

NATIONAL EDUCATIONAL ASSESMENT AND EXAMINATIONS AGENCY (NEAEA)  
ETHIOPIAN UNIVERSITY ENTRANCE EXAMINATION (EUEE)  
MATHEMATICS EXAMINTION 2007

BOOKLET CODE: 00

NUMBER OF ITEMS:

SUBJECT CODE: 00

TIME ALLOWED: 00

1. Which one of the following is the equation of an ellipse with centre at (1, 4), vertices at (10, 4) and (1, 2) is :

Not Answered

- A)  $4(x-1)^2 + 81(y-4)^2 = 324$  ✓
- B)  $(x-1)^2 + 9(y-4)^2 = 4$
- C)  $9(x-1)^2 + 4(y-4)^2 = 1$
- D)  $2(x-1)^2 + 9(y-4)^2 = 4$

2. What is the maximum value of  $f(x) = 2x^2 - x^4 - 4$  on  $[0, 2]$ ? Not Answered

- A) -3
- B) 3 ✓
- C) -4
- D) 12

3. Which of the following is convergent sequence? Not Answered

- A) 1, 1/2, 1, 1/3, 1, 1/4, ?
- B)  $\{(-1)^n\}_{n=1}^{\infty}$
- C)  $\left\{10^{109} - \frac{1}{100^n}\right\}_{n=1}^{\infty}$  ✓
- D)  $\left\{n + \sin \frac{1}{n}\right\}_{n=1}^{\infty}$

4. Let  $f(x) = 2x(x^2 + 1)^4$ , then which of the following is an anti-derivative of  $f(x)$ ? Not Answered

- A)  $2x/5 (x^2 + 1)^5 + c$
- B)  $2/5 (x^2 + 1)^5 + c$
- C)  $x/5 (x^2 + 1)^5 + 1$
- D)  $1/5 (x^2 + 1)^5 - 1$  ✓

5. Which one of the following is an arithmetic sequence? Not Answered

- A) 3, 5, 7, 9, 11,? ✓
- B) 3, 6, 12, 24, 28, ◆
- C) -3, 6, -9, 12, -15, ◆
- D) 1, 3, 6, 10, 15, 21, ◆

6. Suppose that  $p$  represents the statement ◆◆He missed the tournament ◆◆ $q$  represents the statement ◆He got the gold medal.◆ And  $r$  represents the statement ◆he took a trip abroad.◆. then which of the following symbolic expressions represents the statement: ◆If He took a trip abroad and he does not miss the tournament, then he get the gold medal.◆? Not Answered

- A)  $(r \Rightarrow q) \neg p$
- B)  $r \wedge (p \Rightarrow q)$
- C)  $(r \wedge \neg p \Rightarrow q)$  ✓
- D)  $\neg(r \vee p) \vee q$

7. Let  $f(x) = \begin{cases} a \frac{\sin x}{x}, & x < 0 \\ e^{2x} - 2, & x \geq 0 \end{cases}$  if  $f$  is continuous at  $x=0$ , then what is the value of  $a$ ? Not Answered

- A) 1/2
- B) 2
- C) -1/2 ✓
- D) -2

8. The Ozone level (in ppb- parts per billion) on a sunny day in metropolitan area is given by formula  $p(t) = 80 + 12t \diamond t^2$  where  $t$  is time in hours and  $t = 0$  corresponds to 9A.M. what is the rate of increase of Ozone level after 3-hrs(i.e. at 12 A.M)? Not Answered

- A) 6 ppb ✓
- B) 12 ppb
- C) 107 ppb
- D) 113 ppb

9. Which of the following functions is one to one correspondence? Not Answered

- A)  $f: \mathbb{R} \rightarrow \mathbb{R}, f(x) = \tan x$ , where  $\mathbb{R}'$  is domain of  $f$
- B)  $g: \mathbb{R} \rightarrow \mathbb{R}, g(x) = 2^x$
- C)  $h: [-\infty, \infty) \rightarrow [0, \infty) : h(x) = x^2$
- D)  $r: [0, \infty) \rightarrow [0, \infty) : r(x) = x + 5$  ✓

