MATHS

BOOKS - INDEPENDENTLY PUBLISHED MATHS (ENGLISH)

MODEL TEST 6

Mcqs

1. If $10y - 6 = 3k(5y - 3)$ for all y, then k=

A. $\frac{1}{2}$

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

C. $\frac{3}{2}$

D. $\frac{5}{3}$

Answer: B

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2. Two 6-sided dice are rolled . What is the probability that the sum of the faces showing up is less than 5 ?

A. $\frac{1}{12}$

B. $\frac{1}{6}$

C. $\frac{7}{11}$

D. $\frac{7}{10}$

Answer: B

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3. If (a,b) is a solution of the system of equations

$\begin{cases} 2x - y = 7 \\ x + y = 8 \end{cases}$, then the difference , a-b , equals

A. -12

B. -10

C. 0

D. 2

Answer: D

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4. If $f(x) = x - 1, g(x) = 3x, \text{ and } h(x) = \frac{5}{x}$, then $f^{-1}(g(h(5)))$=

A. 4

B. 3

C. $\frac{5}{6}$

D. $\frac{1}{2}$

Answer: A

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5. A sphere is inscribed in a cube. The ratio of the volume of the sphere to the volume of the cube is

A. $0.79:1$

B. $1:2$

C. $0.52:1$

D. $1:3.1$

Answer: C

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6. Fing y if the slope of the line containing the point (-1,3) and (4,y) is 0.75

A. 0.75

B. 1

C. 6.75

D. 8

Answer: C

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7. The roots of the equation $3x^4 + 4x^3 + x - 1 = 0$ consist of

A. three positive real numbers and one negative real number

B. three negative real numbers and one positive real number

C. one negative real number and three imaginary numbers

D. one positive real number , one negative real number, and two imaginary numbers.

Answer: D

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8. For what value(s) of k is $x^2 + 3x + k$ divisible by x+k ?

A. only 0

B. only 0 or 2

C. only 0 or -4

D. no value of k

Answer: B

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9. What number should be added to each of the three numbers, 3,11 and 27 so that the resulting numbers form a geomatric sequence ?

A. 2

B. 3

C. 4

D. 5

Answer: D

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10. What is the equation of the set of points that are 5 units from point (2,3,4) ?

A. $2x + 3y + 4z = 5$

B. $x^2 + y^2 + z^2 - 4x - 6y - 8z = 25$

C. $(x-2)^2 + (y-3)^2 + (z-4)^2 = 25$

D. $x^2 + y^2 + z^2 = 5$

Answer: C

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11. If $3x^{3/2} = 4$, then x=

A. 1.12

B. 1.21

C. 1.34

D. 1.49

Answer: B

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12. If $f(x) = x^3 - 4$, then the inverse of f=

A. $-x^3 + 4$

B. $\sqrt[3]{x+4}$

C. $\sqrt[3]{x-4}$

D. $\frac{1}{x^3 - 4}$

Answer: B

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13. If f is an odd function and $f(a) = b$, which of the following must also be true ?

I. $f(a) = -b$

II. $f(-a) = b$

III. $f(-a) = -b$

A. only I

B. Only III

C. Only III

D. Only I and II

Answer: C

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14. For all θ, $\tan\theta + \cos\theta + \tan(-\theta) + \cos(-\theta) =$

A. 0

B. $2\tan\theta$

C. $2\cos\theta$

D. $2(\tan\theta + \cos\theta)$

Answer: C

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15. The period of the function $f(x) = k\cos kx$ is $\frac{\pi}{2}$. The amplitude of f is

A. $\frac{1}{4}$

B. $\frac{1}{2}$

C. 1

D. 4

Answer: D

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16. If $f(x) = \frac{x+2}{(x+2)(x^2-4)}$, its graph will have

A. one horizontal and three vertical asymptotes

B. one horizontal and two vertical asymototes

C. one horizontal and one vertical asymptote

D. zero horizontal and one vertical asymptote

Answer: C

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17. At a distance of 100 feet, the angle of elevation from the horizontal ground to the top of a building is 42° .

