

OMT-101

ASSIGNMENT BOOKLET

Bachelor's Preparatory Programme

PREPARATORY COURSE IN GENERAL MATHEMATICS

(Valid from 1st July, 2014 to 31st March, 2015)



**School of Sciences
Indira Gandhi National Open University
Maidan Garhi
New Delhi-110068
(July 2014 Cycle)**

Dear Student,

This assignment booklet consists of certain questions related to the printed study material that has been sent to you. It is necessary to do this assignment as it constitutes the continuous evaluation component of this course.

The main purpose of this assignment is to help you assess your grasp of the learning material. The information given in the printed course material should be sufficient for answering the assignment.

You have to complete the assignment in time. You will not be allowed to appear for the term-end examination if you do not submit the assignment in time. If you appear in the term-end examination without submitting the assignment, then the result of the term-end examination is liable to be cancelled.

Please submit your assignment before 31st March, 2015.

The counselor attached to your study centre will be evaluating your assignment as well as OMR sheet and will give the comments on them within a month after submission. These comments will give you some feedback regarding your understanding of the subject.

For your own record, **retain a copy** of all the assignment response which you submit to the Coordinator of your study centre. If you do not get back your evaluated assignments along with the comments on them within a month after submission, please ask your study centre coordinator for them.

In case you are unable to submit the assignment response by 31st March, 2015 then you have to wait for the assignments meant for the next batch of students. **The request for the new assignment may be addressed to the Assistant Registrar, Material Production & Distribution Division, Indira Gandhi National Open University, Maidan Garhi, New Delhi-110068, in the month of January/February in the prescribed form printed in the programme guide.** (Assignments are also available from the IGNOU website www.ignou.ac.in. You can access them by clicking on the links “Student Zone → Assignments → BPP”.)

Instructions for Formating Your Assignments

Before attempting the assignment please read the following instructions carefully.

- 1) On top of the first page of your answer sheet, please write the details exactly in the following format:

ROLL NO. :

NAME :

ADDRESS :

.....

.....

COURSE CODE :

COURSE TITLE :

ASSIGNMENT NO. :

STUDY CENTRE : **DATE:**

PLEASE FOLLOW THE ABOVE FORMAT STRICTLY TO FACILITATE EVALUATION AND TO AVOID DELAY.

- 2) Use only foolscap size writing paper (but not of very thin variety) for writing your answers.
- 3) Leave 4 cm margin on the left, top and bottom of your answer sheet.
- 4) Your answers should be precise.
- 5) While solving problems, clearly indicate which part of which question is being solved.
- 6) **This assignment (along with the filled OMR sheet) is to be submitted to the Study Centre.**
- 7) **This assignment is valid only upto March 31st, 2015.**

We strongly suggest that you **retain a copy of your answer sheets.**

We wish you good luck.

Assignment (OMT-101)
(To be done **after** studying the course material)

Course Code: OMT-101
Assignment Code: OMT-101/2014-15
Maximum Marks: 100

Section – A

1. a) How will you represent the following statement in symbolic form?
“Sum of the squares of sum and difference of two numbers is equal to twice the sum of the squares of the numbers .”
Is this statement true? If yes, give a valid argument, otherwise, give a counter-example. (3)
- b) Several lines can be drawn through a single point. How many lines can be drawn through two points, three points, or...? Work on this problem. What can you conjecture from here? Can you prove your conjecture? (2)
- c) Use number line to show that
i) $6 + (-4) = 2$
ii) $-5 - (-2) = -3$ (2)
- d) Evaluate the following expression using BODMAS rule : (3)
i) $(90 \div 3 \times 3 + 5) \div (-2 \times 3 + 9)$
ii) $20 - 2 \times \frac{9+21 \div 7}{73-64}$
2. a) Simplify the following expressions: (2)
i) $\left(2\frac{1}{3} \times 3\frac{4}{5} - 5\frac{6}{7}\right) \div \frac{79}{5 \times 7}$
ii) $6\frac{2}{7} \div 3\frac{13}{14} \div 1\frac{3}{5}$
- b) The following are the expenses (in ₹) of a person in a weekend shopping:
- | | | |
|---------------|---|--------|
| Shoes | : | 450.77 |
| Jacket | : | 889.99 |
| Food expenses | : | 300.00 |
| Glasses | : | 120.49 |
| Fuel Expenses | : | 150.28 |
| Movie | : | 230.50 |
- Find the total expenses. If the expenses in last weekend were ₹ 1500.98, then find which weekend's expenses are higher? (2)
- c) Simplify the following
- i) $\frac{\sqrt{27 \times 3}}{4^2 + 9} \times 25$ ii) $\frac{(4^3 + 3^4)}{2\sqrt{36} - 8} \div \frac{7 \times 2^3}{5}$ (2)
- d) Place the following fractions in ascending order. (2)

