MATHS

BOOKS - S CHAND MATHS (ENGLISH)

QUADRATIC EQUATIONS

Example

1. Solve: $2x^2 + 2x - 3 = 0$, giving your answer correct to one decimal place.

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2. Solve: $x^2 + x + 1 = 0$.

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3. Solve: $x^{\frac{2}{3}} + x^{\frac{1}{3}} - 2 = 0$.

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4. If $4^{1+x} + 4^{1-x} = 10$, find x.

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5. If $\sqrt{\frac{2x^2+x+2}{x^2+3x+1}}+2.\sqrt{\frac{x^2+3x+1}{2x^2+x+2}}-3=0,$

find x.

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6. Solve: $(x+1)(x+2)(x+3)(x+4)+1=0.$

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7. Examine the nature of the roots of the equations

(i) $2x^2+2x+3=0$

(ii) $2x^2-7x+3=0$

(iii) $x^2 \_ 5x - 2 = 0$

(iv) $4x^2 - 4x + 1 = 0$

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8. If a,b,c are real, then both the roots of the equation (x-b)(x-c)+(x-c)(x-a)+(x-a)(x-b)=0 are always (A) positive (B) negative (C) real (D) imaginary.

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9. For what value of m, are the roots of the equation (3m+1)$x^2 + (11 + m)x + 9 = 0$ equal ? Real and unequal ?

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10. If α, β are roots of $x^2 - px + q = 0$, find the value of

(i) $\alpha^2 + \beta^2$

(ii) $\alpha^3 + \beta^3$

(iii) $\alpha - \beta$,

(iv) $\alpha^4 + \beta^4$.

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11. If α and β are the roots of $ax^2 + bx + c = 0$, form the equation whose roots are $\frac{1}{\alpha}$ and $\frac{1}{\beta}$.

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12. If α, β are the roots of $ax^2 + bx + c = 0$, form that equation whose roots are $(\alpha^2 + \beta^2), \left(\frac{1}{\alpha^2} + \frac{1}{\beta^2}\right)$.

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13. Find the condition that one root of $ax^2 + bx + c = 0$ may be four times the other.

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14. Prove that the condition that one root of $ax^2 + bx + c = 0$ may be the square of the other is $b^3 + a^2c + ac^2 = 3abc.$

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15. For which value of k will the equations $x^2 - kx - 21 = 0$ and $x^2 - 3kx + 35 = 0$ have one common root ?

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16. If $x^2 + px + q = 0$ and $x^2 + qx + p = 0$ have a common root, prove that either $p = q$ or $1 + p + q = 0$.

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17. Graph the expression $x^2 + x - 6$.

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18. Graph the expression $4 - 5x - x^2$.

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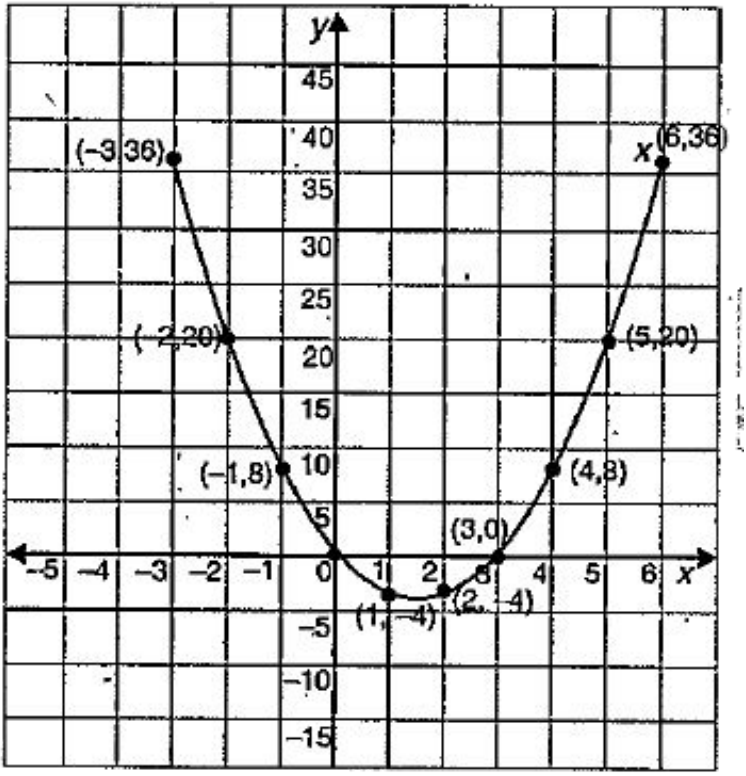
19. state true or false : - The roots x=0 and x=3 of the equation $2x(x-3)=0$ are the x-intercepts of the graph of y=2x(x-3) as shown in the figure.



