MINISTRY OF HIGHER EDUCATION UNIVERSITY OF NGAOUNDERE

COMPETITIVE ENTRANCE EXAMINATION INTO ENSAI

(THE NATIONAL SCHOOL OF AGRO-INDUSTRIAL SCIENCES)

ENSAI

MIP

30TH AND 31ST AUGUST 2003

SUBJECT:

MATHEMATICS

Time : 3 Hours

Coefficient :3

Examination Centre........Douala.. Desk N° ....

Name ...Kekhambany....Other names......Njikè Fulgence

Date of Birth ..12 April 1984. Place of Birth ...Douala.........

Entry Qualification ....?.......OPTION ....1.........

NOTE:

Any distinctive marks anywhere else except on this page, which makes it possible to identify the candidate, will lead to the cancellation of the candidate's script. The four pages in the beginning and end of this question booklet may be used for rough work.

This paper is made up of Multiple Choice Questions. Candidates are to use the answer sheet found in the middle of this question booklet for their answers. Indicate your choice of the right answer by marking an X in box corresponding to the chosen answer.

Carefully fill out the required information on the answer sheet before attempting the questions.

No other materials other than pencils and pens are allowed in the examination room

SCRAP

(For Rough Work)

$1+2^2+3^2+\dots+n^2 = \frac{(n+1)n(2n+1)}{6}$

1 : $\lim_{n\to+\infty} \frac{(n+1)(n-2)(n+3)}{n^3}$

(A) 1 ✓ (B) −1 (C) $+\infty$ (D) doesn't exist (E) none of these

2 : $\lim_{n\to+\infty} \frac{1+2^2+3^2+\dots+n^2}{n^3}$

(A) 1 (B) doesn't exist (C) $\frac{1}{3}$ ✓ (D) $+\infty$ (E) none of these

3 : $\lim_{n\to+\infty}\left(\frac{x+n}{y+n}\right)^n =$

(A) $+\infty$ (B) $x-y$ (C) e^{x-y} ✓ (D) 1 (E) none of these

4 : The primitive of $f(x)=\frac{1}{x\sqrt{1-\ln x}}$ is given by the equation $F(x)=$

(A) $\frac{1}{\sqrt{1+\ln x}}$ (B) $2\sqrt{1-\ln x}$ ✓ (C) $\frac{1}{2}\sqrt{1-\ln x}$ (D) $\sqrt{1-\ln x}$ (E) $\frac{\ln x}{\sqrt{1-\ln x}}$.

5 : $\lim_{x\to 0}\left(\frac{1}{x}-\frac{\ln(1+x)}{x^2}\right)=$

(A) doesn't exist (B) −1 (C) $\frac{1}{2}$ (D) $-\infty$ (E) none of these

6 : $\lim_{x\to 0}\frac{\sqrt{1+\sin x}-\sqrt{1-\sin x}}{x}=$

(A) $\frac{1}{2}$ (B) $+\infty$ (C) 1 ✓ (D) doesn't exist (E) −1

7 : The domaine of definition $f: x \mapsto \frac{3\sin x+\frac{1}{2}\tan^2 x}{x(x-1)\cos x}$ is :

(A) IR (B) IR\ $\{0, \frac{\pi}{2}\}$ (C) IR\ $\{1, \frac{\pi}{2}\}$

(D) IR\ $\{1, 0, \frac{\pi}{2}+2k\pi, k\in Z\}$ ✓ (E) none of these

8 : The function f defined in IR by $f(x)=\frac{\ln(1+x)-\ln(1-x)}{x}$ if $x\neq 0$, and $f(0)=y$ is continue in IR when y is equals :

(A) 1 (B) $\frac{1}{2}$ (C) 2 ✓ (D) −1 (E) none of these

9 : A circular outlet on a damp has a diameter y; given that the rate of water flow, Q per second is defined by the equation $Q=cy\sqrt{h-y}$ where h is the deepest point of the damp measured from the outlet. (the quantities h and c being constants) : In order to maintan a Q at the maximu, y must be equals to:

$y = 1+n$

(A) $\frac{2}{3}h$ (B) $\frac{2h}{\sqrt{3}}$ (C) $h\sqrt{\frac{2}{3}}$ (D) h (E) none of these