$$2\frac{3}{4}, 5\frac{2}{7}, 3\frac{9}{11}, \frac{3}{5}, 3\frac{2}{9}, \frac{2}{5}, \frac{9}{8}, \frac{3}{5/3}$$

- (e) Vinita earns ₹ 4050/- if she works for 7 days. How much she will earn if she works for 30 days? Sunita earns ₹ 6000 in 30 days. What is the ratio between the earnings of Vinita and Sunita? (2)

3. a) Find the missing numbers in the following (2)

(i) $\left(\frac{2^{-2} \times 5}{\sqrt{5}}\right)^3 \times \left(\frac{\sqrt{125} \times 2^3}{3^2 \times 6}\right)^2 = \frac{5^\square}{2^\square \times 3^\square}$

(ii) $\frac{(10a)^5 \times (3a^2b)^3 \times (\sqrt{5})^2}{(5a^{-1})^6 \times (9ab)^4} = \frac{2^\square \times a^\square}{3^\square \times b^\square}$

- b) Find at least three solutions of each of the following equations: (3)

(i) $3x - y + 8 = 0$ (ii) $4x + 3 = 3y - 4$

- c) For what value of a the polynomial $2x - 1$ divides the polynomial $4x^3 + ax + 1$? Justify. (2)

- d) Prove that no matter what the real numbers a and b are, the sequence with n^{th} term $a + nb$ is always an A.P. What is the sum of the first 20 terms of this sequence? (3)

4. a) Find the sum of the following series: (2)

$$(1 + 1 \times 2) + (1 + 2 \times 5) + (1 + 3 \times 10) + \dots + (1 + 10 \times 101).$$

- b) There are 5 different Hindi books, 6 different Urdu books and 8 different Sanskrit books. In how many ways can a pair of books be selected if the selected books are from different languages? (2)

- c) Find the value of $(0.98)^{1/4}$ correct to 5 decimal places. (3)

- d) Find the value of x in Fig. 1 if

i) $y = \frac{3}{2}x$ ii) $y = 111^\circ$ (3)

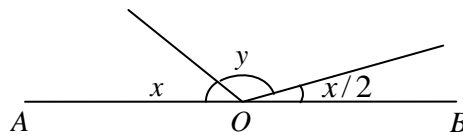


Fig. 1

5. a) Change the following angles from one system to another

i) $87\frac{3}{4}^\circ$ to seconds ii) 45.9° to minutes iii) $639''$ to degrees (3)

- b) "If two opposite sides of a quadrilateral are equal and parallel then it is a rectangle." Is this statement true? Explain. (2)

- c) Find the angle x in Fig. 2. (3)

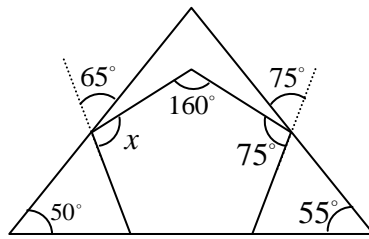


Fig. 2

- d) Describe all the symmetries of Fig. 3. (2)

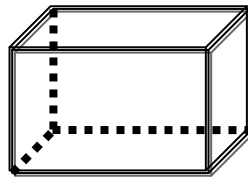


Fig. 3

6. a) Copy the following figure on some stiff paper. Cut the dotted triangle and paste it just below it. Make tessellations using this motif. (3)

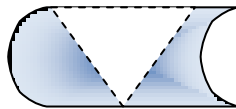


Fig. 4

- b) With the help of examples explain the difference between the parabola and paraboloid. (2)
- c) List two objects that you can find around you in each of the following categories: (2)
- (i) Cylinder (ii) Ellipsoid