The height of the building is

A. 67 feet

B. 74 feet

C. 90 feet

D. 110 feet

Answer: C

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18. A sphere has a surface area of 36π . Its volume is

A. 84

B. 113

C. 201

D. 339

Answer: B

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19. A pair of dice is tossed 10 times. What is the probability that no 7s or 11s appear as the sum of the sides facing up ?

A. 0.08

B. 0.09

C. 0.11

D. 0.16

Answer: A

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20. The lengths of two sides of a triangle are 50 inches and 63 inches. The angle opposite the 63-inch side is 66° . How many degrees are in largest angle of the triangle ?

A. 66°

B. 67°

C. 68°

D. 71°

Answer: C

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21. Which of the following is an equation of a line that is perpendicular to $5x + 2y = 8$?

A. $8x - 2y = 5$

B. $5x - 2y = 8$

C. $2x - 5y = 4$

D. $2x + 5y = 10$

Answer: C

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22. What is the period of the graph of the function $y = \dfrac{\sin x}{1 + \cos x}$?

A. 4π

B. 2π

C. π

D. $\dfrac{\pi}{2}$

Answer: B

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23. For what values of k are the roots of the equation $kx^2 + 4x + k = 0$ real and unequal ?

A. $0 < k < 2$

B. $|k| < 2$

C. $|k| > 2$

D. $-2 < k < 0$ or $0 < k < 2$

Answer: D

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24. Minor defects are found on 7 to 10 new cars. If 3 of the 10 cars are selectred at random , what is the probability that 2 have minor defects ?

A. 0.143

B. 0.333

C. 0.525

D. 0.667

Answer: C

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25. If $f(x) = 3x^2 + 24x - 53$, find the negative value of $f^{-1}(0)$.

A. -58.80

B. -9.80

C. -8.23

D. -1.87

Answer: B

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26. If $\log_b x = 0.2,$ and $\log_b y = 0.4,$ what is the relationship between x and y ?

A. y=2x

B. $y = x^2$

C. $y = \sqrt{x}$

D. $xy = 0.6$

Answer: B

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27. If $7^{x-1} = 6x$, find x .

A. -13.2

B. 0.08

C. 0.22

D. 12.6

Answer: D

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28. A red box contains eight items , of which three are defective, and a blue box contains five items, of which two are defective . An item is drawn at random from each box. What is the probability that one item is defective and one is not ?

A. $\frac{17}{20}$

B. $\frac{5}{8}$

C. $\frac{17}{32}$

D. $\frac{19}{40}$

Answer: D

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29. If $(\log_3 x)(\log_5 3) = 3$, find x.

A. 5

B. 9

C. 25

D. 125

Answer: D

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30. If $f(x) = \sqrt{x}, g(x) = \sqrt[3]{x+1}$, and $h(x) = \sqrt[4]{x+2}$, then $f(g(h(2))) =$

A. 1.2

B. 1.4

C. 2.9

D. 4.7

Answer: A

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31. In $\triangle ABC, \angle A = 45^\circ, \angle B = 30^\circ,$ and $b = 8$. Side a =

A. 6.5

B. 11

C. 12

D. 14

Answer: B

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32. The equations of the asymptotes of the graph of $4x^2 - 9y^2 = 36$ are

A. y=x and y=-x

B. y=0 and x=0

C. $y = \frac{2}{3}x \text{ and } y = -\frac{2}{3}x$

D. $y = \frac{3}{2}x \text{ and } y = -\frac{3}{2}x$

Answer: C

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33. If $g(x-1) = x^2 + 2$, then g(x)=

A. $x^2 - 2x + 3$

B. $x^2 + 2x + 3$

C. $x^2 - 3x + 2$

D. $x^2 + 2$

Answer: B

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34. If $f(x) = 3x^3 - 2x^2 + x - 2$, and $i = \sqrt{-1}$ then $f(i)$ =

A. $-2i - 4$

B. 4i-4

C. 4i

D. $-2i$

Answer: D

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35. If the hour hand of a clock moves K radians in 48 minutes , K=

A. 0.3

B. 0.4

C. 0.5

D. 2.4

Answer: B

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36. If the longer diagonal of a rhombus is 10 and the large angle is 100°, what is the area of the rhombus ?