10 : A energy consisting of N batteries is built by assembling n batteries in series, and then putting the series in parallel (assume that n is divisable by N) : The intensity of current in the battery is given by the formula $I=\frac{NnE}{NR-n^2r}$, where E is the electromotive force of the pile of batteries . R the external resistance, and r the internal resistance. In order to obtain a maximum current intensity n must be equals to :

(A) $\sqrt{\frac{NR}{r}}$ (B) The nearest whole number to $\sqrt{\frac{NR}{r}}$

(C) $\sqrt{\frac{Nr}{R}}$ (D) The nearest whole number to $\sqrt{\frac{Nr}{R}}$ (E) None of these

For questions 11 and 12 : A rectangular beam is to be cut out from a tree trunk of diameter d. Given (x, y) to be the width and the height of the rectangular section.

11 : For maximum resistance to a bending force, the couple (x, y) must be equal to

(A) $\left(\frac{d}{\sqrt{3}}, \frac{d}{\sqrt{2}}\right)$ (B) $\left(\frac{d}{\sqrt{2}}, \frac{d}{\sqrt{2}}\right)$ (C) $\left(\frac{d}{\sqrt{2}}, \frac{d}{\sqrt{3}}\right)$ (D) $\left(\frac{d}{\sqrt{3}}, \frac{d}{\sqrt{3}}\right)$

(E) none of these

12 : For maximum resistance to a compression force, the couple (x, y) must be equal to

(A) $\left(\frac{d}{\sqrt{3}}, \frac{d}{\sqrt{2}}\right)$ (B) $\left(\frac{d}{\sqrt{2}}, d\sqrt{\frac{2}{3}}\right)$ (C) $\left(d\sqrt{\frac{2}{3}}, \frac{d}{\sqrt{3}}\right)$ (D) $\left(\frac{d}{\sqrt{3}}, d\sqrt{\frac{2}{3}}\right)$

(E) none of these

13 : $\int\frac{dx}{3x^2-x+1}=$

(A) $\frac{2}{\sqrt{11}}\arctan\frac{3x-2}{\sqrt{11}}+K$ (B) $\frac{6}{\sqrt{11}}\arctan\frac{2x-1}{\sqrt{11}}+K$ (C) $\frac{2}{\sqrt{11}}\arctan\frac{6x-1}{\sqrt{11}}+K$

(D) $\frac{3}{\sqrt{11}}\arctan\frac{3x-2}{\sqrt{11}}+K$ (E) none of these

14 : $\int\frac{dx}{(x+1)\sqrt{x^2-2}}=$

(A) $\arcsin\frac{1}{\sqrt{x+1}}+K$ (B) $\arccos\frac{1}{x+1}+K$ (C) $-\arcsin\frac{1}{x+1}+K$

(D) $\arccos\frac{1}{\sqrt{x+1}}+K$ (E) none of these

15 : $\int_0^{\pi} e^{x}\sin x\,dx=$

(A) $\frac{1}{2}(1-e^{\pi})$ (B) $\frac{1}{2}(1+e^{\pi})$ (C) 1

(D) $\frac{1}{2}(e^{-\pi}-e^{\pi})$ (E) none of these

16 : The area of the ellipse $r=\frac{p}{1-\varepsilon\cos\theta}$ $(\varepsilon<1)$ is equal to

(A) $\frac{\pi p^2}{(1-\varepsilon^2)^2}$ (B) $\frac{\pi p^2}{(1-\varepsilon^2)^{3/2}}$ (C) $\frac{\pi p^2}{(1-\varepsilon)^2}$

(D) $\frac{\pi p^2}{(1+\varepsilon^2)^{3/2}}$ (E) none of these

17 : The surface of a plane figure limited by the paraboles $y=x^2$, $y=\frac{x^2}{2}$ and the line $y = 2x$ is equals :

(A) $\frac{20}{3}$ (B) $\frac{32}{3}$ (C) 4 (D) -4 (E) none of these

For questions 18, 19 et 20 consider the equations $I=\int_0^{\frac{\pi}{2}}\ln(\sin x)dx$ and $J=\int_0^{\frac{\pi}{2}}\ln(\cos x)dx$

