



MATHS

BOOKS - S CHAND IIT JEE

FOUNDATION

QUADRATIC EQUATIONS

Solved Examples

1. Solve $\frac{x^2 - 4}{3} = 20$

A. ± 8

B. 8

C. -8

D. None

Answer:



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2. Solve : $x(2x + 5) = 3$



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3. Solve by factorization:

$$\frac{x+1}{x-1} - \frac{x-1}{x+1} = \frac{5}{6}, \quad x \neq 1, -1$$



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4. Solve: $3^{4+1} - 2 \times 3^{2x+2} - 81 = 0$



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5. Solve : $\sqrt{2x+7} = x+2$



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6. The sum of two numbers is 18 and their product is 56. Find the numbers.



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7. The numerator of a fraction is one more than its denominator. If its reciprocal is subtracted from it the difference is $\frac{11}{30}$. Find the fraction.



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8. In a group of children, each child exchanges a gift with every other child. If the number of gifts is 132, then the number of children in the group is (a) 10 (b) 11 (c) 12 (d) 13



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9. The age of father is equal to the square of the age of his son. The sum of the age of the

father and five times the age of the son is 66 years. Find their ages.



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10. In a flight of 2800 km, an aircraft was slowed down due to bad weather. Its average speed for the trip was reduced by 100 km/hour and time increased by 30 minutes. Find the original duration of flight.

A. $3\frac{1}{2}$ hours

B. $5\frac{1}{2}$ hours

C. $4\frac{1}{2}$ hours

D. $2\frac{1}{2}$ hours

Answer: $3\frac{1}{2}$ hours



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11. Two trains leave a railway station at the same time. The first train travels towards west and the second train towards north. The first train travels 5 km/hr faster than the second

train. If after two hours they are 50 km apart
find the average speed of each train.



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12. The angry Arjun carried some arrows for fighting with Bheeshm. With half the arrows, he cut down the arrows thrown by Bheeshm on his and with six other arrows he killed the rath driver of Bheeshm. With one arrow each he knocked down respectively the rath, flag and the bow of Bheeshm. Finally, with one more

than four times the square root of arrows he laid Bheeshm unconscious on an arrow bed. Find the total number of arrows Arjun had.



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Question Bank

1. Which of the following is a quadratic equation?

A. $x^{\frac{1}{2}} + 2x + 3 = 0$

B. $(x - 1)(x + 4) = x^2 + 1$

C. $x^4 - 3x + 5 = 0$

D. $(2x + 1)(3x - 4) = 2x^2 + 3$

Answer: D



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2. If $a^2 - ab = 0$, which of the following is the correct conclusion?

A. $a=0$

B. $a=b$

C. $a^2 = b$

D. either $a=0$ or $a=b$

Answer: D



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3. The equation formed by multiplying each root of

$ax^2 + bx + c = 0$ by 2 is $x^2 = 36x + 24 = 0$

A. 2,3

B. 3,5

C. 8,15

D. 6,5

Answer: B



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4. The roots of the equation

$2x^2 - 11x + 15 = 0$ are 3, $\frac{5}{2}$ (b) 5, $\frac{3}{2}$ (c)

$-3, -\frac{5}{2}$ (d) None of these

A. $3, \frac{5}{2}$

B. $5, \frac{3}{2}$

C. $-3, -\frac{5}{2}$

D. None of these

Answer: A



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5. Find a if $a - 3 = \frac{10}{a}$

A. $\sqrt{7}, 7$

B. $5, -2$

C. $-5, 2$

D. $-\sqrt{7}, 7$

Answer: B



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6. Of the following quadratic equations, which is the one whose roots are 2 and -15?

A. $x^2 - 2x + 15 = 0$

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

C. $x^2 + 13x - 30 = 0$

D. $x^2 - 30 = 0$

Answer: C



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7. The common root of the equations

$x^2 - 7x + 10 = 0$ and $x^2 - 10x + 16 = 0$ is

A. -2

B. 3

C. 5

D. 2

Answer: D



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8. An equation equivalent to the quadratic equation $x^2 - 6x + 5 = 0$ is

