



India's Number 1 Education App

MATHS

BOOKS - CENGAGE MATHS (ENGLISH)

INEQUALITIES AND MODULUS

Subjective

1. Solve $\frac{2x + 3}{x^2 + x - 12} < \frac{1}{2}$.



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2. Solve $\frac{1}{x - 2} + \frac{1}{x - 1} > \frac{1}{x}$.



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3. $\left(\sqrt{8 + 2x - x^2} > 6 - 3x \right)$



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4. Solve, $\frac{\sqrt{2x - 1}}{x - 2} < 1$.



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5. Solve, $\sqrt{x - 6} - \sqrt{10 - x} \geq 1$.



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6. Solve, $\frac{1 - \sqrt{21 - 4x - x^2}}{x + 1} \geq 0$.



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7. Solve $|x|^2 - |x| + 4 = 2x^2 - 3|x| + 1$.



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8. Solve the simultaneous equations

$$|x + 2| + y = 5, x - |y| = 1 \text{ Find } x.$$



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9. Solve $x - \sqrt{1 - |x|} < 0$.



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10. Solve $|x - 1| - 2| = |x - 3|$.



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11. Solve : $(|x - 1| - 3)(|x + 2| - 5) < 0$.



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12. For $a, b \in R$ prove that

$$\frac{|a + b|}{1 + |a + b|} \leq \frac{|a|}{1 + |a|} + \frac{|b|}{1 + |b|}$$



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Single Correct Answer

1. If $f(x) = ax^2 + bx + c$ and $f(-1) \geq -4$,
 $f(1) \leq 0$ and $f(3) \geq 5$, then the least value of
 a is

A. $1/4$

B. $1/8$

C. $1/3$

D. $-1/3$

Answer: B



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2. The complete set of values of x for which

$$\frac{x^3(x - 1)^2(x + 4)}{(x + 1)(x - 3)} \geq 0 \text{ is}$$

- A. $(-\infty, -4] \cup (-1, 0] \cup (3, \infty) \cup \{1\}$
- B.
- $(-\infty, -4] \cup (-1, 0] \cup (3, \infty) \cup \{-1\}$
- C. $[-4, -1) \cup [0, 1) \cup (3, \infty)$
- D. $[-4, -1) \cup [0, 1] \cup (3, \infty)$

Answer: A



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3. The set of all values of x for which

$$\frac{(x+1)(x-3)^2(x-5)(x-4)^3(x-2)}{x} < 0$$

A. $(-\infty, -1) \cup (0, 2) \cup (4, 5)$

B. $(-1, 0) \cup (2, 4) \cup (5, \infty)$

C. $(-1, 0) \cup (2, 3) \cup (4, 5)$

D. $(-\infty, -1) \cup (0, 2) \cup [3, 5)$

Answer: A



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4. The solution set of inequality

$$\frac{(e^x - 1)(2x - 3)(x^2 + x + 2)}{(\sin x - 2)(x + 1)x} \leq 0$$

- A. $\left[\frac{3}{2}, \infty \right)$
- B. $(-\infty, -1) \cup \left[\frac{3}{2}, \infty \right)$
- C. $(-1, 0) \cup \left[\frac{3}{2}, \infty \right)$
- D. $R - \{0, -1\}$

Answer: B



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5. The solution set of inequality

$$\frac{1}{2^x - 1} > \frac{1}{1 - 2^{x-1}} \text{ is}$$

- A. $(1, \infty)$
- B. $(0, \log_2(4/3))$
- C. $(-1, \infty)$
- D. $(0, \log_2(4/3)) \cup (1, \infty)$

Answer: D



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6. Let $A = \{x : x^2 - 4x + 3 < 0, x \in R\}$

$$B = \{x : 2^{1-x} + p \leq 0, x^2 - 2(p+7)x + 5 \leq 0\}$$

If $B \subseteq A$, then $p \in$

A. $[-4, -1]$

B. $[-4, \infty)$

C. $(-\infty, 1)$

D. $[0, 1]$

Answer: A



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7. Let $a, b > 0$ satisfies $a^3 + b^3 = a - b$. Then