18 : Which of the following statements is not correct

(A) I converges (B) J converges (C) I and J are of the same nature

(D) $I = J$ (E) I is a defined integral

19 : Which of the following statements is correct

(A) I and J are of the same nature (B) I diverges (C) I converges towards 0 (D) I converges towards π (D) $I+J$ diverges

20 : Which of the following statements is correct

(A) $I+J = 2I+\frac{\pi}{2}\ln 2$ (B) $I+J = 0$ (C) $I = -\frac{\pi}{2}$ (D) $J = -\pi$

21 : The R précision with which the number $\frac{\pi}{4}$ can be calculated using serial development $\arctan x=x-\frac{x^3}{3}+\frac{x^5}{5}-\cdots$ (and using the sum of the first 5 with $x=1$) is :

(A) $R<\frac{1}{11}$ (B) $R<0.1$ (C) $R<0.001$ (D) $R<\frac{1}{40}$ (E) none of these

22: The decimal part of a rational number consisting of a repetitive term written as 0.123123123... is equal to

(A) $\frac{123}{999}$ (B) $\frac{12}{99}$ (C) $\frac{124}{999}$ (D) $\frac{121}{999}$ (E) $\frac{1}{9}$

For each of the following functions in questions 23 to 25 determine the step of the limited development in the order of n and point x_0 indicated in each case

(A) π (B) $\frac{3\sqrt{\pi}}{2}$ (C) $\frac{3\pi}{2}$ (D) 4π (E) 4π

23: $f(x)=\frac{\sqrt{x+2}-2}{\sqrt{x+7}-3}$, $x_0 = 2$; $n = 1$.

(A) $-2+(x-2)$ (B) $\frac{3}{2}-\frac{5}{96}(x-2)$ (C) $-\frac{3}{2}-\frac{5}{96}(x-2)$

(D) $-2-(x-2)$ (E) none of these

24: $f(x)=e^{x}\sin x$, $x_0 = 0$, $n = 5$

(A) $x-x^2+x^3-\frac{x^4}{4}$ (B) $x+x^2+\frac{x^3}{3}-\frac{x^5}{30}$ (C) $1-x-\frac{x^2}{2}-\frac{x^3}{6}-\frac{x^5}{30}$

(D) doesn't exist (E) none of these

25: $Arcsin\,x$, $x_0 = 0$, $n = 5$

(A) $1-\frac{x^2}{2}-\frac{x^4}{4!}$ (B) $x-\frac{x^3}{6}-\frac{x^5}{5!}$ (C) $x+\frac{x^3}{6}+\frac{x^5}{5!}$

(D) $1-\frac{x^2}{2}+\frac{x^4}{24}-x^6$ (E) $x-\frac{x^3}{3}+\frac{2x^5}{9}$

26: The integral of the arc $\int_C (5x\,dx+x^3\,dy)$ where C is the closed curve positively orientated made of the parabole defined by $y=x^3$ and the line $y=2x$, between the points (0, 0) and (2, 4) of the cartesian plan is equals to :

(A) 0 (B) $\frac{12}{3}$ (C) $\frac{37}{19}$ (D) $-\frac{28}{15}$ (E) none of these

27: At which point of a sphere defined by $x^2+y^2+z^2=19$ is the following function $f(x,y,z)=2x+3y+5z$ maximum ? $2x+3y+5z$

(A) (0, 1, 2) (B) $(\sqrt{2}, \frac{3\sqrt{2}}{2}, \frac{5\sqrt{2}}{2})$ (C) $(\sqrt{2}, \frac{3\sqrt{2}}{2}, \frac{2\sqrt{5}}{3})$

(D) $(\sqrt{2}, 1, \frac{5\sqrt{5}}{2})$ (E) none of these

28: The maximum value of the function given in the preceeding question is equals to :

(A) 18 (B) $\frac{19\sqrt{2}}{3}$ (C) $\frac{2\sqrt{2}}{3}$ (D) $15\sqrt{2}$ (E) none of thes