A. $6x^2 - 5x + 1 = 0$

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

C. $5x^2 - 6x + 1 = 0$

D. $|x - 3| = 2$

Answer: D



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9. The roots of the equation

$$\frac{x}{x-1} + \frac{x-1}{x} = 2\frac{1}{2} \text{ are}$$

A. 1,2

B. 2,1

C. $-2, 1$

D. 2, -1

Answer: D



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10. Find the roots of the equation

$$\frac{1}{a + b + x} - \frac{1}{x} = \frac{1}{a} + \frac{1}{b}?$$

A. $a, -b$

B. $-a, b$

C. a, b

D. $-a, -b$

Answer: D



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11. The values of x satisfying the equation

$$5^{2x} - 5^{x+3} + 125 = 5^x \text{ are}$$

A. 0 and 2

B. -1 and 3

C. 0 and -3

D. 0 and 3

Answer: D



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12. The root of the equation

$$3^{2x} - 10 \cdot 3^x + 9 = 0 \text{ are}$$

A. a positive fraction

B. a negative fraction

C. a positive integer

D. a negative integer

Answer: C



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13. If one root of the quadratic equation

$3x^2 - 10x + p = 0$ is $\frac{1}{3}$, then the value of p

and the other root respectively is :

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

B. $3, 3$

C. $-\frac{1}{3}, -\frac{1}{3}$

D. $-3, -3$

Answer: B



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14. Thrice the square of a natural number decreased by 4 times the number is equal to 0

more than the number. The number is a. 4 b. 6

c. 5 d. 10

A. 4

B. 5

C. 6

D. 10

Answer: B



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15. The product of two successive natural numbers is 1980. Which is the smaller number?

A. 34

B. 35

C. 44

D. 45

Answer: C



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16. A two digit number is such that the product of digit is 8 . when 18 is added to the number , the digits are reversed . The number is:

A. 18

B. 2

C. 41

D. 81

Answer: B



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17. The difference of mother's age and her daughter's age is 21 years and the twelfth part of the product of their ages is less than the mother's age by 18 years. The mother's age is:

A. 22 years

B. 32 years

C. 24 years

D. 42 years

Answer: C



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18. The sum of a number and its positive square root is $\frac{6}{25}$. Find the number.

A. 5

B. $\frac{1}{5}$

C. 25

D. $\frac{1}{25}$

Answer: D



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19. In a school hall, 460 students were sitting in rows and columns in such a way that the number of students sitting in each column was three more than the number of students sitting in each row. The number of students in each column was:

A. 0

B. 23

C. 24

D. None of these

Answer: A



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20. The length of a hypotenuse of a right triangle exceeds the length of its base by 2cm and exceed twice the length of the altitude by 1cm .Find the length of each side of the triangle (in cm)

A. 18 cm

B. 17 cm

C. 25 cm

D. 40 cm

Answer: D



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21. If the price of an article is increased by Rs. 2 per dozen that at present the number of things available for Rs. 56 is 8 less than before.

The price per dozen at present is:

A. Rs. 14

B. Rs. 12

C. Rs. 10

D. Rs. 28

Answer: B



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22. If the perimeter of a rectangular plot is 34 metres and its area is 60 square metres, what is the length of each of the shorter side?

A. 10m

B. 15m

C. 17m

D. 5m

Answer: D



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23. Two little bands of monkeys were at play. An eighth of them squared were jabbering wildly in the thicket when twelve shouted

loudly with glee. How many monkeys were there in the thicket?

A. 16

B. 32

C. 64

D. 24

Answer: A



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24. One-fourth of a herd of cows is in the forest. Twice the square root of the herd has gone to mountains and the remaining 15 are on the banks of a river. The total number of cows is

A. 6

B. 100

C. 63

D. 36

Answer: D



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25. A positive number when decreased by 4 is equal to 21 times the reciprocal of the number.

The number is a. 3 b. 5 c. 7 d. 9

A. 8

B. 7

C. 6

D. 5

Answer: B



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26. A man in 1900s realised that in the year 1980 his age was the square root of the year of his birth. What is his birth year?

A. 1929

B. 1949

C. 1936

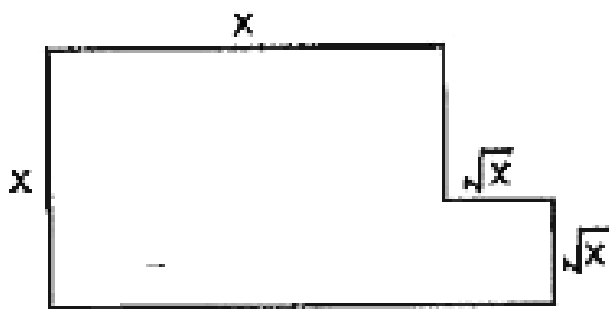
D. 1946

Answer: C



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27. A swimming pool is to be built in the shape of the letter L. The shape is formed from two squares with side dimensions x and \sqrt{x} as shown. If the area of the pool is $30m^2$, what is the value of x .