A. 37

B. 40

C. 42

D. 45

Answer: C

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37. Let $f(x) = \sqrt{x^2 - 4x}$ and g(x) = 3x . The sum of all values for which f(x) = g(x) is

A. -8.5

B. 0

C. 8

D. 9.4

Answer: D

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38. How many subsets does a set with n distinct elements have ?

A. n^2

B. 2^n

C. $\frac{(2n)!}{2(n!)}$

D. n

Answer: B

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39. If $f(x) = 2^{3x-5}$, find $f^{-1}(16)$

A. 1

B. 2

C. 3

D. 4

Answer: C

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40. For what positive vavlue of n are the zeros of $p(x) = 5x^2 + nx + 12$ in ratio 2:3 ?

A. 0.42

B. 1.32

C. 4.56

D. 15.8

Answer: D

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41. If f(-x) = $-f(x)$ for all x and if the point (-2,3) is on the graph of f , which of the following points must also be on the graph of f ?

A. (-3,2)

B. (2,-3)

C. (-2,3)

D. (-2,-3)

Answer: B

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42. A man piles 150 tookpicks in layers so that each layer has one less tookpick than the below. If the top layer has three tookpicks , how many layers are there ?

A. 15

B. 17

C. 20

D. 148

Answer: A

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43. If the circle $x^2 + y^2 - 2x - 6y = r^2 - 10$ is tangent to the line 12y = 60 , the value of r is

A. 1

B. 2

C. 3

D. 4

Answer: B

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44. If $a_0 = 0.4$ and $a_{n+1} = 2|a_n| - 1$, then a_5 =

A. -0.6

B. -0.2

C. 0.2

D. 0.4

Answer: C

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45. If $5.21^p = 2.86^q$, what is the value of $\frac{p}{q}$?

A. -0.60

B. 0.55

C. 0.6

D. 0.64

Answer: D

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46. The matrix A = $\begin{bmatrix} -3 & x \\ 4 & 2/3 \end{bmatrix}$ does not have an inverse. Find the value of x.

A. $-\frac{2}{3}$

B. $-\frac{1}{2}$

C. 0

D. $\frac{3}{4}$

Answer: B

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47. There is a linear relationship between the number of chirps made by a cricket and the air temperature . A least-squares fit of data collected by a biologist yields the equation:

temp$(^\circ F)$ = 22.8 + (3.4)(#chirps/min)

What is the estimated increase in temperature that corresponds to an increase of 5 chirps per minute ?

A. $3.4^\circ F$

B. $17.0^\circ F$

C. $22.8^\circ F$

D. $26.2^\circ F$

Answer: B

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48. If the length of the daimeter of a circle is equal to the length of the major axis of the ellipse whose equation is $x^2 + 4y^2 - 4x + 8y - 28$, to the nearest whole number , what is the area of the cirle ?

A. 28

B. 64

C. 113

D. 254

Answer: C

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49. The force of the wind on a sail varies jointly as the area of the sail and the square of the wind velocity. On a sail of area 50 square yards , the force of a 15-mile-per-hour wind is 45 pounds . Find the force on the sail if the wind increases to 45 miles per hour.

A. 135 pounds

B. 225 pounds

C. 405 pounds

D. 450 pounds

Answer: C

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50. If the riser of each step in the drawing above is 6 inches and the tread is 8 inches , what is the value of |AB| ?

A. 40 inches

B. 43.9 inches

C. 46,6 inches

D. 48.3 inches

Answer: B

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