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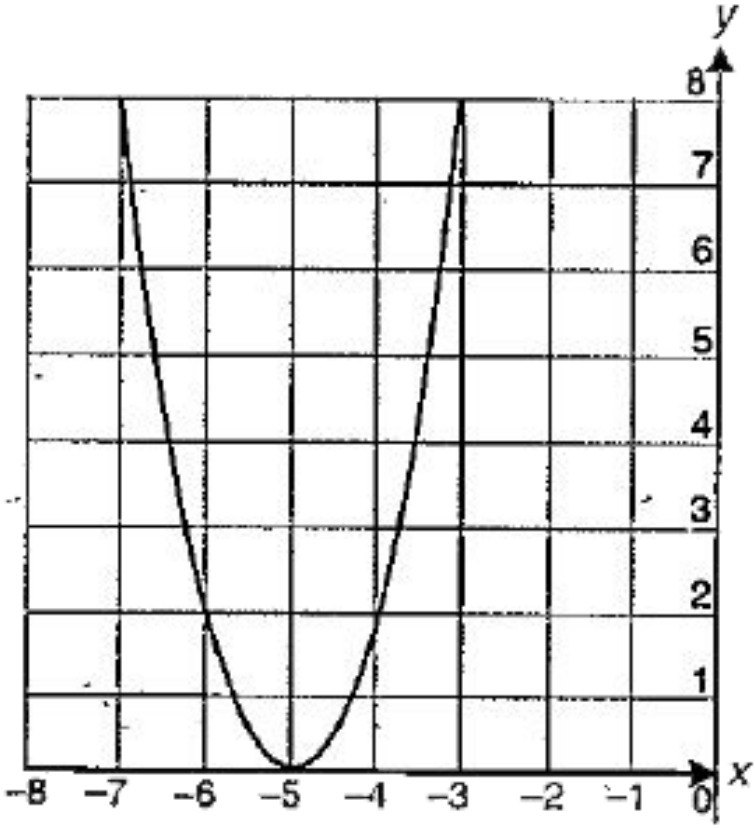
20. State true or false : The two roots x=-5,-5 of the equation $(x+5)^2=0$ is the x-intercept of the graph of $y=(x+5)^2$ as shown below.



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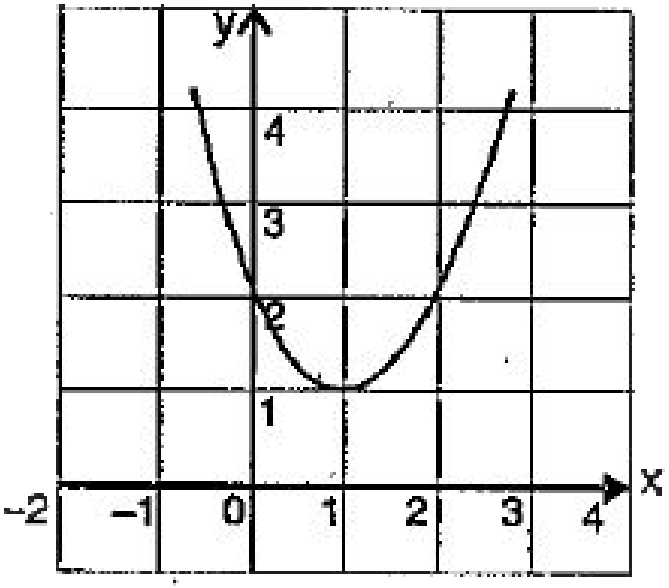
21. The graph of the function f(x)=$x^2 - 2x + 2$ does not touch the x-axis as shown below because the roots are imaginary. Find the roots of the quadratic equation.



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22. (i) Draw a graph of $y = x^2 - 4x + 3$ for $-2 \leq x \leq 5$.

(ii) Use the graph to solve the equation $x^2 - 4x + 3 = 0$.

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23. Find the value of $6x^2 - 5x + 1$ for all real value of x.

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24. Determine the sign of the function $3x^2 - 2x + 1$ for real values of x.

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25. Find the ranges of the values of x for which $x^2 - 4x + 2$ lies between -1 and +1.

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26. Determine the value of 'a' so that the expression $x^2 - 2(a+1)x + 4, x \in R$ is always positive.