10. Different codes, each of which consisting of five characters, are to be generated in such a way that the first two characters are any of the English capital letters (A to Z) and the remaining three are any of the digits (0, 1, 2, ◆, 9). How many distinct codes can be generated? Not Answered

- A) 468,000
- B) 260
- C) 676,000 ✓
- D)  $26! \times 10!$

11. A certain meeting hall has 20 rows of seats. There are 20 seats in the first row, 22 seats in the second row, 24 seats in the third row, and so on. How many seats are there on the last (20<sup>th</sup>) row of the hall?

Not Answered

- A. 46
- B) 58 ✓
- C) 76
- D) 5240

12. Two perpendicular lines  $l_1$  and  $l_2$  are intersecting at  $(-1, 2)$ . If the angle of inclination of  $l_1$  is  $45^\circ$ , then what is the equation of  $l_2$ ? Not Answered

- A)  $y = -x + 3$
- B)  $y = x + 3$
- C)  $y = -x + 1$  ✓
- D)  $y = x + 1$

13. What is the area of the region between the graph of  $y = \sin x$  and x-axis where  $0 \leq x \leq 2\pi$ ? Not Answered

- A) 4 ✓
- B)  $4\pi$
- C) 2
- D)  $2\pi$

14. The following is the set of data representing the average mark of students: 91, 89, 93, 91, 87, 94, 92, 85, 91, 90, 96, 93, 89. Then which one of the following statements is true about the data? Not Answered

- A) the median is 90.5
- B) the upper quartile is 92
- C) the range of marks is 11 ✓
- D) the mean is 91.5

15. If  $f(x) = \ln(\sqrt{x^2 + 1})$ , which of the following is equal to  $f'(x)$ ? Not Answered

- A)  $\frac{x}{\sqrt{x^2+1}}$
- B)  $\frac{x}{x^2+1}$  ✓
- C)  $\frac{2x}{\sqrt{x^2+1}}$
- D)  $\frac{2x}{x^2+1}$

16. If  $z = \frac{3+i}{i-2}$  is a given complex number, then what is the conjugate  $\bar{z}$ , of  $z$ ? Not Answered

- A)  $\bar{z} = \frac{-3+i}{2+i}$  ✓
- B)  $\bar{z} = \frac{i-3}{2-i}$
- C)  $\bar{z} = -6 - 2i$
- D)  $\bar{z} = -1 - i$

17. What is the principal argument of  $(5 + 5i)^{11}$ ? Not Answered

- A)  $\pi/2$
- B)  $2\pi/3$
- C)  $\pi/4$
- D)  $3\pi/4$  ✓

18. Which one of the following is equal to  $\lim_{x \rightarrow 9} \frac{x-9}{3-\sqrt{x}}$ ? Not Answered

- A) 6
- B) -3
- C) -6 ✓
- D)  $\infty$

19. For arbitrary propositions  $p$  and  $q$ , which one of the following is a valid equivalence? Not Answered

- A)  $\neg(p \Rightarrow q) \equiv (q \Rightarrow p)$
- B)  $[\neg(p \Rightarrow) \wedge p] \equiv (p \wedge \neg q)$  ✓
- C)  $[p \vee \neg q] \equiv p \Rightarrow q$
- D)  $[(p \vee q) \Rightarrow q] \equiv [p \Rightarrow \neg q]$

20. An object is moving along the parabola  $y = \sqrt{2x}$  in  $xy$ -plane. At what point on its path does the object become closest to the point  $(2, 0)$ ? Not Answered

- A)  $(3, \sqrt{6})$  ✓
- B)  $(1, 1)$
- C)  $(1, \sqrt{2})$
- D)  $(2, 2)$

21. If  $f$  and  $g$  are continuous on  $\mathfrak{R}$  and  $a, b \in \mathbf{R}$ , which one of the following is necessarily true? Not Answered