- A. $a^2 + b^2 = 1$
- B. $a^2 + ab + b^2 < 1$
- C. $a^2 + b^2 > 1$
- D. none of these

Answer: B



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8. The number of integers satisfying

$$|2x - 3| + |x + 5| \leq |x - 8| \text{ is}$$

A. 5

B. 6

C. 7

D. 8

Answer: C



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9. Which of the following is not the solution of

$$|2x + 5| - |x - 3| \geq |x + 8| ?$$

- A. $(-\infty, -8]$
- B. $[3, \infty)$
- C. $(-8, 3)$
- D. none of these

Answer: C



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10. The number of integral values of x

satisfying the equation $|x - |x - 4|| = 4$ is

A. 5

B. 7

C. 9

D. infinite

Answer: D



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11. The solution of $|2x - 3| < |x + 2|$ is

- A. $(-\infty, 1/3)$
- B. $(1/3, 5)$
- C. $(5, \infty)$
- D. $(-\infty, 1/3) \cup (5, \infty)$

Answer: B



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12. The solution set of the inequation

$$\left| \frac{1}{x} - 2 \right| < 4, \text{ is}$$

A. $(-\infty, -1/2)$

B. $(1/6, \infty)$

C. $(-1/2, 1/6)$

D. $(-\infty, -1/2) \cup (1/6, \infty)$

Answer: D



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13. The solution of $\left| x + \frac{1}{x} \right| > 2$ is

- A. $R - \{0\}$
- B. $R - \{-1, 0, 1\}$
- C. $R - \{1\}$
- D. $R - \{-1, 1\}$

Answer: B



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14. The solution of the inequality

$$\frac{|x+2| - |x|}{\sqrt{8-x^3}} \geq 0 \text{ is}$$

A. $[-1, 2]$

B. $[1, 2]$

C. $[-1, 1]$

D. $[0, 3\sqrt{4})$

Answer: A



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15. If $\left| \frac{12x}{4x^2 + 9} \right| \leq 1$, then

- A. $x \in R$
- B. $x \in [-3, 3]$
- C. $x \in [-1, \infty)$
- D. $x \in (-\infty, 2]$

Answer: A



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16. Let a, b, c, d be real numbers such that $|a-b|=2$,
 $|b-c|=3$, $|c-d|=4$. Then the sum of all possible
values of $|a-d| =$

A. 9

B. 18

C. 24

D. 30

Answer: B



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17. The number of solutions of the equation

$$\sqrt{x^2} - \sqrt{(x-1)^2} + \sqrt{(x-2)^2} = \sqrt{5} \text{ is}$$

- A. 0
- B. 1
- C. 2
- D. More than 2

Answer: C



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18. If $|x^2 - 2x - 8| + |x^2 + x - 2| = 3|x + 2|$,

then the set of all real values of x is

- A. $[1, 4] \cup \{-2\}$
- B. $[1, 4]$
- C. $[-2, 1] \cup [4, \infty)$
- D. $(-\infty, -2] \cup [1, 4]$

Answer: A



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19. The number of integers satisfying the equation $|x| + \left| \frac{4 - x^2}{x} \right| = \left| \frac{4}{x} \right|$ is

A. 5

B. 4

C. 6

D. 7

Answer: B



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20. The equation

$$|2ax - 3| + |ax + 1| + |5 - ax| = \frac{1}{2}$$

possesses

A. Infinite number of real solutions for some

$$a \in R$$

B. finitely many real solutions for some

$$a \in R''$$

C. no real solutions for some $a \in R$

D. no real solutions $a \in R$

Answer: D



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21. The set of values of x satisfying

$$\left| \frac{x^2 - 5x + 4}{x^2 - 4} \right| \leq 1 \text{ is}$$

- A. $\left[0, \frac{8}{5} \right]$
- B. $\left[\frac{8}{5}, \infty \right]$
- C. $[-\infty, -2]$
- D. R

Answer: A



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