



MATHS

BOOKS - MAXIMUM PUBLICATION

MODEL PAPER 20

Example

1. $A = \{x : x \text{ is an integer and } -3 < x < 7\}$

$B = \{x : x \text{ is a natural number less than } 6\}$

Express A and B in roster form .



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$$2. A = \{x : x \text{ is an integer and } -3 < x < 7\}$$

$$B = \{x : x \text{ is a natural number less than 6}\}$$

Find $A - B, B - A$



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$$3. A = \{x : x \text{ is an integer and } -3 < x < 7\}$$

$$B = \{x : x \text{ is a natural number less than 6}\}$$

$$(A - B) \cup (B - A) = A - B$$



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4. In a class of 35 students , 24 likes to play cricket ,16 likes to play football. Also each student like to play at least one of the two game . How many likes to play both cricket and football?



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5. $\sin 315^\circ = \dots\dots\dots$ a) $-\frac{1}{2}$ b) $-\frac{1}{\sqrt{2}}$ c) $-\frac{\sqrt{3}}{2}$ d) 1

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

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

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

D. 1

Answer: B



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6.

Prove

that

$$2 \sin^2 \left(\frac{\pi}{6} \right) + \sec^2 \left(\frac{7\pi}{6} \right) \cos^2 \left(\frac{\pi}{3} \right) = \frac{3}{2}$$





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7. If the sum of first n terms of an arithmetic progression $2, 5, 8, \dots$ is equal to sum of the first n terms of another arithmetic progression $57, 59, 61, \dots$. Then find the value of n



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8. The sum of first three terms of a Geometric Progression is $\frac{13}{12}$ and their product is -1 . Find the common ratio and the terms.



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9. The sum of first three terms of a geometric progression is $\frac{13}{12}$ and their product is -1

Find geometric progression.



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10. Find the ratio in which the line segment joining the points $(2,4,-3)$ and $(-3,5,4)$ is divided by XY Plane.



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11. Find the ratio in which the line segment joining the points $(2,4,-3)$ and $(-3,5,4)$ is divided by XY Plane. And hence find the coordinate of the point.



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12. Find the derivative of $\cos x$ from first principle.



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13. Find the derivative of $\frac{\cos x}{1 + \sin x}$ with respect to x .



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14. Which of the given graph doesn't represent a function