- A) if  $\int_a^b f(x)dx = \int_a^b g(x)dx$ , then  $f(x) = g(x)$  for all  $x \in [a, b]$
- B) if  $f'(x) = g'(x)$  for all  $x \in [a, b]$ , then  $\int_a^b f(x)dx = \int_a^b g(x)dx$

- C) if  $f(x) \geq 3$  for all  $x \in [-2, 2]$ , then  $\int_{-2}^2 f(x) dx \geq 12$  ✓
- D)  $\int_a^b f(x) dx = \int_b^a f(x) dx$

22. Consider the following system of equations: 
$$\begin{cases} ax + by = 2 \\ x + 3y + 2z = 0 \\ 2x + y + z = 0 \end{cases}$$
 if the determinant of the coefficient matrix is 2, then what is the solution set of the system? Not Answered

- A)  $\{(1, 3, -5)\}$  ✓
- B)  $\{(1/a, 1/b, 0)\}$
- C)  $\{(-2, -6, 10)\}$
- D)  $\emptyset$

23. For what values of a and b is the function  $f(x) = \begin{cases} 1 - 3x^2, & \text{for } x \leq 1 \\ ax + b, & \text{for } x > 1 \end{cases}$  is differentiable at  $x=1$ ?

Not Answered

- A)  $a = 6, b = 0$
- B)  $a = -3, b = 1$
- C)  $a = 0, b = -2$
- D)  $a = -6, b = 4$  ✓

24. Which one of the following is equal to  $\int \frac{\ln x + x^2 e^x}{x} dx$ ? Not Answered

- A)  $\frac{1}{2} \ln^2 x + e^x(x^2 - 1) + c$
- B)  $\frac{1}{2} \ln^2 x + e^x(x - 1) + c$  ✓
- C)  $\frac{1}{x^2} \ln x + e^x(x - 1) + c$
- D)  $\frac{-1}{x^2} \ln x + e^x(x^2 - 1) + c$

25. What is the focus of the parabola  $y^2 + 4y + 8x = 4$ ? Not Answered

- A) (1, -2)
- B) (-1, -2) ✓
- C) (3, -2)
- D) (-3, -2)

26. A city has two daily newspapers, X and Y. the following information was obtained from the survey of 100 residents of the city: 35 people subscribe to X, 60 people subscribe to Y and 20 subscribe to both newspapers. Then how many of the people in the survey do not subscribe to either of the newspapers? Not Answered

- A) 5
- B) 25 ✓
- C) 40
- D) 55

27. Which one of the following is necessarily true? Not Answered

- A) if  $f'(x) = 0$  for all  $x$  in the interval  $I$ , then  $f(x) = 0$  for all  $x$  in  $I$ .
- B) if  $f(x) = x^2 \sin x + 5$ , then there is  $c \in (0, \pi)$  such that  $f'(c) = 0$
- C)  $f(x) = e^x$  is increasing on  $(-\infty, \infty)$  ✓
- D)  $f(c) = 0$ , then  $f$  attains its maximum or minimum value at  $x = c$

28. The derivative of the function  $f(x) = \int_{-x}^x \frac{dt}{1+t}$  is : Not Answered

- A)  $\frac{2}{1-x^2}$  ✓
- B)  $\ln |1+x|$
- C)  $\frac{1}{1+x}$
- D)  $\ln \left| \frac{1+x}{1-x} \right|$

29. If  $p(x) = 3x^2$  and  $q(x) = x^2 + x$ , then what is the solution set of  $\frac{p(x)}{3q(x)} - \frac{1}{x} = \frac{1}{q(x)}$ ? Not Answered

- A)  $\{-1, 2\}$
- B)  $\{2\}$  ✓
- C)  $\{-3, 2\}$
- D)  $\{-3\}$

30. What are the values of  $u$  and  $v$  that satisfy the equation:  $\frac{u+3i}{4-2i} = \frac{2+vi}{20}$ ? Not Answered