29: If $ABCA$ is the perimeter of the triangle ABC of heights $A=(a, 0, 0)$, $B=(0, a, 0)$ and $C=(0, 0, a)$ then $\oint_{ABCA} (y^2dx+z^2dy+x^2dz)=$

(A) 0 (B) $\frac{\sqrt{a}}{2}$ (C) $5a$ (D) $-a^2$ (E) $3a^2+a$

30) If C is the ellipse of the equation $x+y=1$, $z+x=1$, then $\int x\,dx-(x\pm1)\,dy+(x-y-z)\,dz=0$

For questions 31 and 32. If the elements a_{ij} of a square matrix A of order 3 are defined by $a_{ij}=(-1)^{i+j}$. Then,

31.

(A) $A^2=0$ (B) $A^2=I$ (C) $A^2=3A$

(D) $A^2=-3A$ (E) none of the above

32.

(A) A is inversible (B) $\lambda=0$ is an eigen value of A

(C) det(A) = -1 (D) $\lambda=-1$ is an eigen value of A

(E) none of the above

33. Which of the following subsets is not a subspace of IR^3 ?

(A) all vectors of the form (a, 0, 0) (B) all vectors of the form (a, b, a)

(C) all vectors of the form (a, b, c), with b = a − c

(D) all vectors of the form (a, b, c), with b = a + c - 1

(E) none of the above

34. Which of the following subsets is a subspace of the vector space IP_3 of polynomials of degree less than 3 with coefficients in IR :

(A) All polynomials $a_0+a_1x+a_2x^2+a_3x^3$ with $a_0=0$;

(B) All polynomials $a_0+a_1x+a_2x^2+a_3x^3$ with $a_3=0$;

(C) All polynomials $a_0+a_1x+a_2x^2+a_3x^3$ where a_2 is a positive integer ;

(D) All polynomials of the form a_0+a_1x where a_0 et a_1 are purely imaginary;

(E) none of the above

35. Which of the following vectors is a linear combination of the vectors u =(1, -1, 3) and v = (2, 4, 0) ?

(A) (3, 3, 3) (B) (4, 2, 6) (C) (1, 5, 6)

(D) (0, 0, 0) (E) none of the above

36. Which of the functions given below belong to the subspace generated by the functions $f(x)=\cos^2 x$ and $g(x)=\sin^2 x$

(A) $\cos 2x$ (B) $\sin x$ (C) $3-x^2$

(D) 1 (E) none of the above

37. The line integral $\oint_C 5x\,dy + x^2\,dy$ where C is the positively oriented closed curved. consisting of the arc of parabola $y = x^2$ and the straight line $y = 2x$, between the points (0,0) et (2,4), is equal to :

(A) 0 (B) $-\frac{14}{3}$ (C) $\frac{37}{19}$ (D) $-\frac{28}{15}$ (E) none of the above

38. The double integral $\iint_D (x^2 + y^2)\,dx\,dy$ where $D = \{(x,y)/ y \geq 0,\ x^2 + y^2 - x \geq 0\}$ is equal to:

(A) $\frac{\pi}{4}$ (B) $\frac{1}{8}$ (C) $\frac{3\pi}{2}$ (D) $\frac{2\pi}{15}$ (E) none of the above

39. Where on the sphere $x^2 + y^2 + z^2 = 19$ does then the function $f(x,y,z) = 2x + 3y + 5z$ take on its maximum value ?

(A) (0, 1, 2) (B) $(\sqrt{2}, \frac{3\sqrt{2}}{2}, \frac{5\sqrt{5}}{2})$ (C) $(\sqrt{2}, \frac{3\sqrt{2}}{2}, \frac{2\sqrt{5}}{3})$

(D) $(\sqrt{2}, 1, \frac{5\sqrt{5}}{2})$ (E) none of the above

40. The minimum value for the function in exercise 39 is given by:

(A) 18 (B) $\frac{19\sqrt{2}}{3}$ (C) $19\sqrt{2}$ (D) $\frac{2\pi}{15}$ (E) none of the above

41. Supposons qu'une paire de dés sont jetés. Si la variable x désigne la somme des points. La probabilité correspondant à x = 5 est donnée par :
(a) 2/18, (b) 3/36, (c) 1/36, (d) 4/36

42. Quelle est la valeur de la variable aléatoire x, étant donné que x représente le nombre de faces obtenues lorsqu'une pièce est lancée, si le côté face apparaît dans le premier ou le second tirage.
(a) 1, (b) 2, (c) 0 , (d) Aucune.