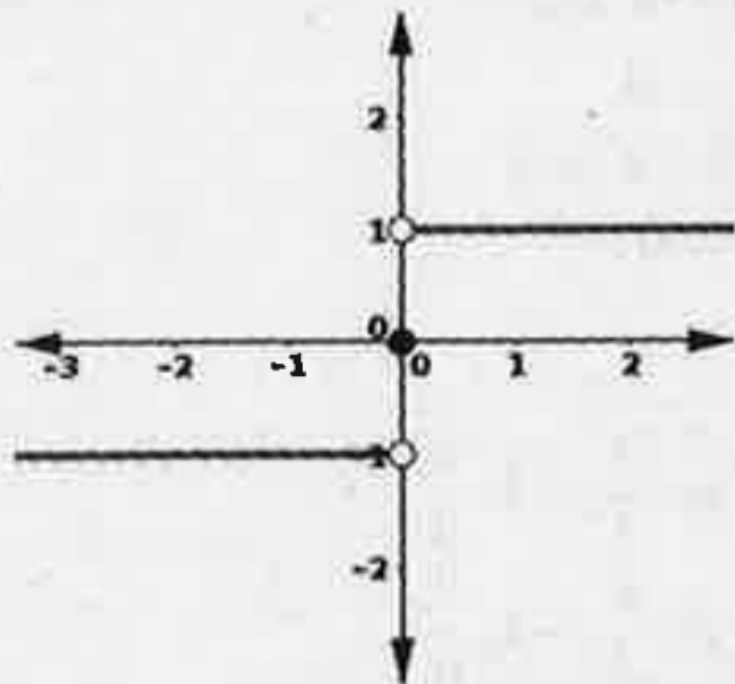


Figure:1

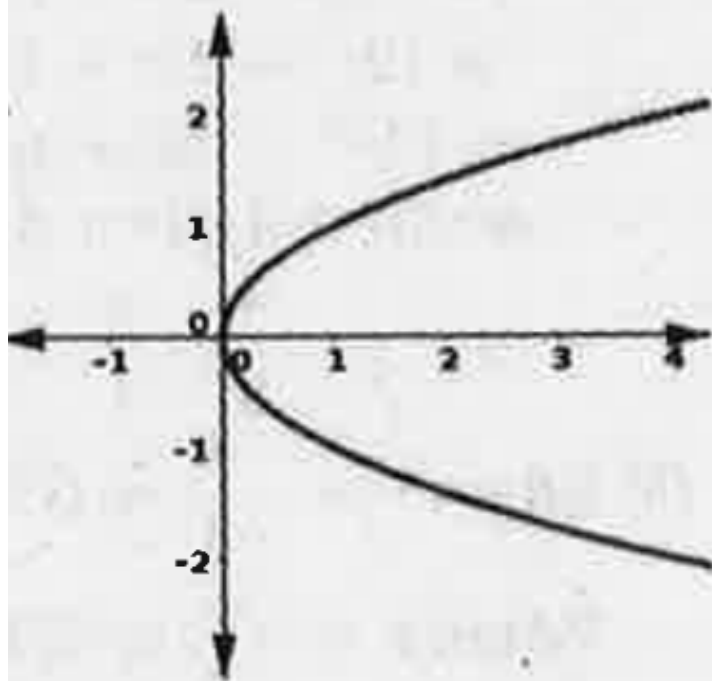


Figure:2

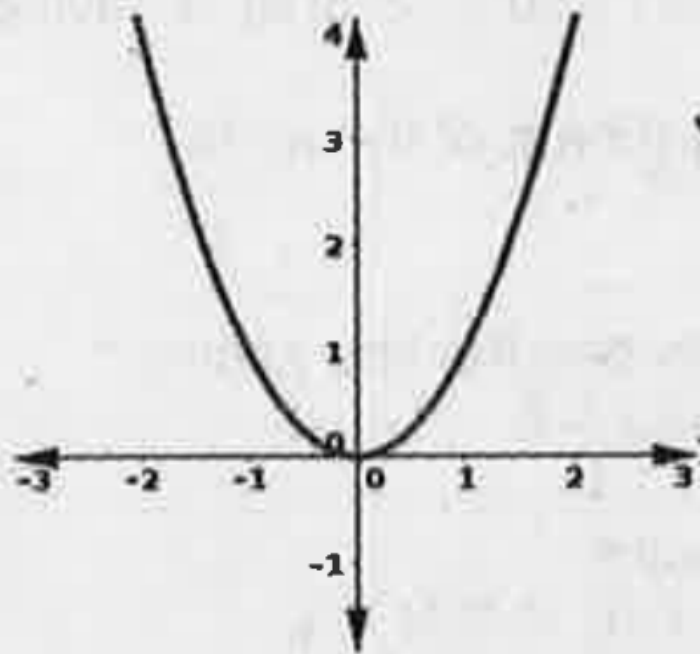


Figure:3

