MCQs for Class 10 Maths - Chapter 1 Real Numbers:

1. The decimal expansion of the rational number $\frac{33}{2^2 \cdot 5}$ will terminate after

(A) one decimal place

(B) two decimal places

(C) three decimal places

(D) more than 3 decimal places

Answer: B
Explanation: The termination of any rational number depends upon the power of 2 in the prime factorization of denominator.

2. For some integer m, every odd integer is of the form

(A) m

(B) m + 1

(C) 2m

(D) 2m + 1

Answer: D
Explanation: As the number 2m will always be even, so if we add 1 to it then, the number will always be odd.
3. If two positive integers a and b are written as $a = p^3q^2$ and $b = pq^3$; p, q are prime numbers, then HCF (a, b) is:

(A) pq

(B) pq^2

(C) p^3q^3

(D) p^2q^2

Answer: B
Explanation: Since a = p × p × p × q × q,
b = p × q × q × q
Therefore H.C.F of a and b = pq^2

4. The product of a non-zero number and an irrational number is:

(A) always irrational

(B) always rational

(C) rational or irrational

(D) one

Answer: A
Explanation: Product of a non-zero rational and an irrational number is always irrational i.e.,

$$\frac{3}{4} \times \sqrt{2} = (\text{rational}) \times (\text{irrational}) = \text{irrational.}$$

5. If the HCF of 65 and 117 is expressible in the form 65 m – 117, then the value of m is
(A) 4

(B) 2

(C) 1

(D) 3

Answer: B
Explanation: By Euclid's division algorithm,

$$b = aq + r$$

$$117 = 65 \times 1 + 52$$

$$65 = 52 \times 1 + 13$$

$$52 = 13 \times 4 + 0$$

$$\text{H.C.F}(65,117) = 13$$

$$\text{Since, H.C.F} = 65m - 117$$

$$\text{So } 65m - 117 = 13$$

$$\Rightarrow 65m = 130$$

$$\Rightarrow \quad m = 2$$

6. The largest number which divides 70 and 125, leaving remainders 5 and 8, respectively, is

(A) 13

(B) 65

(C) 875

(D) 1750

Answer: A
Explanation: Since 5 and 8 are the remainders of 70 and 125, respectively. Thus after subtracting these remainders from the numbers, we have the numbers
65 = (70 – 5), 117 = (125 – 8) which is divisible by the required number.

Now required number = H.C.F of (65,117)

$$117 = 65 \times 1 + 52$$

$$65 = 52 \times 1 + 13$$

$$52 = 13 \times 4 + 0$$

$$\text{H.C.F}(65, 117) = 13$$

7. If two positive integers p and q can be expressed as $p = ab^2$ and $q = a^3b$; a, b being prime numbers, then LCM (p, q) is
(A) ab

(B) a^2b^2
(C) a^3b^2
(D) a^3b^3
Answer: C
Explanation:
p = a × b × b

q = a × a × a × b

Since L.C.M is the product of the greatest power of each prime factor involved in the numbers

Therefore, L.C.M of p and q = a^3b^2

8. The values of the remainder r, when a positive integer a is divided by 3 are:
(A) 0, 1, 2, 3

(B) 0, 1

(C) 0, 1, 2

(D) 2, 3, 4

Answer: C
Explanation:
According to Euclid's division lemma,

a = 3q + r, where 0 r < 3

As the number is divided by 3.So the remainder cannot be greater than divisor 3 also r is an integer. Therefore, the values of r can be 0, 1 or 2.

9. $\frac{987}{10500}$ will have

(A) Terminating decimal expansion

(B) Non-Terminating Non repeating decimal expansion
(C) Non-Terminating repeating decimal expansion
(D) None of these

Answer: A
Explanation: After simplification,

$$\frac{987}{10500} = \frac{47}{500}$$
$$= \frac{47}{5^3 \times 2^2}$$

As the denominator has factor $5^3 \times 2^2$ and which is of the type $5^m \times 2^n$, So this is a terminating decimal expansion.