43. Une variable aléatoire qui prend des valeurs d'un nombre fini ou d'un nombre infini comptable est appelée :
(a) une variable aléatoire non discrète
(b) une variable aléatoire continue
(c) une variable aléatoire discrète
(d) (a) et (b).

44. Si la variable X répond à la fonction $f(x) = K(x^2 + 1)$, où $-\infty < x < \infty$, alors la valeur de la constante K est donnée par :
(a) Π/2 (b) 1, (c) -Π/2, (d) 1/Π

45. En utilisant la fonction de l'exercice 32, quel est la probabilité que X^2 tombe entre 1/3 et 1.
(a) ½, (b) 1/6, (c) 2/Π (d) 1/3

46. Soit la fonction $f(x) = k/(x^2 + 1)$, la fonction de distribution correspondante sera :
(a) $1/\Pi \tan^{-1} u$, (b) $\tan^{-1} x + \Pi/2$, (c) $½ + 1/\Pi \tan^{-1} x$, (d) Aucune.

47. Laquelle des valeurs suivantes est la vraie valeur de K ?
(a) 42 (b) 1/21, (c) 42K (d) 1/42.

48. $P(X \geq 1, Y \leq 2)$ est donnée par:
(a) 12/42, (b) 6/21, (c) (a) et (b), (d) 4/7

49. Quelle est la valeur de P(X = 2, Y = 1) ?
(a) 5/42, (b) 4/7, (c) 13/42 (d) Aucune.

50. Dans un jeu où un dé est lancé simplement, un joueur gagne 40 francs si 4 apparait, gagne 20 francs si 2 apparait et perd 30 francs si 6 apparait et ne perd ni ne gagne si une autre face apparait. Quel est la somme d'argent supposée gagnée ?
(a) 10 frs, (b) 25 frs, (c) 15 frs, (d) aucune.

51. Quelle est la probabilité d'avoir exactement deux fois le côté face dans 6 lancés de pièces ?
(a) ½, (b) 15/64, (c) 15/4, (d) 0.

52. Laquelle des propositions suivantes n'est pas vraie quand une pièce est lancée trois fois ?
(a) La probabilité d'avoir 3 fois le côté face est 1/8
(b) La probabilité d'avoir pas plus d'une fois le côté pile est ½.
(c) La probabilité d'avoir 2 pile et 1 face est ½.
(d) La probabilité d'avoir au moins 1 face est 7/8.

53. Dans une famille de 4 enfants, quelle sera la probabilité d'avoir au moins 1 garçon ?
(a) ¼, (b) 1/16, (c) 3/8, (d) 15/16.

54.. Un homme possède 400 boulons. Si la probabilité d'avoir un boulon défectueux est 0,1 alors la moyenne de boulons défectueux est donnée par :
(a) 40, (b) 36, (c) ni (a) ni (b), (d) Aucune des réponses. $\mu = np$

55. Quelle est la probabilité d'obtenir entre 3 et 6 côtés face de manière inclusive dans 6 lancés de pièce en utilisant une distribution binomiale ?
(a) 11/128, (b) 0.7734, (c) (a) et (b), (d) Aucune.

56. Un dé est jeté 120 fois, la probabilité de voir la face 4 apparaitre 18 fois ou moins sera :
(a) 0.5, (b) 0.1443 (c) 0.4115, (d) 0.3557.

57. Etant donné que 10% d'outils produits dans une certaine entreprise parait défectueux, la probabilité que dans un échantillon de 10 outils choisis au hasard exactement deux soient défectueux, en utilisant l'approximation de Poisson à la distribution binomiale sera :
(a) 0.19, (b) 0.18, (c) 0.1839, (d) (b) ou (c).