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27. If x is real, prove that the value of the expression $\frac{(x-1)(x+3)}{(x-2)(x+4)}$ cannot be between $\frac{4}{9}$ and 1.

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28. If x be real, find the maximum value of $\frac{(x+2)}{2x^2+3x+6}$.

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29. If x is real, then find the minimum value of $\frac{x^2-x+1}{x^2+x+1}$.

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30. If x is real, the maximum value of $\frac{3x^2+9x+17}{3x^2+9x+7}$ is

(a) $\frac{17}{7}$

(b) $\frac{1}{4}$

(c) 41

(d) 1

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Exercise 10 A

1. Find the roots of the equations.

Q. $2x^2 + x - 3 = 0$

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2. Find the roots of the equations.

Q. $6x^2 + 7x - 20 = 0.$

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3. Find the roots of the equations.

Q. $36x^2 + 23 = 60x.$

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4. Find the roots of the equations.

Q. $x^2 - 2x + 5 = 0$

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5. Find the roots of the equations.

Q. $3x^2 - 17x + 25 = 0.$

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6. Find the roots of the equations.

Q. $x^2 + 3x - 3 = 0$, giving your answer correct to

two decimal places.

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7. Find the roots of the equations.

Q. $5x^2 - x + 4 = 0.$

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8. Find the roots of the equations:

$\sqrt{3}x^2 - \sqrt{2}x + 3\sqrt{3} = 0.$

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9. Find the roots of the equations.

Q. $\frac{x^2+8}{11} = 5x - x^2 - 5$

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10. Find the roots of the equations.

Q. $\frac{2x}{x-4} + \frac{2x-5}{x-3} = 8\frac{1}{2}.$

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11. The number of real solutions of the equation $\left|x^2\right| - 3|x| + 2 = 0$ is (a) 3 (b) 4 (c) 1 (d) 3.

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Exercise 10 B

1. Solve the equations:

$x^4 - 5x^2 + 6 = 0.$

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2. Solve the equations:

Q. $x^5 + 242 = \frac{243}{x^5}.$

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3. Solve the equations:

$10x^{-2} - 9 - x^{-4} = 0.$

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4. Solve the equations:

Q. $3^{2x} - 10 \times 3^{x} + 9 = 0.$

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5. Solve the equations:

Q. $2^{2x-1} - 9 \times 2^{x-2} + 1 = 0.$

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6. Solve the equations:

$3^{2x+1} + 3^2 = 3^{x+3} + 3^x.$

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7. Solve the equations:

Q. $\sqrt{x^2 - 3x} = 4x^2 - 12x - 3.$

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8. Solve the equations:

Q. $\sqrt{\frac{x^2+2}{x^2-2}} + 6\sqrt{\frac{x^2-2}{x^2+2}} = 5.$

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9. Solve the equations:

Q. $\sqrt{\frac{2x^2+1}{x^2-1}} + 6\sqrt{\frac{x^2-1}{2x^2+1}} = 5.$

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10. Solve the equations:

Q. $x(x-1)(x+2)(x-3) + 8 = 0.$

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11. Solve the equations:

Q. $(x-7)(x-3)(x+1)(x+5)=1680.$

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12. Solve the equation:

$(2x-7)\left(x^2-9\right)(2x+5)=91.$

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13. solve the equation: $2^{2x}-2^{x+2}-4\times 2^3=0.$

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14. Solve the equations:

$2^{x^2} : 2^x = 8 : 1$

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15. Solve the equation:

$2^{2x+3} + 2^{x+3} = 1 + 2^x.$

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16. Solve the equations:

$4^x - 3^{x-\frac{1}{2}} = 3^{x+\frac{1}{2}} - 2^{2x-1}$.

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Exercise 10 C

1. Without solving, find the nature of the roots of the following equations:

(i) $3x^2 - 7x + 5 = 0$.

(ii) $4x^2 + 4x + 1 = 0$.

(iii) $3x^2 + 7x + 2 = 0$.

(iv) $x^2 + px - q^2 = 0$.

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2. If the equation $\left(1+m^2\right)x^2+2mcx+c^2-a^2=0$ has equal roots, show that $c^2=a^2\left(1+m^2\right)$.

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3. Find the value of m so that the roots of the equation $(4-m)x^2+(2m+4)x+(8m+1)=0$ may be equal.

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4. If the roots of $ax^2 + x + b = 0$ be real and unequal, show that the roots of $\frac{x^2 + 1}{x} = 4\sqrt{ab}$ are imaginary.