- d) A boiler is in the form of a cylinder 2 m long with hemispherical ends each of 1 m diameter. Find the volume of the boiler. (3)

7. a) Find the area of the shaded portion in Fig. 5. (3)

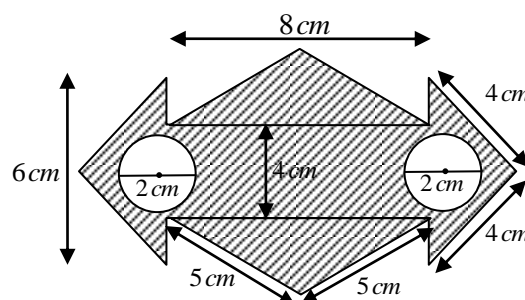


Fig. 5

- b) In Fig. 6, a right angle triangle AOB is given. C is the mid-point of the hypotenuse AB . Show that it is equidistant from the vertices O, A and B . (2)

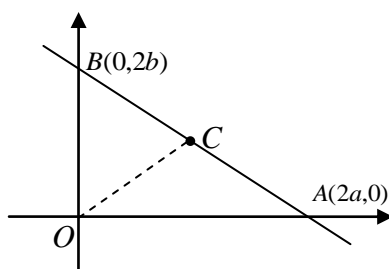


Fig. 6

- c) Find the equation of the line AB in Fig. 6. Also find the area of the triangle AOC in the same figure. (3)
- d) Find the cost of purchasing 250 share of a company, each of par value ₹ 100/- quoted at ₹ 200/- each in the market, from the shareholder. Also find the gain to the new shareholder if he sells each share at a premium of ₹ 100/-. (2)
8. a) Suman opened a saving bank account with PNB on 7th Feb, 2013 with a cheque deposit of ₹ 4500/-. Subsequently she deposited ₹ 2000/- on the 4th day of every month. She withdraw ₹ 1500/- on 8th April and Rs. 4000/- on 7th June, 2013 through ATM. Write all the entries of the passbook. If the interest rate is 6.5% per annum, calculate the interest upto the last day of 31st October, 2013 and make the entries in the passbook alongwith the balance. (3)
- b) In the month of October, 2013 a person spent his monthly salary amounting to ₹ 35000 on different items as given below:

| Items | Clothing | Food | House Rent | Education | Miscellaneous | Recurring Deposit |
|------------------|----------|-------|------------|-----------|---------------|-------------------|
| Amount Spent (₹) | 3000 | 11450 | 5500 | 8000 | 5050 | 2000 |

Represent the information in the form of a pie chart. (2)

- c) Find the mean deviation, variance and standard deviation of the following data: (3)

22, 54, 67, 56, 87, 90, 33, 22,
45, 65, 98, 90, 98, 30, 40, 20,
29, 38, 94, 89, 30, 48, 28, 38

- d) 17 cards numbered 1, 2, 3, ..., 16, 17 are put in a box and mixed thoroughly. One person draws a card from the box. Find the probability that the number on the card is
(i) odd (ii) prime (2)

Section – B

The following 20 questions are multiple choice types. Only one of the four alternatives given in each is correct. You have to identify the correct answer. Each question is worth **1 mark**.

You have to give the answers in the **OMR sheet attached with this** and submit it at your study centre along with Section-A answer sheet, for evaluation. Please read the instructions given for filling the OMR sheet, carefully before you start filling your answers.

(Please note that this is the format appearing in your Term End Examination.)