10. A rational number in its decimal expansion is 327.7081. What would be the prime factors of q when the number is expressed in the p/q form?
(A) 2 and 3

(B) 3 and 5

(C) 2, 3 and 5

(D) 2 and 5

Answer: D
Explanation: This can be explained as,

$$327.7081 = \frac{3277081}{10000} = \frac{p}{q}$$

$$\therefore q = 10000 = 10^4$$

$$= (2 \times 5)^4$$

$$= 2^4 \times 5^4$$

11. The least number that is divisible by all the numbers from 1 to 10 (both inclusive) is

(A) 10

(B) 100

(C) 2060

(D) 2520

Answer: D

Explanation: Factors of 1 to 10 numbers

$$1 = 1$$

$$2 = 1 \times 2$$

$$3 = 1 \times 3$$

$$4 = 1 \times 2 \times 2$$

$$5 = 1 \times 5$$

$$6 = 1 \times 2 \times 3$$

$$7 = 1 \times 7$$

$$8 = 1 \times 2 \times 2 \times 2$$

$$9 = 1 \times 3 \times 3$$

$$10 = 1 \times 2 \times 5$$

$$\text{L.C.M of numbers from 1 to 10 is} = 1 \times 2 \times 2 \times 2 \times 3 \times 3 \times 5 \times 7 = 2520$$

12. $n^2 - 1$ is divisible by 8, if n is

(A) an integer

(B) a natural number

(C) an odd integer greater than 1

(D) an even integer

Answer: C
Explanation: n can be even or odd
Case 1: If n is even

$$n = 2k$$

Then

$$a = (2k)^2 - 1$$

$$a = 4k^2 - 1$$

For $k = -1$

$$4(-1)^2 - 1 = 3, \text{ not divisible by } 8$$

Case 2: If n is odd

$$n = 2k + 1$$

Then

$$a = (2k + 1)^2 - 1$$

$$a = 4k^2 + 4k + 1 - 1$$

$$a = 4k^2 + 4k$$

For $k = 1$

$$a = 4k^2 + 4k = 8$$

Which is divisible by 8.

Similarly we can check for any integer.

13. If n is a rational number, then $5^{2n} - 2^{2n}$ is divisible by
(A) 3

(B) 7

(C) Both 3 and 7

(D) None of these

Answer: C
Explanation:
$5^{2n} - 2^{2n}$ is of the form $a^{2n} - b^{2n}$ which is divisible by both (a + b) and (a – b).
So, $5^{2n} - 2^{2n}$ is divisible by both 7, 3.

14. The H.C.F of 441, 567 and 693 is
(A) 1

(B) 441

(C) 126

(D) 63

Answer: D
Explanation:
693 = 3×3×7×7

567 = 3×3×3×3×7

441 = 3×3×7×11

Therefore H.C.F of 693, 567 and 441 is 63.

15. On a morning walk, three persons step off together and their steps measure 40 cm, 42 cm and 45 cm, respectively. What is the minimum distance each should walk so that each can cover the same distance in complete steps?
(A) 2520cm

(B) 2525cm

(C) 2555cm

(D) 2528cm

Answer: A
Explanation: We need to find the L.C.M of 40, 42 and 45 cm to get the required minimum distance.
40 = 2×2×2×5

42 = 2×3×7

45 = 3×3×5

L.C.M. = 2×3×5×2×2×3×7 = 2520

MCQs from Class 10 Maths Chapter 2 - Polynomials:

1. The zeroes of the quadratic polynomial $x^2 + 99x + 127$are
(A) both positive

(B) both negative

(C) one positive and one negative

(D) both equal

Answer: (B)
Explanation: Roots can be calculated as,

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$x = \frac{-99 \pm \sqrt{99^2 - 4 \times 1 \times 127}}{2 \times 1}$$

$$x = \frac{-99 \pm \sqrt{9293}}{2}$$

$$x = \frac{-99 \pm 96.4}{2}$$

$$x = \frac{-99 \pm 96.4}{2}$$

Since $96.4 < 99$

Hence both zeroes are negative.

2. If the zeroes of the quadratic polynomial $x^2 + bx + c$, $c \neq 0$are equal, then
(A) c and a have opposite signs

(B) c and b have opposite signs

(C) c and a have the same sign

(D) c and b have the same sign

Answer: (C)

Explanation: For equal roots

$$b^2 - 4ac = 0$$
$$\Rightarrow \quad b^2 = 4ac$$
$$\Rightarrow \quad ac = \frac{b^2}{4}$$
$$\Rightarrow ac > 0 \text{ (Since square of any number cannot be negative)}$$

Which is only possible when a and c have same sign.