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5. Find 'a' so that the sum of the roots of the equation $ax^2 + 2x - 3a = 0$ may be equal to their product.

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6. If α, β are the roots of the equation $x^2 + x + 1 = 0$, find the value of $\alpha^3 - \beta^3$.

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7. If α, β are the roots of the equation $x^2 + px + q = 0$, find the value of

(a) $\alpha^3\beta + \alpha\beta^3$

(b) $\alpha^4 + \alpha^2\beta^2 + \beta^4$.

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8. If the roots of the equation $x^2 + px + 7 = 0$ are denoted by α and β, and $\alpha^2 + \beta^2 = 22$, find the possible values of p.

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9. If α, β are the roots of the equation $3x^2 - 6x + 4 = 0$, find the value of

$$\left(\frac{\alpha}{\beta} + \frac{\beta}{\alpha}\right) + 2\left(\frac{1}{\alpha} + \frac{1}{\beta}\right) + 3\alpha\beta.$$

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10. If α, β are the roots of $ax^2 + bx + c = 0$, find the value of

(i) $\left(\frac{\alpha}{\beta} - \frac{\beta}{\alpha}\right)^2$

(ii) $\frac{\alpha^3}{\beta} + \frac{\beta^3}{\alpha}$.

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11. If the sum of the roots of the equation $x^2 - px + q = 0$ be m times their difference, prove that $p^2(m^2 - 1) = 4m^2q$.

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12. If one root of the equation $x^2 + ax + 8 = 0$ is 4 while the equation $x^2 + ax + b = 0$ has equal roots, find b.

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13. Find the value of a for which one root of the quadratic equation $(a^2 - 5a + 3)x^2 + (3a - 1)$ x+2=0 is twice as large as the other.

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14. If α, β are the roots of the equation $ax^2 - bx + b = 0$, prove that

$$\sqrt{\frac{\alpha}{\beta}} + \sqrt{\frac{\beta}{\alpha}} - \sqrt{\frac{b}{a}} = 0.$$

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15. If α and β are the roots of the equation $x^2 + x - 7 = 0$, form the equation whose roots are α^2 and β^2.

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16. If α and β are the roots of the equation $2x^2 + 3x + 2 = 0$, find the equation whose roots are $\alpha + 1$ and $\beta + 1$.

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17. Find the equation whose roots are $\frac{\alpha}{\beta}$ and $\frac{\beta}{\alpha}$, where α and β are the roots of the equation $x^2 + 2x + 3 = 0$.

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18. If α and β are the roots of the equation $2x^2 - 3x + 1 = 0$, form the equation whose roots are $\frac{\alpha}{2\beta + 3}$ and $\frac{\beta}{2\alpha + 3}$.

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19. If $a \neq b$ and $a^2 = 5a - 3, b^2 = 5b - 3$, then form that equation whose roots are $\frac{a}{b}$ and $\frac{b}{a}$.

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20. Given that α and β are the roots of the equation $x^2 = x + 7$.

(i) Prove that (a) $\frac{1}{\alpha} = \frac{\alpha - 1}{7}$ and (b) $\alpha^3 = 8\alpha + 7$.

(ii) Find the numerical value of $\frac{\alpha}{\beta} + \frac{\beta}{\alpha}$.

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21. Given that α and β are the roots of the equation $x^2 - x + 7 = 0$, find

(i) The numerical value of $\frac{\alpha}{\beta + 3} + \frac{\beta}{\alpha + 3}$,

(ii) an equation whose roots are $\frac{\alpha}{\beta + 3}$ and $\frac{\beta}{\alpha + 3}$.

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22. Given that α and β are the roots of the equation $2x^2 - 3x + 4 = 0$, find an equation whose roots are $\alpha + \frac{1}{\alpha}$ and $\beta + \frac{1}{\beta}$.

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23. The roots of the quadratic equation $x^2 + px + 8 = 0$ are α and β. Obtain the values of p, if

(i) $\alpha = \beta^2$

(ii) $\alpha - \beta = 2$.

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24. If the roots of $x^2 - bx + c = 0$ be two consecutive integers, then find the value of $b^2 - 4c$.

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25. The roots of the equation $px^2 - 2(p+1)x + 3p = 0$ are α and β. If $\alpha - \beta = 2$, calculate the value of α, β and p.

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26. The roots of the equation $ax^2 + bx + c = 0$ are α and β. Form the quadratic equation whose roots are $\alpha + \frac{1}{\beta}$ and $\beta + \frac{1}{\alpha}$.