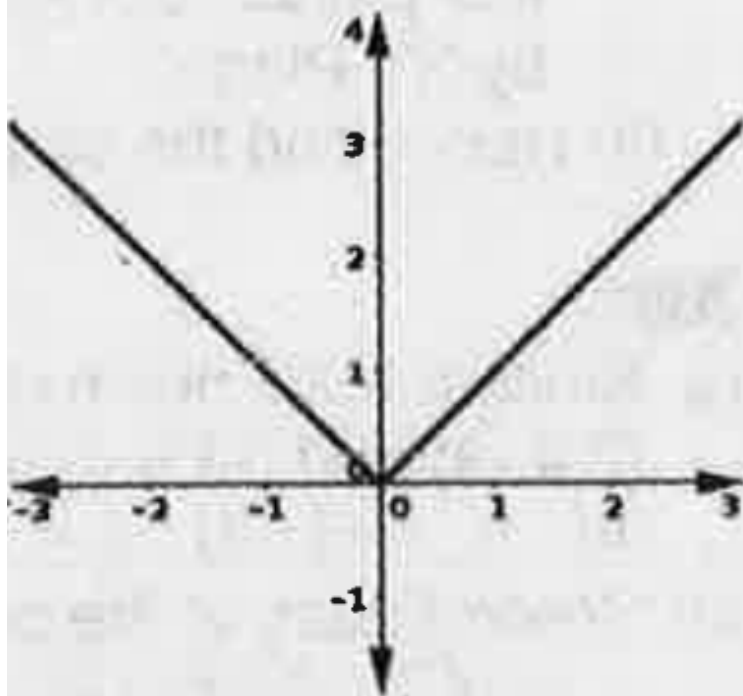
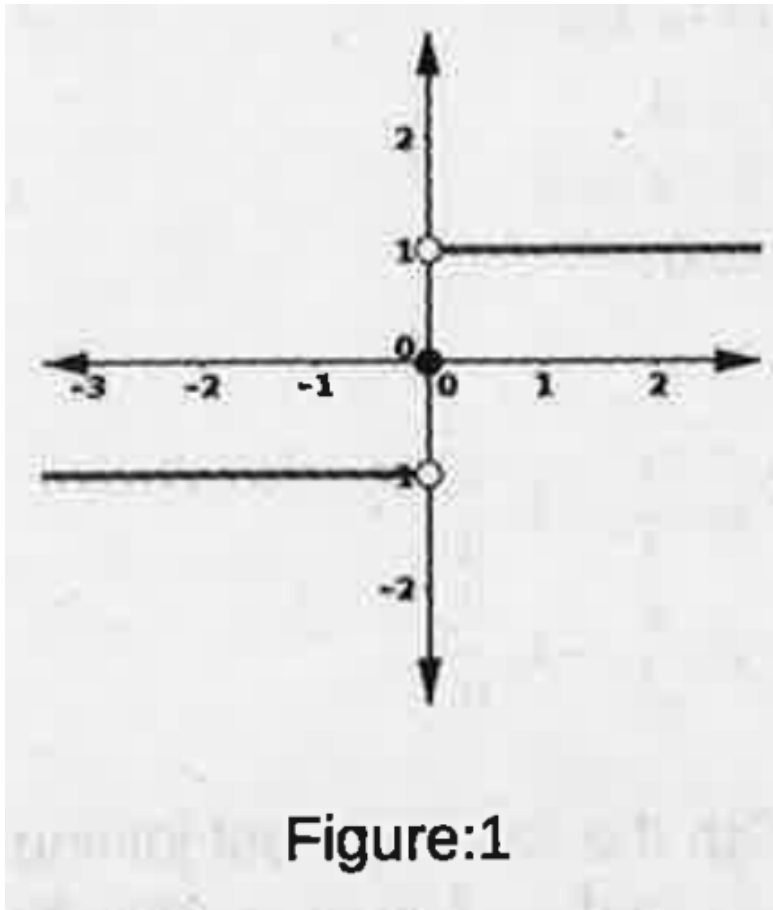


Figure:4



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15. Identify signum function from given graphs