- Which one of the statements is false?
 - Rational numbers are real numbers.
 - Whole numbers are integers.
 - Natural numbers are rational numbers.
 - Rational numbers are whole numbers.
- LCM and HCF of the numbers 60, 30, 35 and 45 are, respectively,
 - 420, 5
 - 1260, 7
 - 420, 7
 - 1260, 5
- Area of a rectangle of length $2\frac{2}{3}$ cm and breadth $3\frac{1}{2}$ cm is
 - 2 cm^2
 - 3 cm^2
 - $9\frac{1}{3}\text{ cm}^2$
 - $6\frac{1}{3}\text{ cm}^2$
- If x and y are inversely proportional and c is any constant then
 - $x = y/c$
 - $xy = c$
 - $x - y = c$
 - $x + y = c$
- $\left(\frac{a}{b}\right)^{3/2} \times \left(\frac{b}{c}\right)^{2/3} \times \left(\frac{c}{a}\right)^{3/2}$ is equal to
 - 1
 - $\left(\frac{b}{a}\right)^{5/6}$
 - $\left(\frac{b}{c}\right)^{-5/6}$
 - $\left(\frac{b}{c}\right)^{5/6}$
- Sum of the series $2 + 2.2^2 + 3.2^3 + \dots + n.2^n$ is
 - $2^{n+1} \cdot (n + 1) + 2$
 - $2^{n+1} \cdot (n - 1) + 2$
 - $2^{n-1} \cdot (n + 1) + 2$
 - $2^{n+1} \cdot (n - 1) - 2$
- $P(n, r) + P(n, n - r)$ is equal to
 - $C(n, r)[r! + (n - r)!]$
 - $C(n, r)[n! + (n - r)!]$
 - $C(n, r)[r! - (n - r)!]$
 - $C(n, r)[n! - (n - r)!]$
- What angle is made by the needles of a wall clock at 12:40 O'clock?
 - Obtuse Angle
 - Acute Angle
 - Right angle
 - Straight Angle
- The card 'Ace of Diamonds' has
 - Rotation Symmetry
 - Reflection Symmetry
 - Both
 - No symmetry

10. False statement is
- 1) All angles of rhombus are equal.
 - 2) Each angle of a triangle is acute.
 - 3) The diagonals of a parallelogram meet at 90° .
 - 4) The Diagonals of a square are equal.
11. The number of edges of a octahedron is
- 1) 10
 - 2) 12
 - 3) 8
 - 4) 16
12. The curved surface area of a conical tent of height 12 m and diameter 10 m is
- 1) 130π
 - 2) 30π
 - 3) 60π
 - 4) 65π
13. The number of cubes of edge 3 cm that can be made from a cube of edge 21 cm is
- 1) 7
 - 2) 343
 - 3) 49
 - 4) 21
14. The line joining (2, 3) and (0, 3) passes through
- 1) (0, 0)
 - 2) (3, 3)
 - 3) (3, 2)
 - 4) (0, 2)
15. Let $P(4, 3)$, $Q(10, -1)$ and $R(-3, -4)$ be three points. Then which of the following is true?
- 1) $QR < PQ + PR$
 - 2) $QR > PQ + PR$
 - 3) $QR = PQ + PR$
 - 4) $QR < PR < PQ$
16. Mukesh purchases a T-shirt at MRP ₹500/- from a showroom and pays 12.5% VAT at the MRP. Total amount paid by Mukesh is
- 1) ₹ 562/-
 - 2) ₹ 550/-
 - 3) ₹ 600/-
 - 4) ₹ 580/-
17. Mean, Mode and Median of the data 1, 2, 3, 0, 4, 3, 2, 3, 2, 3, 2, 9, 4, 3, 5, 3, 2 are respectively
- 1) 3, 2 and 3
 - 2) 3, 3 and 2
 - 3) 3, 3 and 3
 - 4) 2, 3 and 3
18. If a ball of diameter 2 cm is put into a cup full of water, how much water will come out?
- 1) 34.00 cm^3
 - 2) 33.52 cm^3
 - 3) 31.23 cm^3
 - 4) 33.50 cm^3
19. The probability that a randomly chosen two digit number has its unit digit 0 is
- 1) $\frac{1}{10}$
 - 2) $\frac{2}{10}$
 - 3) $\frac{2}{9}$
 - 4) $\frac{1}{9}$

20. A single letter is chosen from the word 'PROBABILITY'. The probability that the word is a consonant is

1) $\frac{7}{11}$

2) $\frac{4}{11}$

3) $\frac{6}{11}$

4) $\frac{5}{11}$

INSTRUCTIONS FOR MARKING IN THE OMR RESPONSE SHEET

1. Use only H.B. pencil for filling the response sheet
2. Mark your answers in the proper column
3. Enter your Enrolment no., year, month, course code and examination code in the respective boxes given for that as shown below. For example if your enrolment number is 071645498, then you need to first write the enrolment number as shown in the box titled enrolment no., given below. Then you have to darken each circle corresponding to each digit appearing in the enrolment number. Suppose, for example, the leftmost digit is 0. So we darken the first 0 in the box. Next digit is 7. Then we select the row containing 7 and darken the '7' in the second column. Similarly you can fill the other digits.