- A)  $u=2, v=3$
- B)  $u=-6, v=10$
- C)  $u=2, v=16$  ✓
- D)  $u=-4, v=6$

31. What is the sum of all multiples of 3 between 20 and 200? Not Answered

- A) 7,227

- B) 6,570 ✓
- C) 6,150
- D) 5,166

32. The invers of the function defined by  $g(x) = \frac{2x}{x+3}$  is equal to: Not Answered

- A)  $g^{-1}(x) = -\frac{2x}{x-3}$
- B)  $g^{-1}(x) = -\frac{3x}{x-2}$  ✓
- C)  $g^{-1}(x) = -\frac{x+3}{2x}$
- D)  $g^{-1}(x) = -\frac{x+2}{3x}$

33. If  $A = \begin{pmatrix} 0 & x & 0 \\ 1 & -1 & 1 \\ 0 & y & -1 \end{pmatrix}$  and  $A^{-1} = \begin{pmatrix} 1 & 1 & 1 \\ 3 & 0 & 0 \\ 2 & 0 & -1 \end{pmatrix}$ , then what are the value of x and y? Not Answered

- A)  $x = 3, y = -2$
- B)  $x = 2/3, y = 1/3$
- C)  $x = -3, y = 2$
- D)  $x = 1/3, y = 2/3$  ✓

34. If  $f(2) = -e$ ,  $f'(2) = 4$ ,  $g(1) = -5$ ,  $g'(1) = 1$  and  $F(x) = f(2x+2)(g(x-x^2))$ , then what is the value of  $F'(0)$ ?

Not Answered

- A) 19
- B) 0
- C) -20
- D) -40 ✓

35. A ladder 6m long rests against a vertical wall. If the bottom of the ladder slides away from the wall at a rate (speed) of 0.5 m/s, how fast the angle between the top of ladder and the wall changing when the angle is  $\pi/4$  rad? Not Answered

- A)  $\sqrt{2}/2$  rad/sec
- B)  $\sqrt{2}/12$  rad/sec ✓
- C)  $\sqrt{2}/6$  rad/sec
- D)  $\sqrt{2}/3$  rad/sec

36. The value(s) of x where the graph of the function  $y = \frac{x^2-1}{x^3}$  crosses its horizontal asymptote is (are):

Not Answered

- A)  $x = -2$

- B)  $x = -1$  and  $x = 1$  ✓
- C)  $x = 0$
- D)  $x = -\sqrt{2}$  and  $x = +\sqrt{2}$

37. If  $A = \begin{pmatrix} 3 & -2 & 8 \\ 0 & 6 & 7 \\ 0 & 4 & 5 \end{pmatrix}$ , then  $\det(A^T A)$  is equal to :

- A) 12
- B) 36 ✓
- C) 30
- D) 15

38. Suppose that the first 3 letters (A, B, and C) and number digits are to be used to form car plates in a small town. How many different plates can be formed in total that contains 1, 2 or 3 letters and then followed by 3 digits?

- A) 3,000
- B) 27,000
- C) 39,000 ✓
- D) 100,000

39. A ball is thrown vertically from ground up to a height of 16m. Each time it drops  $h$  meters, it rebounds  $0.80h$  m. noting that the ball travels every height of  $h$  twice, what is the total vertical distance travelled by the ball before it comes to rest?

- A) 40m
- B) 80m
- C) 160m ✓
- D) 320m

40. Suppose that a function  $f$  has a property that  $f(x + y) = f(x)f(y)$  for all  $x$  and  $y$  and that  $f(0) = 2$ ,  $f'(0) = 1$ . Then which one of the following represents the formula for the derivative  $f'(x)$ ?

- A)  $f'(x) = 2f'(x) + 1$
- B)  $f'(x) = f(x) + 2f'(x)$
- C)  $f'(x) = f(x) + 2$
- D) no such function ✓

41. Which one of the following is true about a conic section represented by the equation  $\frac{x^2}{k} + \frac{y^2}{k-9} = 1$ ?