3. The number of polynomials having zeroes as –2 and 5 is
(A) 1

(B) 2

(C) 3

(D) more than 3

Answer: (D)
Explanation: The polynomial with zeroes –2 and 5 is:

$$f(x) = x^2 - (-2+5)x + (-2)5$$
$$\Rightarrow f(x) = x^2 - 3x - 10$$

But as we can multiply this polynomial with any number,

The number of polynomials having zeroes as –2 and 5 can be infinite.

4. The degree of the polynomial $(x + 1)(x^2 - x - x^4 + 1)$ is:
(A)2

(B) 3

(C) 4

(D) 5

Answer: (D)
Explanation: Since the highest degree variable in first bracket is x and in second bracket is x^4 on multiplying x with x^4.the highest power we obtain is 5.

5. If the zeroes of the quadratic polynomial $x^2 + (a + 1)x + b$ are 2 and –3, then
(A) a = –7, b = –1

(B) a = 5, b = −1

(C) a = 2, b = − 6

(D) a = 0, b = − 6

Answer: (D)

Explanation: For $x^2 + (a + 1)x + b$

Sum of zeroes is:

$$2+(-3) = -\frac{\text{coefficient of } x}{\text{coefficient of } x^2}$$

$$\Rightarrow -1 = -\frac{a+1}{1}$$

$$\Rightarrow a+1 = 1$$

$$\Rightarrow a = 0$$

Product of zeroes is:

$$2\times(-3) = \frac{\text{constant term}}{\text{coefficent of } x^2}$$

$$\Rightarrow -6 = \frac{b}{1}$$

$$\Rightarrow b = -6$$

6. Given that one of the zeroes of the cubic polynomial $ax^3 + bx^2 + cx + d$ is zero, the product of the other two zeroes is

(A) −c/a

(B) c/a

(C) 0

(D) 3

Answer: (B)

Explanation: Since one of the zero of the cubic polynomial is zero, therefore

$$P(x) = ax^3 + bx^2 + cx + d$$

$$\Rightarrow P(0) = ax^3 + bx^2 + cx + d$$

$$\Rightarrow \quad 0 = a(0)^3 + b(0)^2 + c(0) + d$$

$$\Rightarrow \quad d = 0$$

Now polynomial reduces to $ax^3 + bx^2 + cx$

Let the zeroes be α, β and γ then,

Let the zeroes be α, β and γ

$$\alpha \times \beta + \beta \times \gamma + \gamma \times \alpha = \frac{\text{coefficent of x}}{\text{coefficent of } x^3}$$

If one of the root say γ is zero then,

$$\Rightarrow \alpha\beta = \frac{c}{a}$$

So the product of other two zeroes is c/a.

7. If one of the zeroes of the cubic polynomial $x^3 + ax^2 + bx + c$ is −1, then the Product of the other two zeroes is

(A) b − a + 1

(B) b − a − 1

(C) a − b + 1

(D) a − b −1

Answer: (A)
Explanation: Since one of the zero is –1, therefore

$$P(x) = x^3 + ax^2 + bx + c$$
$$\Rightarrow P(-1) = (-1)^3 + a(-1)^2 + b(-1) + c$$
$$\Rightarrow \quad 0 = -1 + a - b + c$$
$$\Rightarrow \quad c = 1 - a + b$$

Propduct of all zeroes is:

$$\alpha\beta\gamma = \frac{-\text{constant term}}{\text{coefficent of } x^3}$$
$$\Rightarrow (-1)\beta\gamma = \frac{-c}{1}$$
$$\Rightarrow \quad \beta\gamma = c$$
$$\Rightarrow \quad \beta\gamma = 1 - a + b$$

8. If one of the zeroes of the quadratic polynomial $(k - 1)x^2 + kx + 1$ is −3, then the value of k is
(A) 4/3

(B) – 4/3

(C) 2/3

(D) – 2/3

Answer: (A)
Explanation: Since one of the zero is – 3, so

$$P(x) = (k-1)\ x^2 + kx + 1$$
$$P(-3) = (k-1)\ (-3)^2 + k(-3) + 1$$
$$0 = 9k - 9 - 3k + 1$$
$$0 = 6k - 8$$
$$\Rightarrow \quad k = 4/3$$

