Faculty of Commerce
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Exercises and Answers in Business Mathematics 1

1st Year English Section

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State whether each of the following is true or false:

1) **If both sides of an equation are multiplied by any constant, the roots of equation remain unchanged.**

   (T) **(F)**

2) **A quadratic equation is an equation of the form $ax^{2}+bx+c=0$, where a, b, and c are any constants.**

   (T) **(F)**

3) **The solution of the equation $x^2 = 4$ is given $x = 2$.**

   (T) **(F)**

4) **A linear equation always has only one root.**

   (T) **(F)**

5) **A quadratic equation always has two different roots.**

   (T) **(F)**

6) **It is possible for a linear equation to have no roots at all.**

   (T) **(F)**

7) **It is possible for a quadratic equation to have no roots at all.**

   (T) **(F)**

(8-18) Choose the Letter that represents the value of x:

8) $3(2 - x) + x = 5(2x - 1) + 2$

(A) 3/4 (B) 4/3 (C) 9/8

9) $4(3x - 1) - 3(2x + 1 = 1 - 7x$

(A) 12 (B) 1 (C) 7/13

10) $(3x + 1)^2 - (3x - 1)^2 = 12x + 7$

(A) 0 (B) false statement (C) 7

11) $X^2 + 13x + 40 = 0$

(A) (5,8) (B) (-5,8) (C) (4,10)

12) $(2x - 1)^2 = 3x^2 + (x- 1)(x -2)$

(A) (1) (B) (-5) (C) (5)

13) $5x^2 = 13x + 6$

(A) (3/5, 2) (B) (6/5,1) (C) (-2/5,3)

14) $x/p + x/q +x/r = pq + qr + rp$

(A) p+q+r (B) pqr (C) 0

15) $2^{x2} = 8/4^x$

(A) (3,1) (B) (-3,1) (C) (3,-1)

16) $\sqrt{2x + 5} = x + 1$

(A) (2)   (B) ($\pm$ 2)   (C) (4)

17) $\sqrt{x + 5} = x - 1$

(A) (-3,1)   (B) ($\pm$ 2)   (C) (3,-1)

18) $4^x = 8^{3-x}$

(A) (5/9)   (B) (9)   (C) (9/5)

(19-21) Choose the Letter that solves the following equations for the indicated variables:

19) If 1/x + 1/y = 1/z, **then z =**

(A) (x(1-x))   (B) (x$\pm$ y)   (C) (1)

20) If 1/x + 1/y = 1/z, **then x =**

(A) (x(1-x))   (B) (1-y)   (C) (1)

21) If 1/x + 1/y = 1/z, **then y =**

(A) (x(1-x))   (B) (1-x)   (C) (1)

(22-26) State whether each of the following is true or false:

22) **A linear inequality in one variable has an infinite number of solutions.**

(T)   (F)

23) **When two sides of an inequality are multiplied by nonzero constant, the direction of the inequality is preserved.**

(T)   (F)

24) **If a negative number is subtracted from both sides of an inequality, the direction of inequality, must be reversed.**

(T) **(F)**

25) **If | x | = a, then x = a or x = -a for all values of the constant a.**

(T) **(F)**

26) **| x + y | = | x | + | y | if and only if x and y are of the same sign.**

(T) **(F)**

(27-30) Choose the Letter that solves the following inequalities:

27) **3(- x) + 5 > x – 2(x – 2).**

(A) (x> 1/2) **(B) (x = 1/2)** **(C) (x<1/2)**

28) **(2x + 1)(x + 2) > 2(x + 3)(x – 1).**

(A) (x> 4) **(B) (x = 4)** **(C) (x<-4)**

29) **$(3x - \frac{1}{4})^2 < 9(x + \frac{1}{2})^2$**

(A) (T statement) **(B) (F statement)** **(C) (0)**

30) **(3x -1)(x + 2) > (3x +2)(x + 1)**

(A) (x= 0) **(B) (x = 2)** **(C) (F statement)**

31) $| 3 - 4x | < 2$

(A) $(x > 1/4, x < 5/4)$ (B) $(x > 4. x < -4)$ (C) $(x \leq 1/4)$

32) $|4x - 7 | \geq 3$

(A) $(x \geq 5/2, x < 1)$ (B) $(x > 4. x < 1)$ (C) $(x \leq 10/4)$

33) $9 + | 2x - 7 | \leq 0$

(A) $(x \geq 5/2, x < 1)$ (B) $(x \leq -1, x \geq -8)$ (C) $(x \leq -1)$

34) $| 2x - 3 | + | 7 + 3x | < 0$

(A) $(x > 5, x < -5)$ (B) $(x \leq 4, x \geq -4)$ (C) $(x < -5/4, x > -5/4)$

35) $| 3x - 5 | + | x - 2 | \geq 0$

(A) $(x \geq 7/4, x \leq 7/4)$ (B) $(x \leq 7, x \geq -7)$ (C) $(x < 4/7, x > -4/7)$

(36 – 42) Choose the Letter that solves the following equation:

36) $| 2x - 3 | + 7 = 4$

(A) (0. 3) (B) (2,3) (C) (0,-3)

37) $| 3x + 4 | - 2 | x + 2 | = 0$

(A) (0. 3) (B) (8,4) (C) (0,-8)

38) $6x^2 + 7x + 1 = 0$

(A) (-1/6. -1) (B) (1/6,1) (C) (-6,-1)

39) $2x^2 - x - 2 = 0$

(A) (1. -2) (B) (-1,2) (C) (1.261, - 0.781)

40) $x^4 - 3x^2 - 7 = 0$

(A) ((3 ± √ 37)/ 2) (B) (±2.13) (C) (x = -7)

41) x^2 -1.5x + 0. 5

(A) (no solution) (B) 1.0.5) (C) (1)

42) | x^2 +2 | = 3x

(A) (2. 1) (B) (2,1 or -2, -1) (C) (-2 ,-1)

(43-52)Are the following statements true or false?

43) The following array of numbers represents a matrix:

$$\begin{pmatrix} 2 & 3 & 4 \\ 0 & 1 & 3 \\ 3 & 2 & \end{pmatrix}$$

(A) (T) (B) (F)

44) If A $[a_1 \quad a_2]$ and B = $\begin{pmatrix} b_1 \\ b_2 \end{pmatrix}$

then, A + B = $a_1 + a_2 \qquad b_1 + b_2$

(A) (T) (B) (F)

45) If A and B are two matrices of the same size, then.

A + B = B + A

(A) (T) (B) (F)

46) The product AB is defined only if the number of rows in A is equal to the number of columns in B.

(A) (T) **(B) (F)**

47) If A and B are two matrices of the same size, then AB and BA are both defined.

(A) (T) **(B) (F)**

48) I A is a matrix of any size and I is the identity matrix, then AI = IA = A.

(A) (T) **(B) (F)**

49) If A and B are two square matrices of the same size, then the size of AB or BA is the same as that of A or B.

(A) (T) **(B) (F)**

50) If A = A + B, then B is a zero matrix.

(A) (T) **(B) (F)**

51) If AB = 0, then either A or B is a zero matrix.

(A) (T) **(B) (F)**

52) If a system has the same number of equations as the number of variables, then the system has a unique solution.

(A) (T) **(B) (F)**

(53-55) From past experience it knows that if charges p dollars per dozen eggs, the number soled per week will be x million dozens, where p = 2 – x, its total weekly revenue then be R = xp = x(2 – x) million dollars. The cost to industry of producing x million dozen eggs per week is given by c = 0.25 + 0.5x million dollars. What price should the marketing board set for eggs to ensure a weekly profit of $0.25 million?