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27. Two candidates attempt to solve a quadratic equation of the form $x^2 + px + q = 0$. One starts with a wrong value of p and finds the roots to be 2 and 6. the other starts with a wrong vlaue of q and finds the roots to be 2 and -9. find the correct roots and the equation.

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28. Given that α and β are the roots of the equation $x^2 = 7x + 4$,

(i) show that $\alpha^3 = 53\alpha + 28$

(ii) find the value of $\frac{\alpha}{\beta} + \frac{\beta}{\alpha}$.

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29. The ratio of the roots of the equation $x^2 + \alpha x + \alpha + 2 = 0$ is 2. find the values of the parameter α.

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30. If $(1 - p)$ is a root of the quadratic equation $x^2 + px + (1 - p) = 0$, then its roots are

(a) 0,-1

(b) -1,1

(c) 0,1

(d) -1,2

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Exercise 10 D

1. Find the condition that one root of $ax^2 + bx + c = 0$ may be

(i) three tiems the other,

(ii) n times the other,

(iii) more than the other by h.

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2. Find the condition that the ratio between the roots of the equation $ax^2 + bx + c = 0$ may be m:n.

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3. If the ratio of the roots of the equation $x^2 + px + q = 0$ is equal to the ratio of the roots of $x^2 + lx + m = 0$, prove that $mp^2 = ql^2$.

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4. For what values of a and b, the equation $x^2 + (2a - 3)x = 3b + 4$ should have both the roots

zero?

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5. Find the values of λ and μ if both the roots of the equation $(3\lambda+1)x^2=(2\lambda+3\mu)x-3$ are infinite.

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6. Find m so that the roots of the equation $\frac{x^2-bx}{ax-c}=\frac{m-1}{m+1}$ may be equal in magnitude and opposite in sign.

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7. The roots of the quadratic equation $4x^2 - (5a + 1)x + 5a = 0$, are p and q. if q=1+p, calculate the possible values of a,p and q.

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8. Find the values of m for which the quadratic equation $x^2 - m(2x - 8) - 15 = 0$ has

(i) equal roots,

(ii) both roots positive.

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9. If $a+b+c=0$, prove that the roots of $ax^2+bx+c=0$ are rational. Hence, show that the roots of $(p+q)x^2-2px+(p-q)=0$ are rational.

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10. Show that the roots of $(x-b)(x-c)+(x-c)(x-a)+(x-a)(x-b)=0$ are real, and that they cannot be equal unless a=b=c.

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11. Determine the values of m for which the equations $3x^2 + 4mx + 2 = 0$ and $2x^2 + 3x - 2 = 0$ may have a common root.

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12. Find the value of k, so that the equation $2x^2 + kx - 5 = 0$ and $x^2 - 4x + 4 = 0$ may have one root common.

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13. If $ax^2 + bx + c = 0$ and $bx^2 + cx + a = 0$ have a common root, prove that $a + b + c = 0$ or $a = b = c$.

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14. The equations $x^2 + x + a = 0$ and $x^2 + ax + 1 = 0$ have a common real root

(a) for no value of a.

(b) for exactly one value of a.

(c) for exactly two values of a.

(d) for exactly three values of a.

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Exercise 10 E

1. Draw the graph of the following quadratic functions.

Q. $y = x^2 - 5x + 6 \qquad 0 \leq x \leq 5.$

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2. Draw the graph of the following quadratic functions.

Q. $y = -x^2 + 2x + 3 \qquad -3 \leq x \leq 5.$

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3. Draw the graph of the following quadratic functions.

$y = x^2 - 4x + 4 \qquad -1 \leq x \leq 5.$

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4. Solve graphically and compare your answer with algebraic solution either by factorization or formula method:

(i) $y = x^2 - 5x + 6$

(ii) $y = -x^2 + 2x + 3$

(iii) $y = x^2 - 4x + 4$

(iv) $y = x^2 - x - 6$

(v) $y = x^2 - 6x + 9$

(vi) $y = -x^2 - x + 12$

(vii) $y = x^2 - 4x + 5 = 0$

(viii) $y = x^2 + 2x + 2 = 0.$

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Exercise 10 F

1. Show that

(a) $x^2 - 3x + 6 > 0$ for all x,

(b) $4x - x^2 - 6 < 0$ for all x.

(c) $2x^2 - 4x + 7$ is always +ve.

(d) $-2x^2+3x-4$ is always -ve.

(e) $-x^2+3x-3$ is always -ve.