- A) it is a circle whose center is at origin for some  $k \in \mathbb{R}$ .
- B) it is an ellipse whose major axis is vertical when  $k > 9$ .
- C) it is a hyperbola whose foci are at  $(-3, 0)$  &  $(3, 0)$  when  $0 < k < 9$ . ✓
- D) it is a hyperbola whose foci are at  $(-3k, 0)$  &  $(3k, 0)$  when  $0 < k < 9$ .

42. Which of the following is NOT a tautology? Not Answered

- A)  $[p \vee (q \Rightarrow r)] \Leftrightarrow [\neg p \Rightarrow (q \Rightarrow r)]$
- B)  $p \vee (q \Rightarrow \neg q)$
- C)  $p \Rightarrow [(p \Rightarrow q) \vee q]$  ✓
- D)  $[p \Leftrightarrow (q \wedge \neg r)] \Leftrightarrow [\neg p \Leftrightarrow (\neg q \vee r)]$

43. What is the solution of the system  $\begin{cases} x + y - z = 1 \\ x + 2y - 3z = 1 \\ 2x + 3y - 4z = 2 \end{cases}$ ? Not Answered

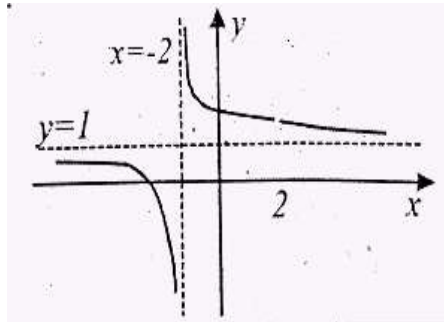
- A)  $\{(0, 2, 1)\}$
- B)  $\{(1 - k, 2k, k) \mid k \in \mathbb{R}\}$  ✓
- C)  $\{(2k + 1, -k, k) \mid k \in \mathbb{R}\}$
- D)  $\emptyset$

44. Let:  $\begin{cases} 3 - 2^{2x}, & \text{if } x < 0.5 \\ \frac{2^x - 5}{x + 1}, & \text{if } x \geq 0.5 \end{cases}$ , if  $c$  is a zero of  $f$ , that is,  $f(c) = 0$ , then which one of the following intervals must

contain  $c$ ? Not Answered

- A)  $(-\infty, 0]$
- B)  $[0, 1]$
- C)  $[1, 2]$
- D)  $[2, 3]$  ✓

45. Which of the following functions could most likely be drawn as in the Figure 1 below?



Not Answered

- A)  $\frac{x+3}{x+2}$
- B)  $\frac{x^2-2x}{x^2-4}$
- C)  $\frac{-x^2-x+6}{x^2-4}$
- D)  $\frac{x^2+x-6}{x^2-4}$  ✓

46. A measurement is grouped in to five class intervals with the following frequency distribution.

Class Intervals	5-15	15-25	25-35	35-45	45-55
Frequency	22	40	68	50	20

What are the first quartile  $Q_1$  & the 75<sup>th</sup> percentile  $P_{75}$  of the measurement? Not Answered

- A)  $Q_1 = 20, P_{75} = 40$
- B)  $Q_1 = 22, P_{75} = 40$
- C)  $Q_1 = 20, P_{75} = 39$
- D)  $Q_1 = 22, P_{75} = 39$  ✓

47. The number of shoes  $s$  that a factory can produce per day is a function of the number of hours  $t$  it operates:

$$s(t) = 40t \text{ for } 0 \leq t \leq 12$$

the daily cost  $c$ , in Birr, to manufacture  $s$  shoes is given by the function

$$c(s) = 0.1s^2 + 90s + 800$$

If the factory operates for 10 hours, what is the cost it incurs in producing as much shoes it can with in this time? Not Answered

- A) Birr 400
- B) Birr 1,600
- C) Birr 52,800 ✓
- D) Birr 124,600

48. Three persons  $P_1, P_2$  and  $P_3$  are firing at a target independently and have a probability 0.7, 0.5 and 0.4, respectively, of hitting the target. What is the probability that at least one of them hits the target?