53) Profit is equal to:

(A) (Revenue–Cost)

(B)(Selling Price per Unit)(C)

(Price per Unit)

54) Profit function is:

(A) (x(2 –x))

(B) (o.25 – 0.5x)

(c) (x^2 -1.5x + 0. 5 = 0)

55) Roots for x are:

(A) (-1. -0.5) (B) (1. 0.5) (c) (2, 1.5)

56) If A = {2, 4, 6}, and B = {1, 2, 3, 4, 5, 6, 7, 8} define Aand B:

(A) (A∪B) (B) (A⊂B) (C) (A∩B)

57) If A = { x | x^2 = 1} and B = { -1, +1} then:

(A) (A∪B) (B) (A∩B) (c) (A=B)

58) A = {y | y^2- 3y + 2 = 0}and B = 1, 2}, then:

(A) (A∪B) (B) (A∩B) (c) (A=B)

59-) Use the symbol ∞ (infinity) and - ∞ (negative infinity) to describe inbounded intervals:

59) (a, ∞)

(A) {x | x ≥ a} (B) {x | x > a} (C) {x | x < a}

60) [a, ∞]

(A) {x | x ≥ a} (B) {x | x > a} (C) {x | x < a}

61) (- ∞ , a)

(A) {x | x ≥ a} (B) {x | x > a} (C) {x | x < a}

(62-67) The following is a system equations:

3x – 2y = 4

x + 3y = 5

62) The augmented matrix in this case is:

(A) $\left(\begin{array}{cc|c} 3 & -2 & 4 \\ 1 & 3 & 5 \end{array}\right)$

(B) $\left(\begin{array}{cc|c} 3 & 1 & 4 \\ -2 & 3 & 5 \end{array}\right)$

(C) $\left(\begin{array}{cc|c} -2 & 3 & 5 \\ 3 & 1 & 4 \end{array}\right)$

63) Interchange the first and second rows, we find:

(A) $\left(\begin{array}{cc|c} 3 & 1 & 4 \\ 2 & 3 & 5 \end{array}\right)$

(B) $\left(\begin{array}{cc|c} 1 & 3 & 5 \\ 3 & -2 & 4 \end{array}\right)$

(C) $\left(\begin{array}{cc|c} -2 & 3 & 5 \\ 3 & 1 & 4 \end{array}\right)$

64) Add -3 times the first row to the second row, we find:

(A) $\left(\begin{array}{cc|c} 3 & 1 & 4 \\ 2 & 3 & 5 \end{array}\right)$

(B) $\left(\begin{array}{cc|c} 1 & 3 & 5 \\ 3 & -2 & 4 \end{array}\right)$

(C) $\left(\begin{array}{cc|c} 1 & 3 & 5 \\ 0 & -11 & -11 \end{array}\right)$

65) Divide the second row by -11, we finf:

(A) $\left(\begin{array}{cc|c} 3 & 1 & 4 \\ 2/-11 & 3/-11 & 5/-11 \end{array}\right)$

(B) $\left(\begin{array}{cc|c} 1 & 3 & 5 \\ 3/-11 & 2/-11 & 4/-11 \end{array}\right)$

(C) $\left(\begin{array}{cc|c} 1 & 3 & 5 \\ 0 & 1 & 1 \end{array}\right)$

66) The value of x is:

(A) (2)　　**(B) (1)**　　**(C) (-2)**

67) The value of y is:

(A) (2)　　**(B) (1)**　　**(C) (-2)**

(68-77: The following function (z) is revenue function where:

Z =4x + 8y

Subject to:

$x + y \leq 20$ (Let the line to be (a-b) from left to right).

$2x + y \leq 32$ (Let the line to be (c-d) from left to right).

(Let Point (h) is the intersection of a-b and c-d)

$x \geq 0, y \geq 0$

(Let Point (h) is the intersection of a-b and c-d, and Point o (0, 0))

68) The problem is:

(A) Revenue Min. problem

(B) Revenue Max. problem

(C) Cost Min. problem

69)The feasible area is:

(A) (Oahd) (B) dhb) (C) (ahc)

70)The feasible area according the first constraint is:
\

(A) (chb) (B) (oahd) (C) (oab)

71) The feasible area according the second constraint is:

(A) (chb) (B) (oahd (C) (ocd)

72) Point (h) is:

(A) (8, 12) (B) (12, 8) (C) (12, -8)

73) The optimal solution is:

(A) (112) (B) (128) (C) (64

74) **If the first constraint becomes x + y $\geq$ 20, the feasible area becomes:**

(A) (ahc) (B) (dhb) (C) (chb)

75) **If the second constraint becomes 2 x + y $\geq$ 32, the feasible area becomes:**

(A) (ah) (B) (dhb) (C) (chb)

76) **If z in the original problem is a cost function, the optimal solution will be:**

(A) (64) (B) (112) (C) (0)

77) **If z in the original problem is a cost function and both the constrains inequalities become $\geq$, the optimal solution will be:**

(A) (0, 32) (B) (12, 8) (C) (20, 0)

(78-87: Minimize T =5x + 3y

Subject to:

x + y $\geq$ 60 (Let the line to be (a-b) from left to right).