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2. Explain why $3x^2+kx-1$ is never always positive for any value of k.

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3. Under what conditions is $2x^2+kx+2$ always positive ?

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4. Find what values of a so that the expression $x^2 - (a+2)x + 4$ is always positive.

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5. Find the range of values of x for which the expression $12x^2 + 7x - 10$ is negative.

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6. (i) Find the values of 'a' for which the expression $x^2 - (3a-1)x + 2a^2 + 2a - 11$ is always positive

(ii) If $x^2 + 4ax + 2 > 0$ for all values of x, then a lies

in the interval.

(a) $(-2, 4)$

(b) (1,2)

(c) $(-\sqrt{2}, \sqrt{2})$

(d) $\left(-\frac{1}{\sqrt{2}}, \frac{1}{\sqrt{2}}\right)$

(e) (-4,2).

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7. Find the greatest value of $3+5x-2x^2$ for all real values of x.

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8. Find the least value of $\frac{6x^2 - 22x + 21}{5x^2 - 18x + 17}$ for real values of x.

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9. If x be real, prove that the value of $\frac{11x^2 + 12x + 6}{x^2 + 4x + 2}$ cannot lie between -5 and 3.

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Chapter Test

1. Solve the equation:

$$5^{x+1} + 5^{2-x} = 5^3 + 1$$

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2. Solve the equations:

$$\sqrt{\frac{x}{1-x}} + \sqrt{\frac{1-x}{x}} = \frac{13}{6}.$$

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3. Solve the equations:

$$(x+1)(x+2)(x+3)(x+4) = 120$$

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4. Prove that both the roots of the equation $x^2 - x - 3 = 0$ are irrational.

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5. For what values of m will the equation $x^2 - 2mx + 7m - 12 = 0$ have (i) equal roots, (ii) reciprocal roots ?

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6. If one root of $2x^2 - 5x + k = 0$ be double the other, find the value of k.

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7. If α, β be the roots of the equation $x^2 - x - 1 = 0$, determine the value of i) $\alpha^2 + \beta^2$ and

(ii) $\alpha^3 + \beta^3$.

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8. If the roots of the equation $ax^2 + bx + c = 0$ be in the ratio 3:4, show that $12b^2 = 49ac$.

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9. If x is real, prove that the quadratic expression (i) (x-2)(x+3)+7 is always positive.

(ii) $4x - 3x^2 - 2$ is always negative.

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10. Draw the graph of the quadratic function $x^2 - 4x + 3$ and hence find the roots of the equation $x^2 - 4x + 3 = 0$. What is the minimum value of the function ?

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11. For what real values of a, will the expression $x^2 - ax + 1 - 2a^2$, for the real x, be always positive ?

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12. If x be real, prove that the value of $\frac{2x^2 - 2x + 4}{x^2 - 4x + 3}$ cannot lie between -7 and 1.

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13. If the roots of the equation $qx^2 + 2px + 2q = 0$ are real and unequal, prove that the roots of the

equation $(p+q)x^2+2qx+(p-q)=0$ are imaginary.

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14. If α, β be the roots of $x^2-px+q=0$, find the value of $\alpha^5\beta^7+\alpha^7\beta^5$ in terms of p and q.

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15. If the difference between the roots of the equation $x^2+ax+1=0$ is less than $\sqrt{5}$, then the set of possible values of a is (i) $(3,\infty)$ (ii) $(-\infty,-3)$ (iii) $(-3,3)$ (iv) $(-3,\infty)$

A. $(3, \infty)$

B. $(-\infty, -3)$

C. $(-3, 3)$

D. $(-3, \infty)$

Answer: C

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16. Let α, β be the roots of the equation $x^2 - px + r = 0$ and $\alpha/2, 2\beta$ be the roots of the equation $x^2 - qx + r = 0$, then the value of r is (1)

$\frac{2}{9}(p-q)(2q-p)$ (2) $\frac{2}{9}(q-p)(2p-q)$ (3)

$\frac{2}{9}(q-2p)(2q-p)$ (4) $\frac{2}{9}(2p-q)(2q-p)$

A. $\frac{2}{9}(p-q)(2q-p)$

B. $\frac{2}{9}(q-p)(2p-q)$

C. $\frac{2}{9}(q-2p)(2q-p)$

D. $\frac{2}{9}(2p-q)(2q-p)$

Answer: D

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17. α, β are the roots of $ax^2 + 2bx + c = 0$ and $\alpha + \delta, \beta + \delta$ are the roots

of $Ax^2 + 2Bx + C = 0$, then what is $\left(b^2 - ac\right) / \left(B^2 - AC\right)$ equal to ?