Note that the **Course Code** you have to fill in the OMR sheet is the **computer code** for this course which is **1114**. This is different from the course code given in the programme guide or blocks for this course.

| ENROLMENT NUMBER | | | | | | | | |
|------------------|---|---|---|---|---|---|---|---|
| 0 | 7 | 1 | 6 | 4 | 5 | 4 | 9 | 8 |
| ● | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| ① | ① | ● | ① | ① | ① | ① | ① | ① |
| ② | ② | ② | ② | ② | ② | ② | ② | ② |
| ③ | ③ | ③ | ③ | ③ | ③ | ③ | ③ | ③ |
| ④ | ④ | ④ | ④ | ● | ④ | ● | ④ | ④ |
| ⑤ | ⑤ | ⑤ | ⑤ | ⑤ | ● | ⑤ | ⑤ | ⑤ |
| ⑥ | ⑥ | ⑥ | ● | ⑥ | ⑥ | ⑥ | ⑥ | ⑥ |
| ⑦ | ● | ⑦ | ⑦ | ⑦ | ⑦ | ⑦ | ⑦ | ⑦ |
| ⑧ | ⑧ | ⑧ | ⑧ | ⑧ | ⑧ | ⑧ | ⑧ | ● |
| ⑨ | ⑨ | ⑨ | ⑨ | ⑨ | ⑨ | ⑨ | ● | ⑨ |

| COURSE CODE | | | |
|-------------|---|---|---|
| 1 | 1 | 1 | 4 |
| ○ | ○ | ○ | ○ |
| ● | ● | ● | ① |
| ② | ② | ② | ② |
| ③ | ③ | ③ | ③ |
| ④ | ④ | ④ | ● |
| ⑤ | ⑤ | ⑤ | ⑤ |
| ⑥ | ⑥ | ⑥ | ⑥ |
| ⑦ | ⑦ | ⑦ | ⑦ |
| ⑧ | ⑧ | ⑧ | ⑧ |
| ⑨ | ⑨ | ⑨ | ⑨ |

| YEAR | | | |
|------|---|---|---|
| 2 | 0 | 0 | 7 |
| ○ | ● | ● | ○ |
| ① | ① | ① | ① |
| ● | ② | ② | ② |
| ③ | ③ | ③ | ③ |
| ④ | ④ | ④ | ④ |
| ⑤ | ⑤ | ⑤ | ⑤ |
| ⑥ | ⑥ | ⑥ | ⑥ |
| ⑦ | ⑦ | ⑦ | ● |
| ⑧ | ⑧ | ⑧ | ⑧ |
| ⑨ | ⑨ | ⑨ | ⑨ |

| EXAMINATION CENTRE CODE | | | |
|-------------------------|---|---|---|
| 1 | 2 | 4 | 6 |
| ○ | ○ | ○ | ○ |
| ● | ① | ① | ① |
| ② | ● | ② | ② |
| ③ | ③ | ③ | ③ |
| ④ | ④ | ● | ④ |
| ⑤ | ⑤ | ⑤ | ⑤ |
| ⑥ | ⑥ | ⑥ | ● |
| ⑦ | ⑦ | ⑦ | ⑦ |
| ⑧ | ⑧ | ⑧ | ⑧ |
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| MONTH | |
|-------|---|
| 0 | 6 |
| ● | ○ |
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| | ⑨ |

4. For filling the correct choice for the multiple choice questions, do as illustrated in the following example.
Suppose Question 13 is as given below:

Q.No. 13.: Which one of the following is **not** an integer.