9. A quadratic polynomial, whose zeroes are –3 and 4, is

(A) $x^2 - x + 12$

(B) $x^2 + x + 12$

(C) $\frac{x^2}{2} - \frac{x}{2} - 6$

(D) $\frac{x^2}{2} + \frac{x}{2} - 6$

Answer: (C)

Explanation: The polynomial is:

$$x^2 - (\alpha + \beta)x + \alpha\beta$$
$$= x^2 - (-3 + 4)x + (-3)4$$
$$= x^2 - x - 12$$

Dividing the whole polynomial with 2 as

$$x^2 - x - 12$$
$$= \frac{x^2}{2} - \frac{x}{2} - 6$$

10. The value of p for which the polynomial $x^3 + 4x^2 - px + 8$ is exactly divisible by (x – 2) is:

(A) 0

(B) 3

(C) 5

(D) 16

Answer: (D)

Explanation: Since (x – 2) is one of the factor, so f (2) = 0

$$f(x) = x^3 + 4x^2 - px + 8$$
$$\Rightarrow f(2) = (2)^3 + 4(2)^2 - p(2) + 8$$
$$\Rightarrow \quad 0 = 8 + 16 - 2p + 8$$
$$\Rightarrow \quad 2p = 32$$
$$\Rightarrow \quad p = 16$$

11. If sum of the squares of zeroes of the quadratic polynomial $6x^2 + x + k$ is 25/36, the value of k is:

(A) 4

(B) – 4

(C) 2

(D) – 2

Answer: (D)

Explanation: Let α and β are the roots of equation, then

$$\alpha + \beta = -\frac{1}{6}$$
$$\alpha\beta = k/6$$
$$\alpha^2 + \beta^2 = 25/36$$
$$(\alpha + \beta)^2 - 2\alpha\beta = 25/36$$
$$(-1/6)^2 - 2(k/6) = 25/36$$
$$1 - 12k = 25$$
$$12k = -24$$
$$k = -2$$

12. If α and β are zeroes of $x^2 - 4x + 1$, then $1/\alpha + 1/\beta - \alpha\beta$ is

(A) 3

(B) 5

(C) −5

(D) −3

Answer: (A)
Explanation:

For $x^2 - 4x + 1$,

$$\alpha + \beta = \frac{-(-4)}{1} = 4$$
$$\alpha\beta = 1$$

Therefore,

$$\frac{1}{\alpha} + \frac{1}{\beta} - \alpha\beta = \frac{\alpha + \beta}{\alpha\beta} - \alpha\beta$$
$$= \frac{4}{1} - 1 = 3$$

13. If (x + 1) is a factor of $x^2 - 3ax + 3a - 7$, then the value of a is:
(A) 1

(B) −1

(C) 0

(D) −2

Answer: (A)
Explanation:

Since (x + 1) is a factor

$$P(x) = x^2 - 3ax + 3a - 7$$
$$P(-1) = (-1)^2 - 3a(-1) + 3a - 7$$
$$0 = 1 + 3a + 3a - 7$$
$$0 = 6a - 6$$
$$\Rightarrow \quad a = 1$$

14. If one of the zeroes of a quadratic polynomial of the form $x^2 + ax + b$ is the negative of the other, then it
(A) has no linear term and the constant term is negative.

(B) has no linear term and the constant term is positive.

(C) can have a linear term but the constant term is negative.

(D) can have a linear term but the constant term is positive

Answer: (A)

Explanation: If one of the zeroes (say α) of a quadratic polynomial of the form $x^2 + ax + b$ is the negative of the other, then

Sum of zeroes is:

$$\alpha + (-\alpha) = -a$$
$$\Rightarrow \quad a = 0$$

Product of zeroes is:

$$\alpha(-\alpha) = b$$
$$\Rightarrow \quad b = -\alpha^2$$

b has to be negative.

Therefore polynomial has no linear term and the constant term is negative.