A. $(b/B)^2$

B. $(a/A)^2$

C. $\left(a^2b^2\right) / \left(A^2B^2\right)$

D. ab/AB

Answer: A::B

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18. If α, β are the roots of the equation $x^2 - 2x - 1 = 0$, then what is the value of

$\alpha^2\beta^{-2} + \alpha^{-2}\beta^2$?

A. -2

B. 0

C. 30

D. 34

Answer: D

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19. If the roots of the quadratic equation $x^2 + px + q = 0$ are $\tan 30^\circ$ and $\tan 15^\circ$, then value of $2 + q - p$ is

A. 1

B. 2

C. 3

D. 0

Answer: C

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20. If both the roots of the quadratic equation $x^2 - 2kx + k^2 + k - 5 = 0$ are less than 5, then k lies in the interval.

A. (5,6]

B. $(6,\infty)$

C. $(-\infty, 4)$

D. $[4, 5]$

Answer: C

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21. If α and β are the roots of $ax^2 + bx + c = 0$ and if $px^2 + qx + r = 0$ has roots $\frac{1-\alpha}{\alpha}$ and $\frac{1-\beta}{\beta}$ then r=

A. $a + 2b$

B. $a + b + c$

C. $ab + bc + ca$

D. abc

Answer: A::B

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22. The quadratic equations $x^2 - 6x + a = 0$ and $x^2 - cx + 6 = 0$ have one root in common. The other roots of the first and second equations are integers in the ratio 4:3. then the common root is

A. 1

B. 4

C. 3

D. 2

Answer: D

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23. If α, β are the roots of the equation $\lambda\left(x^2 - x\right) + x + 5 = 0$ and if λ_1 and λ_2 are two values of λ obtained from $\frac{\alpha}{\beta} + \frac{\beta}{\alpha} = 4$, then $\frac{\lambda_1}{\lambda_2^2} + \frac{\lambda_2}{\lambda_1^2}$ equals.

A. 4192

B. 4144

C. 4096

D. 4048

Answer: D

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24. If α, β be the roots of $x^2 - a(x-1) + b = 0$, then the value of $\frac{1}{\alpha^2 - a\alpha} + \frac{1}{\beta^2 - a\beta} + \frac{2}{a+b}$ is

A. $\frac{4}{a+b}$

B. $\frac{1}{a+b}$

C. 0

D. -1

Answer: C

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Example Solution

1. The roots of the quadratic equation $x^2 + 2\sqrt{2}x - 6 = 0$ are

A. $2, \ -3\sqrt{2}$

B. $\sqrt{2}, \ -3\sqrt{2}$

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

D. $2\sqrt{2}, \ -3$

Answer: B

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2. If the equation $(m+6)x^2+(m+6)x+2=0$ has real and distinct roots, then

A. $m < \ -6$

B. $m > 2$

C. $-6 < m < 2$

D. $m < -6$ or $m > 2$

Answer: D

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3. If the roots of the equation $x^2 + 5x - p = 0$ differ by unity, then the value of p is

A. -6

B. -5

C. 6

D. 12

Answer: A

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4. If α and β are roots of the equation $px^2 + qx + 1 = 0$, then the value of $\alpha^3\beta^2 + \alpha^2\beta^3$ is

A. $\frac{q}{p^3}$

B. $-\frac{q}{p^3}$

C. $\frac{p}{q^3}$

D. $-\frac{p}{q^3}$

Answer: B

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5. If α, β are roots of the equation $3x^2 + 4x - 5 = 0$, then $\frac{\alpha}{\beta}$ and $\frac{\beta}{\alpha}$ are roots of the equation

A. $15x^2 + 46x + 1 = 0$

B. $15x^2 - 46x + 1 = 0$

C. $x^2 + 46x + 15 = 0$

D. $x^2 - 46x + 15 = 0$

Answer: A

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6. For all real values of x, the maximum value of the expression $3 - 5x - 2x^2$ is

A. $-\frac{5}{4}$

B. $\frac{7}{8}$

C. $-\frac{49}{8}$

D. $\frac{49}{8}$

Answer: D

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7. If the expression $x^2 - (m+2)x + 4$ is always positive for all real values of x, then find range of m