58. Quelle est la probabilité que 3 individus exactement sur 2000 souffrent d'une mauvaise réaction, étant donné que la probabilité qu'un individu souffre d'une mauvaise réaction après une injection d'un sérum est 0,001 ?
(a) 2, (b) 1, (c) 0.180, (d) 0.323

For questions 59 to 60.
If the waiting time T (in minutes) before one is served lunch at a university restaurant is a continuous random variable with density

$$f(t) = \begin{cases} \frac{1}{4}e^{-\frac{t}{4}}, & t > 0 \\ 0 & ailleurs \end{cases}$$ then,

59. the mean of T is equal to :
(A) 1/4 (B) 4 (C) 3 (D) 1/3 (E) none of the above

60. the standard deviation of T is equal to :
(A) 4 (B) 16 (C) 3/4 (D) 1 (E) none of the above

Foe each of the following functions in questions 61 to 70, find the principal part of the Taylor expansion to the given order n, at the specified point x_0

61. $f(x) = \frac{\sqrt{x+2}-2}{\sqrt{x+7}-3}$, $x_0 = 2$, $n = 1$
(A) $-2-(x-2)$ (B) $\frac{3}{2}-\frac{5}{96}(x-2)$ (C) $-\frac{3}{2}-\frac{5}{96}(x+2)$
(D) $-2-(x+2)$ (E) does not exist

62. $f(x) = e^x \sin x$, $x_0 = 0$, $n = 5$
(A) $x - x^2 + x^3 - \frac{x^5}{4}$ (B) $x + x^2 + \frac{x^3}{3} - \frac{x^5}{30}$ (C) $1 - x + \frac{x^2}{2} + \frac{x^3}{6} - \frac{x^4}{5}$
(D) $-x + x^2 - 3x^3 + x^5$ (E) does not exist

63. [illegible] $x_0 = 0$, $n = 5$
(A) $x - \frac{x^2}{2} + \frac{x^3}{3} - \frac{x^4}{4} + \frac{x^5}{5}$ (B) $1 + x - \frac{x^2}{2} + \frac{x^3}{3} - \frac{x^4}{4} + \frac{x^5}{5}$
(C) $-x + \frac{x^2}{2} - \frac{x^3}{3} + \frac{x^4}{4} - \frac{x^5}{5}$ (D) $1 - x + \frac{x^2}{2} - \frac{x^3}{3} + \frac{x^4}{4} - \frac{x^5}{5}$ (E) does not exist

64. $f(x) = Arc\sin x$, $x_0 = 0$, $n = 5$
(A) $x - \frac{x^3}{6} - \frac{x^5}{5!}$ (B) $x + \frac{x^3}{6} + \frac{9x^5}{5!}$ (C) $1 - \frac{x^2}{2} + \frac{x^4}{4!}$
(D) $1 - \frac{x^2}{2} + \frac{x^4}{4!} - x^5$ (E) $-x + \frac{x^3}{3} - \frac{x^5}{5!}$

65. $f(x) = (1-x)^x$, $x_0 = 0$, $n = 4$
(A) $1 - x^2 - \frac{x^3}{2} - \frac{5x^4}{6}$ (B) $1 - x^2 - \frac{x^3}{2} - \frac{x^4}{6}$ (C) $1 - x^2 - \frac{x^3}{2} + \frac{x^4}{6}$
(D) $x - \frac{x^2}{2} - \frac{x^3}{3} - x^4$ (E) $1 - x^2 - \frac{x^3}{2} + \frac{x^4}{6}$

66. The series $\sum_{n=0}^{\infty} \left(\frac{x}{3}\right)^n$ converges in the interval :
(A) [-3,3 [(B)]-3, 3 [(C)]-3, 3] (D) [-3, 3] (E) $]-\infty, \infty[$

67. The series $\sum_{n=0}^{\infty} \left(\frac{x}{2}\right)^n$ has sum :
(A) $\frac{1}{1-\frac{x}{2}}$ (B) $\frac{2}{2-x}$ (C) $\frac{x}{2-x}$ (D) $\frac{x}{x-2}$ (E) $\frac{1}{2-x}$