15. If α, β are zeroes of $x^2 - 6x + k$, what is the value of k if $3\alpha + 2\beta = 20$?
(A) −16

(B) 8

(C) 2

(D) −8

Answer: (A)

Explanation: If α, β are zeroes, then

$$(\alpha+\beta)=6 \qquad ......(1)$$
$$\alpha\beta=k \qquad ......(2)$$

$$3\alpha+2\beta=20$$
$$\alpha+2\alpha+2\beta=20$$
$$\alpha+2(\alpha+\beta)=20$$
$$\alpha+2\times6=20$$
$$\alpha+12=20$$
$$\alpha=8$$
$$3\alpha+2\beta=20$$
$$\Rightarrow 3(8)+2\beta=20$$
$$\Rightarrow \beta=-2$$

Substituting the value of α, β in equation (2) as,

$$\alpha\beta=k$$
$$8(-2)=k$$
$$k=-16$$

MCQs for Class 10 Maths Chapter 3 - Pair of Linear Equations in Two Variables:

1. Graphically, the pair of equations
6x − 3y + 10 = 0

2x − y + 9 = 0

Represents two lines which are:

(A) Intersecting at exactly one point.

(B) Intersecting at exactly two points.

(C) Coincident.

(D) Parallel

Answer: (D)
Explanation:
Here

$$\frac{a_1}{a_2} = \frac{6}{2} = \frac{3}{1}$$

$$\frac{b_1}{b_2} = \frac{-3}{-1} = \frac{3}{1}$$

$$\frac{c_1}{c_2} = \frac{10}{9}$$

This implies

$$\frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$$

Therefore, lines are parallel.

2. The pair of equations x + 2y – 5 = 0 and –3x – 6y + 15 = 0 have:
(A) A unique solution

(B) Exactly two solutions

(C) Infinitely many solutions

(D) No solution

Answer: (C)
Explanation:
Here,

$$\frac{a_1}{a_2} = \frac{1}{-3}$$

$$\frac{b_1}{b_2} = \frac{2}{-6} = \frac{1}{-3}$$

$$\frac{c_1}{c_2} = \frac{-5}{15} = \frac{-1}{3}$$

This implies

$$\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2}$$

Therefore, the pair of equations has infinitely many solutions.

3. If a pair of linear equations is consistent, then the lines will be:
(A) Parallel

(B) Always coincident

(C) Intersecting or coincident

(D) Always intersecting

Answer: (C)
Explanation: If a pair of linear equations is consistent the two lines represented by these equations definitely have a solution, this implies that either lines are intersecting or coincident.

4. The pair of equations y = 0 and y = −7 has
(A) One solution

(B) Two solutions

(C) Infinitely many solutions

(D) No solution

Answer: (D)
Explanation: The graph of equations will be parallel lines. So the equations have no solution.
5. If the lines given by
3x + 2ky = 2

2x + 5y + 1 = 0

are parallel, then the value of k is

(A) 5/4

(B) 2/5

(C) 15/4

(D) 3/2

Answer: (C)
Explanation:
For parallel lines

$$\frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$$
$$\Rightarrow \frac{3}{2} = \frac{2k}{5}$$
$$\Rightarrow k = \frac{15}{4}$$

6. The value of c for which the pair of equations cx – y = 2 and 6x – 2y = 3 will have infinitely many solutions is
(A) 3

(B) – 3

(C) −12

(D) no value

Answer: (A)
Explanation: For infinitely many solutions:
$$\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2}$$
$$\Rightarrow \frac{c}{6} = \frac{-1}{-2}$$
$$\Rightarrow c = 3$$

7. One equation of a pair of dependent linear equations is −5x + 7y – 2 = 0. The second equation can be
(A) 10x + 14y + 4 = 0

(B) −10x – 14y + 4 = 0

(C) −10x + 14y + 4 = 0

(D) 10x − 14y = −4

Answer: (D)
Explanation: For dependent pair, the two lines must have

$$\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2}$$

For option (D)

$$\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2} = \frac{-1}{2}$$

8. Two numbers are in the ratio 5 : 6. If 8 is subtracted from each of the numbers, the ratio becomes 4 : 5. Then the numbers are:
(A) 40, 42