Not Answered

- A) 0.95
- B) 0.85
- C) 0.91 ✓
- D) 0.99

49. Which one of the following is equal to  $\lim_{x \rightarrow \infty} \left( \frac{3x}{3x+2} \right)^{-3x}$ ? Not Answered

- A)  $e^2$  ✓
- B)  $e^{-3}$
- C)  $e^{-2}$
- D)  $e^3$

50. The total cost (in Birr) of producing  $x$  radio sets per day is given by the expression  $0.25x^2 + 35x + 25$  and the price per set at which they may be sold is given by  $50 - (0.5)x$ . What should be the daily output to obtain a maximum total profit? Not Answered

- A) 50 sets per day
- B) 23 sets per day
- C) 10 sets per day

- D) no such case ✓

51. A company manufactures  $x$  computer sets per month. The monthly marginal profit (in Birr) is given by:  $p(x) = 165 - 0.1x$ , for  $0 \leq x \leq 400$ . The company is currently manufacturing 10 sets of computer per month, but is planning to increase production. What is the total change in the monthly profit if the monthly production increased to 60 sets? Not Answered

- A) Birr 50
- B) Birr 1,865
- C) Birr 8,075 ✓
- D) Birr 18,635

52. If angle  $\theta$  is an acute angle of a right triangle, what is the length of the side adjacent to  $\theta$ , given the hypotenuse has 6 units length and  $\sec \theta = 10/3$ ? Not Answered

- A) 1.8 units ✓
- B) 2 units
- C) 18 units
- D) 20 units

53. If  $A = (1, -2)$ ,  $B = (-3, 2)$  and  $\vec{v}$  is a position vector such that  $2\vec{v} + \overrightarrow{AB} = \vec{o}$ , then  $\vec{v}$  is equal to

Not Answered

- A) (2, 0)
- B) (-1, 0)
- C) (-2, 2)
- D) (2, -2) ✓

54. If each of the compound propositions  $P \vee Q$ ,  $P \Rightarrow R$  and  $\neg R$  is true, then which one of the following is True? Not Answered

- A) P
- B) Q ✓
- C)  $Q \Rightarrow P$
- D)  $P \wedge \neg R$

55. If  $\vec{A} = 4\vec{i} - 3\vec{j}$  and  $\vec{u}$  is a unit vector such that  $|\vec{A} + \vec{u}|^2 = 27$ , then the cosine of the angle between  $\vec{A}$  and  $\vec{u}$  is equal to

Not Answered

- A) 0.1 ✓
- B) 0.2
- C) 0.3
- D) 0.4

56. What is the possible value of  $x$  that solves the equation:  $\sin^{-1} x + \cos^{-1}\left(\frac{3}{5}\right) = \pi$

Not Answered

- A)  $\pi/3$
- B)  $3/5$
- C)  $5\pi/2$
- D)  $4/5$  ✓

57. If  $P = (3, \alpha - 1, \alpha + 2)$  and  $Q = (2\alpha + 1, 3, 3\alpha)$  are points in space, what should be the value(s) of  $\alpha$  so that the distance between the two points is 6? Not Answered

- A)  $\alpha = 1$ , or  $\alpha = 5$
- B)  $\alpha = \frac{4+2\sqrt{7}}{3}$ , or  $\alpha = \frac{4-2\sqrt{7}}{3}$  ✓
- C)  $\alpha = -1$ , or  $\alpha = 3$
- D)  $\alpha = -3$ , or  $\alpha = 2$

58. If  $(-1, 2, 2)$  and  $(1, 0, -2)$  are end points of a diameter of a sphere, then which one of the following is true about the sphere? Not Answered

- A)  $(0, 1, 0)$  is a point on the sphere
- B) the equation of the sphere is  $x^2 + (y-1)^2 + z^2 = 6$  ✓
- C) the equation of the sphere is  $x^2 + (y-2)^2 + z^2 = 6$
- D) the radius of the sphere is 6