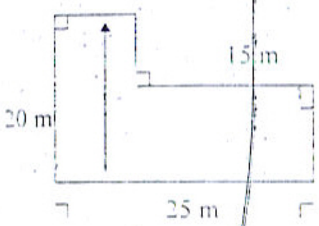
68. The rational number whose decimal part with repetitive terms is written 2.252525... is equal to :
(A) $\frac{2230}{991}$ (B) $\frac{23}{99}$ (C) $\frac{22}{9}$ (D) $\frac{222}{99}$ (E) $\frac{223}{99}$

69. The rational number whose decimal part with repetitive terms is written 0.123123... is equal to:
(A) $\frac{123}{999}$ (B) $\frac{12}{99}$ (C) $\frac{124}{999}$ (D) $\frac{121}{998}$ (E) $\frac{1}{9}$

70. For $x < 1$ the series $x + 2x^2 + ... nx^n + ...$ converges to :
(A) $\frac{x}{1-x^2}$ (B) $\frac{x}{(1-x)^2}$ (C) $\frac{1}{(1-x)^2}$ (D) $\frac{-1}{(1-x)^2}$ (E) $\frac{x^2}{(1-x)}$

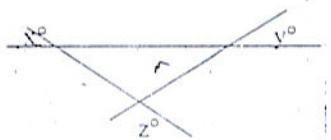
Select :
A if the quantity in column l is greater;
B if the quantity in column 2 is greater;
C if the two quantities are equal ;
D if the relation cannot be determined from the information given..

Column 1	Column 2	Answer
	y	

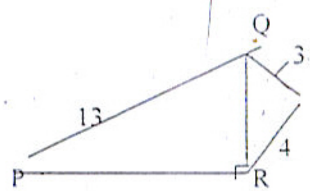


The above figure represents a garden.

	Column 1	Column 2	Answer
Question 71	The area of the garden	350 m²	A B C D



	Column 1	Column 2	Answer
Question 72	x + y + z	160	A B C D



	Column 1	Column 2	Answer
73	The perimeter of triangle PQR	36	A B C D

Select :
A if the quantity in column l is greater;
B if the quantity in column 2 is greater;
C if the two quantities are equal ;
D if the elation cannot be determined from the information given..

	Column 1	Column 2	Answer
	$x > 1$ et $y > 1$		
7	$\dfrac{1}{\frac{1}{x}+\frac{1}{y}}$	$\dfrac{1}{x}+\dfrac{1}{y}$	A B C D

During a certain encounter between two teams X and Y, team X scored 10 points in the first half. During the second period, Team Y scored 15 points more than team X.

	Column 1	Column 2	Answer
75	The number of points Scored by team X during the first period	The number of points scored by team Y during the second period	A B C D

Instructions : Each of the following 25 questions, numbered 76 to 100, has 5 possible answers. You are to select for each of them, the correct answer by ticking it in the space provided on the answer sheet.

76 If 1600 is equal to 25% of a certain number, then 10% of the number is equal to :

(A) 40 (B) 400 (C) 640 (D) 1440 (E) 4000

77. The ratio of 1.8 to 2 is equal to the ratio of :

(A) 9 à 1 (B) 9 à 10 (C) 9 à 20 (D) 18 à 100 (E) 18 à 200

78. If $2x + 7 = 12$, then $4x - 7 =$

(A) 2 (B) 2.5 (C) 3 (D) 10 (E) 13

79. If $x + y = n$ then $x^2 - 2xy - y^2 =$

(A) $2n$ (B) n^2 (C) $n(x - y)$ (D) $n^2 + 2y(n - y)$ (E) $n^2 - yn - x^2$

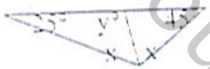
80. What is the maximum number of cubes, each 3 cm on edge, that can be packed into a rectangular with inside dimensions of length 15 cm, 6 cm and 12 cm ?

(A) 360 (B) 120 (C) 90 (D) 40 (E) 20

81 If x is an integer and y = 9x + 13. What is the largest value of x for which y is less than 100 ?

(A) 12 (B) 11 (C) 10 (D) 9 (E) 8

82 What is the value of y in the triangle opposite ?



(A) 70 (B) 80 (C) 90 (D) 100 (E) 110

83. What is the perimeter, in meters, of a rectangular plot 24 m wide, having the same area as a another rectangular plot 64 m long and 48 m wide ?