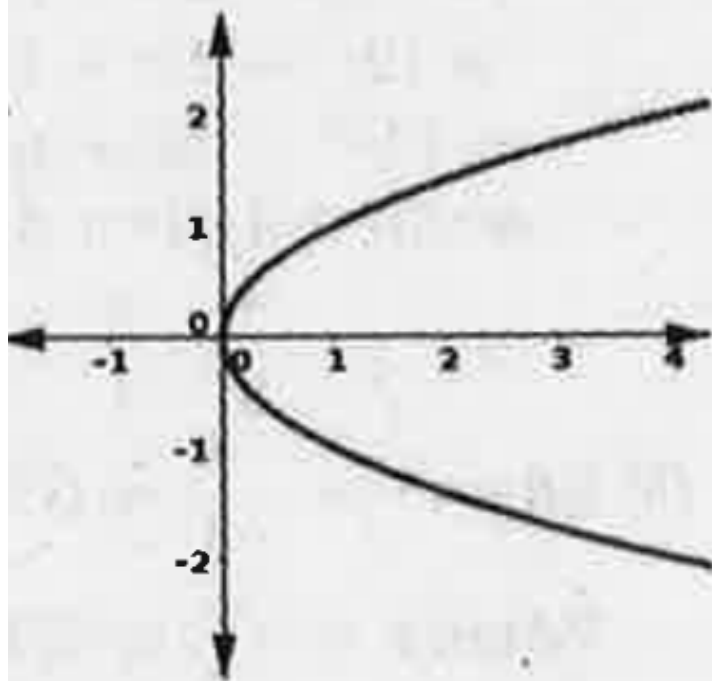


Figure:2

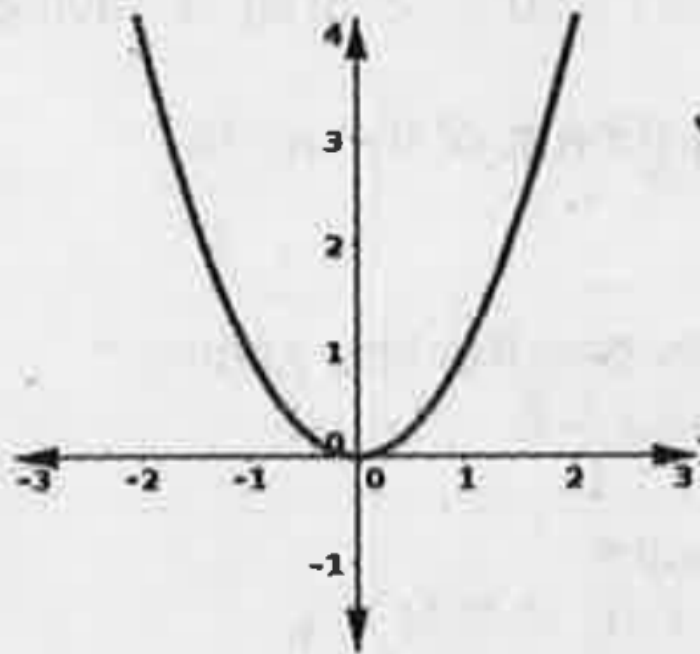


Figure:3

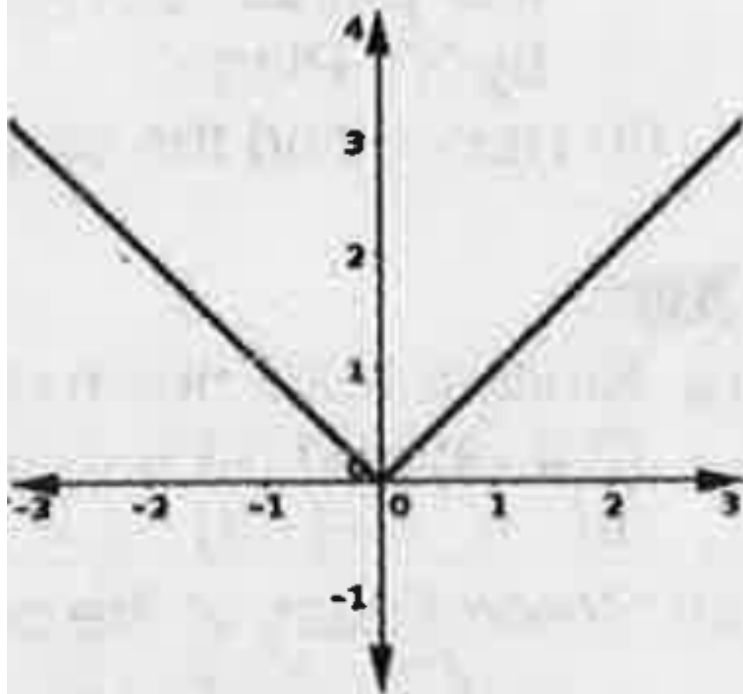


Figure:4



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16. Write domain and range of signum function