59. Suppose that the equation  $x^2 + y^2 + z^2 + 2x + 8z = 6(y + 1)$ , represents a sphere. Where is the point  $(1, -1, 4)$  located relative to the sphere? Not Answered

- A) inside the sphere
- B) on the sphere
- C) at the center of the sphere
- D) outside the sphere ✓

60. Two ships, one with angle of depression  $60^\circ$  due east and the other with  $30^\circ$  due west are observed from a plane 1,000 metres above sea. If the two ships are on the same line, what is the distance between the two ships? [you may use the values:  $\sin 30^\circ = \cos 60^\circ = 1/2$  and  $\sin 60^\circ = \cos 30^\circ = \sqrt{3}/2$ ] Not Answered

- A)  $\frac{1}{\sqrt{3}} 4,000m$  ✓
- B) 2,000m
- C)  $\sqrt{3} 500m$
- D)  $\frac{1}{\sqrt{3}} 600m$

61. What is the image of the ellipse  $(x - 1)^2 + 4y^2 = 1$  under the translation that takes  $(1, 1)$  to  $(0, 2)$  followed, by the reflection through the x-axis? Not Answered

- A)  $x^2 + 4(y - 1)^2 = 1$
- B)  $4x^2 + (y - 1)^2 = 1$
- C)  $x^2 + 4(y + 1)^2 = 1$  ✓
- D)  $4x^2 + (y + 1)^2 = 1$

62. What is the amplitude and period, respectively, of the graph of  $f(x) = -6 \sin x \cos x$ ? Not Answered

- A)  $3, \pi$  ✓
- B)  $6, \pi$
- C)  $3, \pi/2$
- D)  $6, 2\pi$

63. What is the work done (in joule) when a force of 50 Newton is used to pull a cart 20 meters along path if the force is at an angle of  $60^\circ$ ?

[Remember that: Work=(Force) x (distance travelled)] Not Answered

- A) 360
- B) 500 ✓
- C) 760
- D)  $1500\sqrt{2}$

64. Suppose L is the line through the center of the sphere  $x^2 + y^2 + (z - 2)^2 = 9$  and the line intersects the sphere at  $(1, 2, 4)$ . What is the cosine of the angle between L and positive z-axis? Not Answered

- A)  $2/3$  ✓
- B)  $1/3$
- C)  $3/5$
- D)  $4/5$

65. Consider the formula for a natural number  $n \in \mathbb{N}$ :

$$2 + 4 + 8 + \diamond + 2^n = 2^{n+1} + 1$$

To prove this formula a person has used the following argument.

◆ Assume the formula is true for  $n=k$ , for some  $k \in \mathbb{N}$ . Then the person has shown that the formula is also true for  $n=k + 1$ . And then, the person has concluded that, by the Principle of Mathematical induction, the formula is true for all natural numbers  $n \in \mathbb{N}$ . ◆ which one of the following statements is true about the above argument? Not Answered

- A) the formula holds true though it does not work for  $n=1$
- B) since the left-hand-side is an even number and the right-hand-side an odd number, the Principle of Mathematical Induction is False.
- C) this is one example where the Principle of Mathematical Induction fails to work.
- D) the above formula does not work for all natural numbers  $n \in \mathbb{N}$  ✓

## Your Answers

you have scored 0 out of 0

## Answer Key

1.A	11.B	21.C	31.B	41.C	51.C	61.C
2.B	12.C	22.A	32.B	42.C	52.A	62.A
3.C	13.A	23.D	33.D	43.B	53.D	63.B
4.D	14.C	24.B	34.D	44.D	54.B	64.A
5.A	15.B	25.B	35.B	45.D	55.A	65.D
6.C	16.A	26.B	36.B	46.D	56.D	
7.C	17.D	27.C	37.B	47.C	57.B	
8.A	18.C	28.A	38.C	48.C	58.B	
9.D	19.B	29.B	39.C	49.A	59.D	
10.C	20.A	30.C	40.D	50.D	60.A	

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