(A) 112 (B) 152 (C) 224 (D) 256 (E) 304

84. Trees are to be planted 30 m apart along one side of a straight lane 455 m long. If the first tree is to be planted at one end of the lane, how many trees are needed?

(A) 18 (B) 16 (C) 15.5 (D) 15 (E) 14

85. The average (arithmetic mean)of five numbers is 25. After one of the numbers is removed, the average of the remaining numbers is 31. What number has been removed?

(A) 1 (B) 6 (C) 11 (D) 24 (E) None of the above

86. Each time a student ranked first in an examination, his father gave him 500 francs. When he did not rank first, he gave 200 francs to his father. After 21 examinations the student had7000 francs. How many times did he rank first ?

(A) 14 (B) 17 (C) 16 (D) 21 (E) None of the above

87. Today is Manga's 12[th] birthday and his mother's 40[th] . How many years from today will Manga's mother be twice as old as Manga is at that time ?

(A) 12 (B) 14 (C) 16 (D) 18 (E) 20

88. If 1/7 of a certain number is 4, then one quarter of that number is :

(A) 7/16 (B) 2 (C) 16/7 (D) 7 (E) 28

89. If the lengths of the sides of a triangle are x +1, 2x, and 3x, then the sum of its interior angles ,in degrees, is:

(A) 6x (B) 60x (C) 180 (D) 360 (E) None of the above

90. If $n - n = k + k - k$ et $n - k = 5$, then $n =$

(A) 2 (B) 3 (C) 5 (D) 6 (E) 9

91 A watch gains 7 minutes and 6 seconds every six days. If the rate of gain is constant, how much does the watch gain in one day ?

(A) 1 mn 1sec (B) 1 mn 6 sec (C) 1 mn 11sec D) 1 mn 16sec
(E) 1 mn 21sec

92. $\frac{1}{\frac{1}{2}} + \frac{2}{\frac{2}{3}} + \frac{3}{\frac{3}{4}} =$

(A) $\frac{1}{9}$ (B) $\frac{13}{12}$ (C) $\frac{29}{12}$ (D) 8 (E) 9

93. $a > 0, b > 0, et\ c > 0, alors\ a - \frac{1}{b - \frac{1}{c}} =$

(A) $\frac{a+b}{c}$ (B) $\frac{ac - bc + 1}{c}$ (C) $\frac{abc + b - c}{bc}$ (D) $\frac{a - b - c}{abc - 1}$ (E) $\frac{abc + a - c}{bc - 1}$

94. If the circumference of a circle is less than 10π, which of the following quantities is most likely to be its area?

(A) 20π (B) 25π (C) 36π (D) 81π (E) 100π

95. If a, b, and c are consecutive positive integers such that $a < b < c$, the which of the following numbers is odd ?

(A) abc (B) $a + b + c$ (C) $a + bc$ (D) $a(b + c)$ (E) $(a + b)(b + c)$

96. If x can take only the values -3, 0, and 2, and y the values -4, 2, et 3, what is the maximum possible value of

(A) 13 (B) 15 (C) 16 (D) 20 (E) 22

97. What is the largest positive integer n such 2^n is a factor of 12^{10}

(A) 10 (B) 12 (C) 16 (D) 20 (E) 60

98. If $3 < x < 8$ and $5 < y < 11$, which of the inequalities below represents all possible values of xy ?

(A) $3 < xy < 110$ (B) $8 < xy < 19$ (C) $15 < xy < 88$ (D) $24 < xy < 55$
(E) $33 < xy < 40$

99. How many positive integers are both multiples of 4 and divisors 64 ?
(A) Deux (B) Trois (C) Quatre (D) Cinq (E) Six

100. A board of length L meters is cut into two pieces such that the length of one piece is 1meter more than the length of the other piece. Which of the following is the length, in meters, of the longer piece ?

(A) $\frac{L-2}{2}$ (B) $\frac{2L-1}{2}$ (C) $\frac{L-1}{3}$ (D) $\frac{2L-3}{3}$ (E) $\frac{2L-1}{3}$