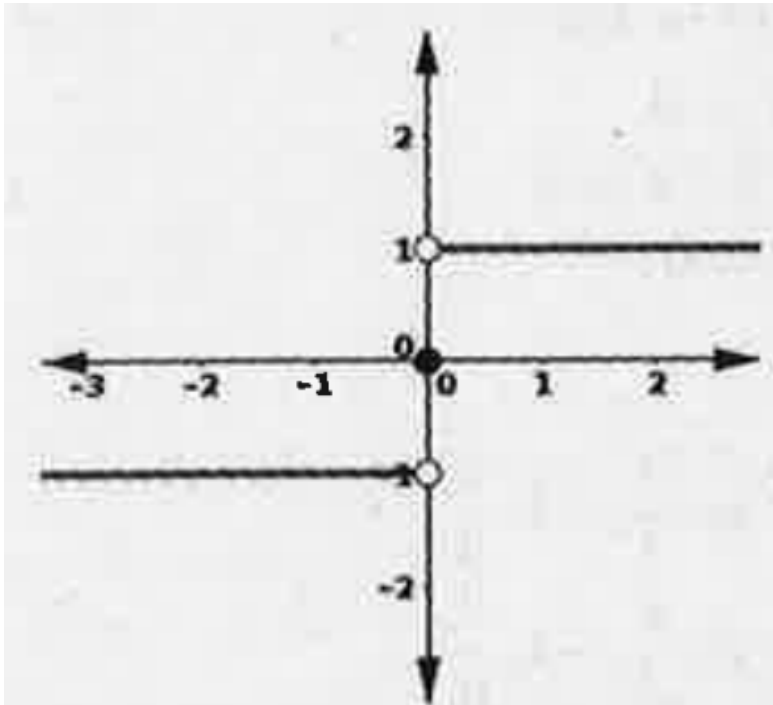


Figure:1

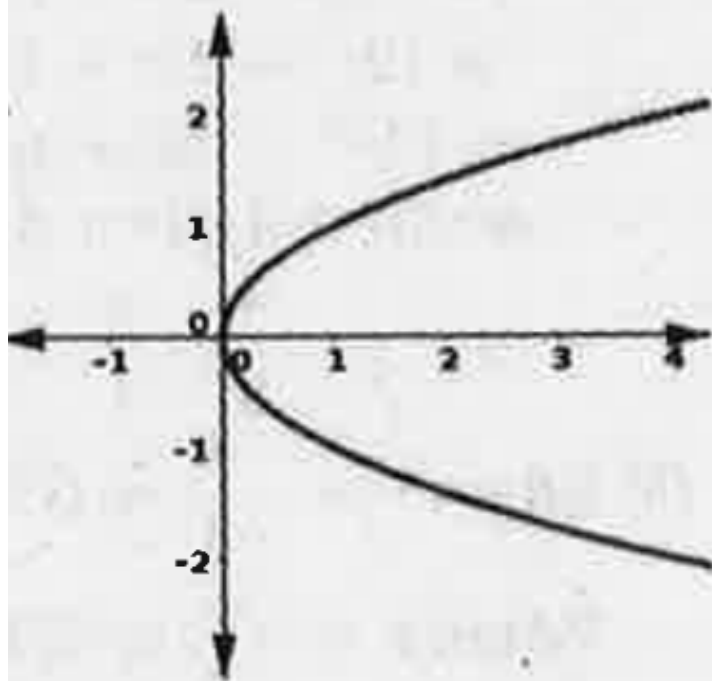


Figure:2

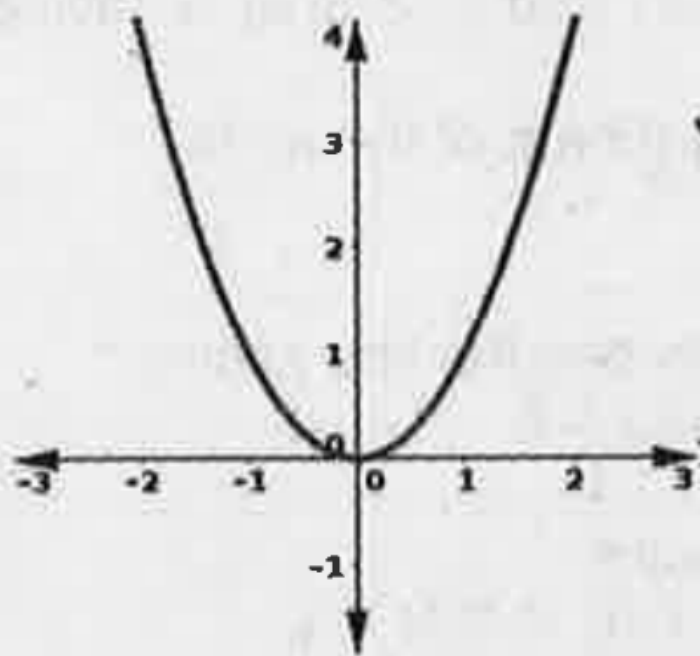


Figure:3

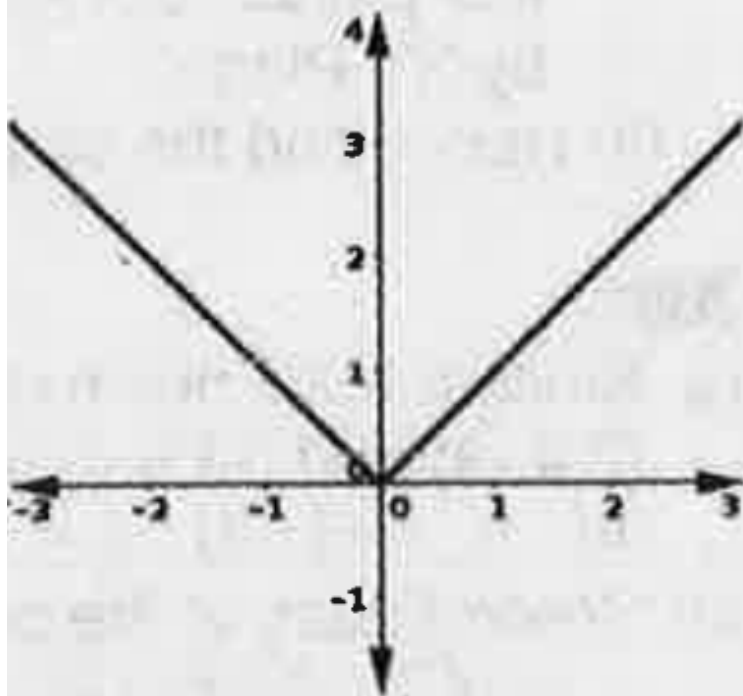


Figure:4



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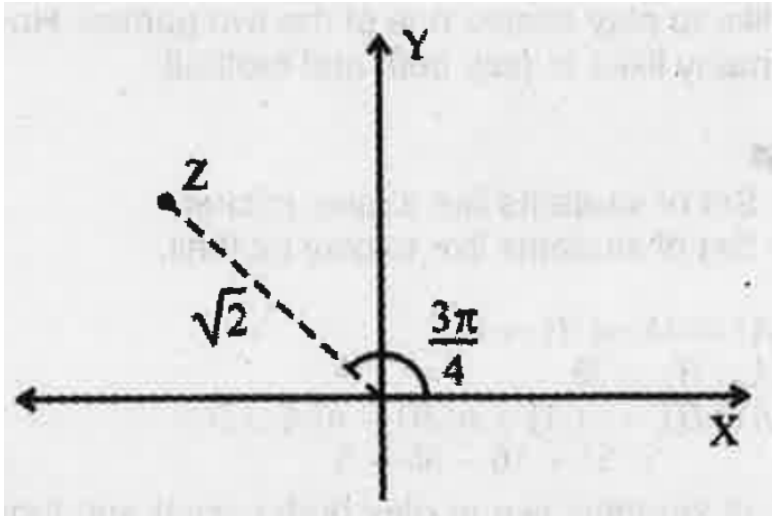