A. 6m

B. 5m

C. 16m

D. 9m

Answer: B



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28. The speed of a boat in still water is 15 km/hr. It can go 30 km upstream and return downstream to the original point in 4 hours 30 minutes. Find the speed of the stream.

A. 5km/hr

B. 8km/hr

C. 10km/hr

D. 15ikm/hr

Answer: A



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29. The diagonal of a rectangular field is 15 metres and the difference between its length and width is 3 metres. The area of the

rectangular field is (a) $9m^2$ (b) $12m^2$ (c) $21m^2$

(d) $108m^2$

A. $9m^2$

B. $12m^2$

C. $21m^2$

D. $108m^2$

Answer: D



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30. In the following question two equations numbered I and II are given. You have to solve both the equations and give answer is

I. $x^2 + 11x + 28 = 0$

II. $y^2 + 15y + 56 = 0$

A. $X > Y$

B. $X \geq Y$

C. $X < Y$

D. $X \leq Y$

Answer: B



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Self Assessment Sheet

1. The roots of the equations

$$(x + 3)(x - 3) = 160 \text{ are}$$

A. ± 13

B. 13, 13

C. ± 12

D. 12, 12

Answer: A



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2. The roots of the equation $(2 - x)^2 = 16$ are

A. ± 4

B. $-6, +2$

C. $6, -2$

D. $6, 2$

Answer: C



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3. Solve for p : $2p(p - 3) + 5(p - 2) = 0$

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

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

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

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

Answer: B



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4. Simplify the expression $\frac{2}{t} - 3 - 2t$ and find the values of t for which the expression is 0.

A. $-2, -1$

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

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

D. $2, 1$

Answer: B



5. The sum of twice a whole number and three times the square of the next largest whole number is 83. What is the number?

A. 6

B. 8

C. 4

D. -4

Answer: C



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6. Two numbers differ by 8 and their product is 153. The number are:

A. 9, -17

B. -17 , 9

C. 17, 9

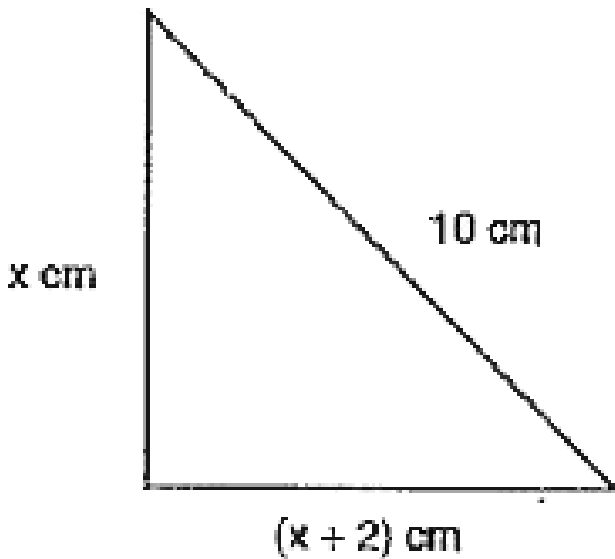
D. 11, 19

Answer: C



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7. Form an equation in x for the following figure and hence find the length of the sides containing the right angle.



A. 4 cm, 6cm

B. 6cm, 8cm

C. 8cm, 10cm

D. 6cm, 10cm

Answer: B



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8. Two lawns have the same area, 121 sq m. One is a square, and the other is rectangular, and four times the perimeter of the rectangle is

equal to five times that of the square. The length and breadth of the rectangle are:

A. 11m, 11m

B. 22m, $5\frac{1}{2}$ m

C. 55m, $2\frac{1}{5}$ m

D. 33m, $3\frac{2}{3}$ m

Answer: B



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9. The difference between the quotients when 192 is divided by two numbers one of which is a square of the other is 21. The number are:

A. 4,16

B. 16256

C. 9,81

D. 8,64

Answer: D



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10. The units digit of a two digit number is 2 more than the tens digit. If the number is subtracted from the sum of the squares of its digits the result is two thirds of the product of the digits. What is the number?

A. 62

B. 58

C. 68

D. 86

Answer: C



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