges to the greatest lower bound of the sequence.
C. Every decreasing bounded sequence converges to the least upper bound of the sequence.
D. Every monotone bounded sequence converges.

26. In order to find point P in space one can start from the origin O(0, 0, 0) move 5 units in the direction of negative x-axis, then move 5 units in the direction of positive Y-axis and finally move 5 units in the direction of negative z-axis. (1)

Which one of the following is the ordered triple of numbers represented by point P?

A. (5,5,5)
B. (-5, 5, -5)
C. (5, -5, 5)
D. (-5, -5, 5)

27. Which of the following is the variance of the data given as: 2, 3, 4, 5, 7 (1)

A. 2.46
B. 2.96
C. 3.06
D. 3.70

28. Which of the following is true about the Arithmetic Mean of a given data? (1)

A. It is affected by extreme values
B. There can be two means for a given data
C. It can also be used for qualitative data
D. it can be obtained even in the absence of some of the values in the data

29. Which of the following pairs of events are depend? (1)

A. Any events obtaining from tossing a coin and rolling a die at the same time.
B. Drawing two balls successively from a box containing balls having the same size and shape with replacement.
C. Drawing two cards one after the other from a well shuffled pack of cards without replacement.
D. Tossing two coins simultaneously and obtaining head from one and tail from the other.

30. Let f and g be two functions. Which one of the following statements is true about f or g (1)

A. If f and g differentiable at a, then f/g is differentiable at a.
B. If $f'(a) = 0$, then the tangent line to the graph of f at (a, f(a)) is $y = a$
C. If f differentiable at a, then it is continuous at a.
D. The line $y = 0$ is the a tangent line graph of $f(x) = |x|$ at (0, 0).

— END OF EXAMINATION —

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