17. For every positive integer n , prove that $7^n - 3^n$ is divisible by 4 using principle of mathematical induction.



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18. In the figure , Z represents a complex number.

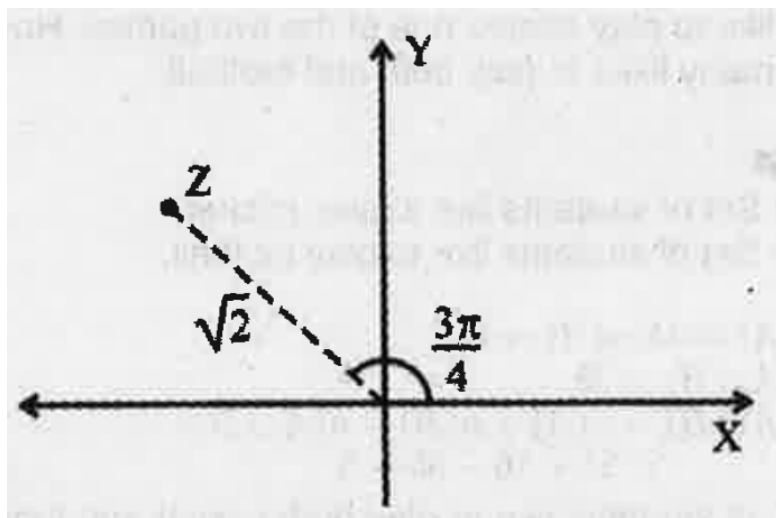
Write the complex number in polar form.