2x + y $\leq$ 90 (Let the line to be (c-d) from left to right).

x $\geq$ 0, y $\geq$ 0

(Let Point (h) is the intersection of a-b and c-d, and Point o (0, 0))

x $\geq$ 0, y $\geq$ 0

Solve by graph method

78) **Point (h) is:**

(A) (30, -30) \ (B) (30, 30) (C) (45, 0)

79) The feasible area is:

(A) (Ahb)   (B) (cah)   (C) (ocd)

80) The feasible area according the first constraint is:

(A) (Ocd)   (B) (dhb)   (C) (oab

81) The feasible area according the second constraint is:

(A) (ocd)   (B) (dhb)   (C) (oab)

82) The optimal solution is:

(A) (d)   (B) (h)   (C) (o)

83) If the T function of original problem was profit function, the optimal solution will be:

(A) (d)   (B) (h)   (c) (b)

84) If the constraints become, $x + y \leq 60$ and $2x + y \geq 90$, the optimal solution becomes:

(A) (Oahd)   (B) (dhb)   (C) (ach)

85) If both constraints inequalities become $\geq$, the optimal solution becomes:

(A) (Oahd)   (B) (Dhb)   (C) (chb)

86) **If both constraints inequalities become ≤, the optimal solution becomes:**

(A) (oahd) **(B) (dhb)** **(c) (ach**

87) **If both constraints become equalities, the optimal solution becomes:**

(A) (a) **(B) (h)** **(C) (d)**

(88-100) Given a sample space for the rolling of a die, let E_1 be the event that an even number turns up, let E_2 be the event that an odd number turns up, so and let E_3 be the event that the number turns up is less than 4.

88) **E_1 U E_2 =**

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

89) **E_1 U E_3 =**

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

90) **E_2 U E_3 =**

(A) (1, 2, 3) **(B) (1, 2. 3, 5)** **(C) (1, 2, 3, 5,)**

91) **$E_1 \cap E_2$ =**

(A) (ϕ) **(B) (1, 2, 3)** **(C) (1, 2. 3, 5)**

92) **$E_1 \cap E_3$ =**

(A) (2) **(B) (1, 2, 3)** **(C) (2, 4)**

93) **$E_2 \cap E_3$ =**

(A) (2) **(B) (1, 2, 3)** **(C) (1, 3)**

94)The probability of throwing a number greater than is:

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

95)The probability of throwing at least two heads by tossing three fair coins is:

(A) (1/2) (B) (1/4) (C) (1/8)

(96-) Throwing two dice find the following:

96)a sum of 9 is:

(A) (1/9) (B) (1/4) (c) (4/6)

97)a sum of mor than 9 is:

(A) (1/9) (B) (1/4) (c) (1/6)

98)a sum of less than 9 is:

(A) (1/9) (B) (8/9) (c) (1/6)

99)a sum of less than 12 is:

(A) (1/9) (B) (35/36) (C) (1/6)

100) a sum of more than 12 is:

(A) (1/9) (B) (1/4) (C) (0)

(101-) **Among a population in a certain city, 25% (D) have a university degree (D), 15% earn more than $25000 per year (E), and 65% have no degree and earn less than $25000 per year.**

101) P(D′) equal:

(A) (0.25) (B) (0.65) (C) (9.75)

102) P(E′) equal:

(A) (0.85) (B) (0.10) (C) (9.75)

103) P(E′ ∩ D′)

(A) (0.25) (B) (0.10) (C) (9.75)

104) P(E ∩ D) equal:

(A) (0.05) (B) (0.10) (C) (9.75)

105) P(E′ ∩ D) equal:

(A) (0.25) (B) (0.20) (C) (9.75)