- (1) -1 (2) $\sqrt{4}$
 (3) 0.5 (4) 0

Suppose your answer to the question is “0.5” which is given in option no. “3”. Then you have to select the column against no. 13 in the boxes given below and write 3 in the box below “13” and shade the circle numbered 3 in that as shown below. If your answer is such that none of the 4 options are correct, then select 0.

| | | | | |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |
| 0 | 0 | 0 | 0 | 0 |
| 1 | 1 | 1 | 1 | 1 |
| 2 | 2 | 2 | 2 | 2 |
| 3 | 3 | 3 | 3 | 3 |
| 4 | 4 | 4 | 4 | 4 |

| | | | | |
|---|---|---|---|----|
| 6 | 7 | 8 | 9 | 10 |
| 0 | 0 | 0 | 0 | 0 |
| 1 | 1 | 1 | 1 | 1 |
| 2 | 2 | 2 | 2 | 2 |
| 3 | 3 | 3 | 3 | 3 |
| 4 | 4 | 4 | 4 | 4 |

| | | | | |
|----|----|----------|----|----|
| 11 | 12 | 13 | 14 | 15 |
| | | 3 | | |
| 0 | 0 | 0 | 0 | 0 |
| 1 | 1 | 1 | 1 | 1 |
| 2 | 2 | 2 | 2 | 2 |
| 3 | 3 | 3 | 3 | 3 |
| 4 | 4 | 4 | 4 | 4 |

| | | | | |
|----|----|----|----|----|
| 16 | 17 | 18 | 19 | 20 |
| 0 | 0 | 0 | 0 | 0 |
| 1 | 1 | 1 | 1 | 1 |
| 2 | 2 | 2 | 2 | 2 |
| 3 | 3 | 3 | 3 | 3 |
| 4 | 4 | 4 | 4 | 4 |

OMR Response Sheet
(For writing answers to multiple choice questions)

This page is to be torn off and after filling the relevant boxes attach it along with your answers to other questions in the assignment. **This is to be submitted at the study centre for evaluation.**

| ENROLMENT NUMBER | | | | | | | | |
|------------------|---|---|---|---|---|---|---|---|
| | | | | | | | | |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 |
| 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 |
| 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 |
| 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 |

| COURSE CODE | | | |
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| 0 | 0 | 0 | 0 |
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| 3 | 3 | 3 | 3 |
| 4 | 4 | 4 | 4 |
| 5 | 5 | 5 | 5 |
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| 7 | 7 | 7 | 7 |
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| 9 | 9 | 9 | 9 |

| YEAR | | | |
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| 0 | 0 | 0 | 0 |
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| 3 | 3 | 3 | 3 |
| 4 | 4 | 4 | 4 |
| 5 | 5 | 5 | 5 |
| 6 | 6 | 6 | 6 |
| 7 | 7 | 7 | 7 |
| 8 | 8 | 8 | 8 |
| 9 | 9 | 9 | 9 |

| EXAMINATION CENTRE CODE | | | |
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| 0 | 0 | 0 | 0 |
| 1 | 1 | 1 | 1 |
| 2 | 2 | 2 | 2 |
| 3 | 3 | 3 | 3 |
| 4 | 4 | 4 | 4 |
| 5 | 5 | 5 | 5 |
| 6 | 6 | 6 | 6 |
| 7 | 7 | 7 | 7 |
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| 9 | 9 | 9 | 9 |

| MONTH | |
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| | 9 |

ANSWERS TO MULTIPLE CHOICE QUESTIONS

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| | | | | |
| 0 | 0 | 0 | 0 | 0 |
| 1 | 1 | 1 | 1 | 1 |
| 2 | 2 | 2 | 2 | 2 |
| 3 | 3 | 3 | 3 | 3 |
| 4 | 4 | 4 | 4 | 4 |

| 6 | 7 | 8 | 9 | 10 |
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| | | | | |
| 0 | 0 | 0 | 0 | 0 |
| 1 | 1 | 1 | 1 | 1 |
| 2 | 2 | 2 | 2 | 2 |
| 3 | 3 | 3 | 3 | 3 |
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| 11 | 12 | 13 | 14 | 15 |
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| 1 | 1 | 1 | 1 | 1 |
| 2 | 2 | 2 | 2 | 2 |
| 3 | 3 | 3 | 3 | 3 |
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| 16 | 17 | 18 | 19 | 20 |
|----|----|----|----|----|
| | | | | |
| 0 | 0 | 0 | 0 | 0 |
| 1 | 1 | 1 | 1 | 1 |
| 2 | 2 | 2 | 2 | 2 |
| 3 | 3 | 3 | 3 | 3 |
| 4 | 4 | 4 | 4 | 4 |