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19. In the above figure , Z represents a complex number.

Find real and imaginary parts of Z .

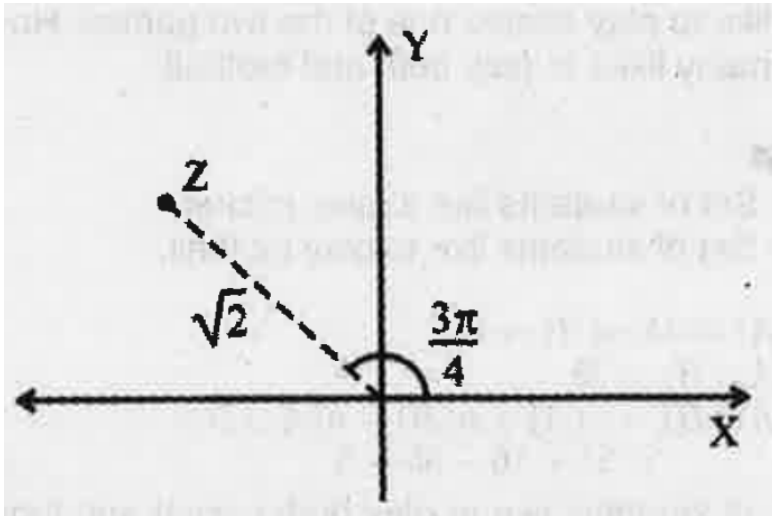


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20. In the above figure , Z represents a complex number.

Find the multiplicative inverse of Z in the form

$$a + ib$$



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21. Solve graphically:

$$2x + y > 4, x + y < 3, 2x - 3y < 6$$



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22. Find the middle term of the expression

$$\left(3 - \frac{x^3}{6}\right)^8$$



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23. Find the area of a triangle formed by the line joining the vertex of parabola $y^2 = 12x$ to the ends of its latus rectum.



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24. Write the negation of the statement "All triangles are not equilateral triangle"



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25. Verify by the method of contradiction.

p : $\sqrt{7}$ is irrational.



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26. Find the probability that when a hand of 7 cards is drawn from a well shuffled deck of 52 cards , it contains all kings



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27. Find the probability that when a hand of 7 cards is drawn from a well shuffled deck of 52 cards , it contains 3 kings



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28. Solve $\sin 2x - \sin 4x + \sin 6x = 0$



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29. For any triangle ABC, prove that

$$\frac{a + b}{c} = \frac{\cos\left(\frac{A - B}{2}\right)}{\sin\left(\frac{C}{2}\right)}$$



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30. ${}^n C_8 = {}^n C_8, n = \dots$

A. 17

B. 12

C. 13

D. 14

Answer: A



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31. In how many way can the letters of the word PERMUTATIONS be arranged if the words starts with P and ends with S.



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32. In how many ways can the letters of the word PERMUTATIONS be arranged in which vowels are all together



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33. How many words with or without meaning each of three vowels and two consonants can

be formed from the letters of the word
INVOLUTE.



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34. Find the equation of the line passing through point $(3,8)$ and perpendicular to the line $x + 3y - 7 = 0$



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35. Consider the line $x + 3y - 7 = 0$

Find the image of the point (3,8) with respect to the given line.



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36. Find the perpendicular distance from point(3,8) to the line $x + 3y - 7 = 0$



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37. The following is the record of goals scored

by team A in a football season:

Calculate the mean of team A.

goals	0	1	2	3	4
matches	1	9	7	5	3



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38. The following is the record of goals scored

by team A in a football season:

Calculate the standard deviation of team A.

goals	0	1	2	3	4
matches	1	9	7	5	3



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39. The following is the record of goals scored by team A in a football season. For the team B mean number of goals scored per match was 2 with a standard deviation of 1.25 goals. Find which team may be considered more consistent

using coefficient of variation.

goals	0	1	2	3	4
matches	1	9	7	5	3



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