A. $m < 2$

B. $m > -6$

C. $-6 < m < 2$

D. $m < -6$ or $m >$

Answer: C

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Multiple Choice Questions

1. The roots of the equation $x^2 - 4x + 13 = 0$ are

A. $2 \pm 3i$

B. $-2 \pm 3i$

C. $5, \ -1$

D. $3i, \ -3i$

Answer: A

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2. The roots of the equation $2x^2 - 5x + 2 = 0$ are

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

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

C. $2, \frac{1}{2}$

D. $-2, -\frac{1}{2}$

Answer: C

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3. If the equation $mx^2 + mx + 1 = -4x^2 - x$ has equal roots, then the values of m are

A. $-5, 3$

B. $5, -3$

C. $5, 3$

D. $-5, \ -3$

Answer: B

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4. If the equation $(m+6)x^2+(m+6)x+2=0$ has a pair of complex conjugate roots, then find interval of m

A. $m > \ -6$

B. $m < 2$

C. $-6 < m < 2$

D. $m < -6$ or $m > 2$

Answer: C

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5. If the roots of the equation $x^2 + 8x - (2k + 3) = 0$ differ by 2, then the value of k is

A. 9

B. -9

C. 6

D. -6

Answer: B

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6. If α and β are roots of the equation $x^2 - 2x + 1 = 0$, then the value of $\frac{\alpha}{\beta} + \frac{\beta}{\alpha}$ is

A. 4

B. 1

C. 2

D. 0

Answer: C

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7. If one root of the equation $3x^2 - 5x + \lambda = 0$ is the reciprocal of the other, then the value of λ is

A. $\frac{1}{3}$

B. -3

C. 3

D. 1

Answer: C

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8. If α and β are roots of the equation $2x^2 - 3x - 5 = 0$, then the value of $\frac{1}{\alpha} + \frac{1}{\beta}$ is

A. $-\frac{3}{5}$

B. $\frac{3}{5}$

C. $\frac{5}{3}$

D. $-\frac{5}{3}$

Answer: A

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9. If α and β are roots of the equation $x^2 + x + 1 = 0$, then $\alpha^2 + \beta^2$ is equal to

A. 2

B. 1

C. -1

D. -2

Answer: C

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10. If α, β are roots of the equation $x^2 - a(\times + 1) - c = 0$, then write the value of $(1+\alpha)(1+\beta)$.

A. $p - q$

B. $1 - p$

C. $1 + q$

D. $1 - q$

Answer: D

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11. If α, β are roots of the equation $x^2 + lx + m = 0$, write an equation whose roots are $-\frac{1}{\alpha}$ and $-\frac{1}{\beta}$

A. $cx^2 + bx + a = 0$

B. $cx^2 - bx + a = 0$

C. $cx^2 - bx + c = 0$

D. $ax^2 - cx + b = 0$

Answer: B

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12. If -4 is a root of the equation $x^2 + px - 4 = 0$ and the equation $x^2 + px + q = 0$ has equal roots, then the value of q is

A. $-\frac{9}{4}$

B. $\frac{9}{4}$

C. $\frac{4}{9}$

D. 36

Answer: B

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13. If the roots α, β of the equation $x^2 - px + 16 = 0$ satisfy the relation $\alpha^2 + \beta^2 = 4$, then the value(s) of p is/are

A. 6 only

B. -6 only

C. 6 or -6

D. 8 or -6

Answer: C

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14. Find the number of real roots of the equation $(x-1)^2+(x-2)^2+(x-3)^2=0$.

A. 1

B. 2

C. 3

D. none

Answer: D

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15. The equation of the smallest degree in the real coefficients having $1 - i$ as one of its roots is

A. $x^2 + 2x - 2 = 0$

B. $x^2 - 2x + 2 = 0$

C. $x^2 + 2x + 2 = 0$

D. $x^2 - 2x - 2 = 0$

Answer: B

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16. The least value of k which makes the roots of the equation $x^2 + 5x + k = 0$ imaginary is

A. 5

B. 6

C. 7

D. 8

Answer: C

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17. For the real values of x, the maximum value of $7 + 10x - 5x^2$ is

A. 12

B. -12

C. 48

D. 60

Answer: A

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18. For all real values of x, the minimum value of the quadratic expression $x^2 - 3x + 3$ is

A. $\frac{3}{2}$

B. $\frac{3}{4}$

C. $-\frac{3}{4}$

D. $-\frac{3}{2}$

Answer: B

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19. If the expression $x^2 - (m+2)x + 4$ is always positive for all real values of x, then find range of m

A. $m > -3$

B. $m < 1$

C. $m < -3$ or $m > 1$

D. $-3 < m < 1$

Answer: D

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