(B) 42, 48

(C) 40, 48

(D) 44, 50

Answer: (C)
Explanation:
According to given information

$$\frac{x}{y} = \frac{5}{6}$$

$$\Rightarrow 6x - 5y = 0 \;\; .....(i)$$

$$\frac{x-8}{y-8} = \frac{4}{5}$$

$$\Rightarrow 5x - 40 = 4y - 32$$

$$\Rightarrow 5x - 4y = 8 \;\; .....(ii)$$

From equation (i)

$$6x - 5y = 0$$

$$\Rightarrow x = \frac{5y}{6}$$

Substituting in ...(2)

$$5x - 4y = 8$$

$$\Rightarrow 5\left(\frac{5y}{6}\right) - 4y = 8$$

$$\Rightarrow \frac{y}{6} = 8$$

$$\Rightarrow y = 48$$

Therefore

$$x = \frac{5y}{6}$$

$$\Rightarrow x = \frac{5 \times 48}{6}$$

$$\Rightarrow x = 40$$

9. The solution of the equations x − y = 2 and x + y = 4 is:
(A) 3 and 5

(B) 5 and 3

(C) 3 and 1

(D) −1 and −3

Answer: (C)
Explanation: Adding both equations, we have:

$$x - y = 2$$

$$\underline{x + y = 4}$$

$$2x = 6$$

$$\Rightarrow x = 3$$

This implies

$$x - y = 2$$

$$\Rightarrow 3 - y = 2$$

$$\Rightarrow y = 1$$

10. For which values of a and b, will the following pair of linear equations have infinitely many solutions?
x + 2y = 1

(a – b)x + (a + b)y = a + b – 2

(A) a = 2 and b = 1

(B) a = 2 and b = 2

(C) a = –3 and b = 1

(D) a = 3 and b = 1

Answer: (D)
Explanation: For infinitely many solutions:

$$\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2}$$

$$\Rightarrow \frac{1}{a-b} = \frac{2}{a+b} = \frac{1}{a+b-2}$$

$$\Rightarrow \frac{1}{a-b} = \frac{2}{a+b}$$

$$\Rightarrow a+b = 2a-2b$$

$$\Rightarrow a-3b = 0 \quad .....(i)$$

$$\text{And } \frac{2}{a+b} = \frac{1}{a+b-2}$$

$$\Rightarrow 2a+2b-4 = a+b$$

$$\Rightarrow a+b = 4 \quad .....(ii)$$

Solving equation (i) and (ii), we get a = 3 and b = 1.

11. The father's age is six times his son's age. Four years hence, the age of the father will be four times his son's age. The present ages, in years, of the son and the father are, respectively
(A) 4 and 24

(B) 5 and 30

(C) 6 and 36

(D) 3 and 24

Answer: (C)
Explanation: Let the age of father be x and of son is y.
Then according to question,

x = 6y …..(i)

Four years hence age of son will be y + 4 and age of father will be x + 4

Then according to question,

x + 4 = 4 (y + 4)

x – 4y = 12 …..(ii)

Solving equations (i) and (ii) we get:

y = 6 and x = 36

12. Rakshita has only Rs. 1 and Rs. 2 coins with her. If the total number of coins that she has is 50 and the amount of money with her is Rs 75, then the number of Rs.1 andRs.2 coins is, respectively
(A) 35 and 15

(B) 35 and 20

(C) 15 and 35

(D) 25 and 25

Answer: (D)
Explanation:
Let her number of Rs.1 coins are x

Let the number of Rs.2 coins are y

Then

By the given conditions

x + y = 50 …..(i)

1 × x + 2 × y = 75

⇒ x + 2y = 75 …..(ii)

Solving equations (i) and (ii) we get:

(x + 2y) – (x + y) = 75 – 50

⇒ y = 25

Therefore, x = 50 – 25 = 25

So the number of coins are 25, 25 each.

13. In a competitive examination, one mark is awarded for each correct answer while 1/2 mark is deducted for every wrong answer. Jayanti answered 120 questions and got 90 marks. How many questions did she answer correctly?
(A) 100

(B) 95

(C) 90

(D) 60

Answer: (A)
Explanation: Let x be the number of correct answers of the questions in a competitive exam.
Then, 120 – x be the number of wrong answers

Then by given condition

$$1\times x-(120-x)\times\frac{1}{2}=90$$

$$\Rightarrow x-60+\frac{x}{2}=90$$

$$\Rightarrow \frac{3x}{2}=150$$

$$\Rightarrow \quad x=\frac{150\times 2}{3}$$

$$\Rightarrow \quad x=100$$

14. The angles of a cyclic quadrilateral ABCD are:
$\angle A = (6x+10)^\circ, \angle B = (5x)^\circ$
$\angle C = (x+y)^\circ, \angle D = (3y-10)^\circ$

Then value of x and y are:

(A) x = 20° and y = 30°

(B) x = 40^{o} and y = 10^{o}
(C) x = 44^{o} and y = 15^{o}
(D) x = 15^{o} and y = 15^{o}
Answer: (A)
Explanation: In cyclic quadrilateral, sum of opposite angles is 180^{0}
Therefore

6x + 10 + x + y = 180

⇒ 7x + y = 170 .....(i)

5x + 3y – 10 = 180

⇒ 5x + 3y = 190 .....(ii)

Multiplying equations (i) and (ii), we get:

x = 20^{o} and y = 30^{o}

15. A shopkeeper gives books on rent for reading. She takes a fixed charge for the first two days, and an additional charge for each day thereafter. Reema paid Rs. 22 for a book kept for six days, while Ruchika paid Rs 16 for the book kept for four days, then the charge for each extra day is:
(A) Rs 5

(B) Rs 4

(C) Rs 3

(D) Rs.2

Answer: (C)
Explanation: Let Rs. x be the fixed charge and Rs. y be the charge for each extra day. Then by the given conditions

x + 4y = 22 .....(i)

x + 2y = 16 .....(ii)

Subtracting equation (ii) from (i), we get:

y = Rs. 3

MCQs for Class 10 Maths Chapter 4 - Quadratic Equations:

1. The roots of quadratic equation $5x^2 – 4x + 5 = 0$ are

(A) Real & Equal

(B) Real & Unequal

(C) Not real

(D) Non-real and equal

Answer: (C)
Explanation: To find the nature, let us calculate $b^2 – 4ac$
$b^2 – 4ac = 4^2 – 4 \times 5 \times 5$
$= 16 – 100$

$= -84 < 0$

2. Equation $(x+1)^2 – x^2 = 0$ has _____ real root(s).
(A) 1

(B) 2

(C) 3

(D) 4

Answer: (A)
Explanation:
Since $(x + 1)^2 − x^2 = 0$
$\Rightarrow x^2 + 1 + 2x − x^2 = 0$
$\Rightarrow 1 + 2x = 0$

$\Rightarrow x= -1/2$

This gives only 1 real value of x.

3. Which constant should be added and subtracted to solve the quadratic equation $4x^2 − \sqrt{3}x + 5 = 0$ by the method of completing the square?
(A) 9/16

(B) 3/16

(C) 3/4

(D) √3/4

Answer: (B)
Explanation:
This can be written as

$$4x^2 - \sqrt{3}x - 5 = 0$$

$$(2x)^2 - 2\cdot(2x)\cdot\frac{\sqrt{3}}{4} - 5 + \left(\frac{\sqrt{3}}{4}\right)^2 - \left(\frac{\sqrt{3}}{4}\right)^2 = 0$$

$$(2x)^2 - 2\cdot(2x)\cdot\frac{\sqrt{3}}{4} + \left(\frac{\sqrt{3}}{4}\right)^2 - 5 - \frac{3}{16} = 0$$

$$\left(2x - \frac{\sqrt{3}}{4}\right)^2 = 5 + \frac{3}{16}$$

$$\left(2x - \frac{\sqrt{3}}{4}\right)^2 = \frac{83}{16}$$

Hence the given equation can be solved by adding and subtracting 3/16.

4. If 1/2 is a root of the equation $x^2 + kx - (5/4) = 0$ then the value of k is
(A) 2

(B) – 2

(C) 3

(D) −3

Answer: (A)
Explanation:
As one root of the equation $x^2 + kx - (5/4) = 0$ is 1/2

$$\Rightarrow \left(\frac{1}{2}\right)^2 + k\left(\frac{1}{2}\right) - \frac{5}{4} = 0$$

$$\Rightarrow \frac{1}{4} + \frac{k}{2} - \frac{5}{4} = 0$$

$$\Rightarrow 1 + 2k - 5 = 0$$

$$\Rightarrow 2k = 4$$

$$\Rightarrow k = 2$$

5. A natural number, when increased by 12, equals 160 times its reciprocal. Find the number.
(A) 3

(B) 8

(C) 4

(D) 7

Answer: (B)
Explanation:
Let the number be x

Then according question,

x + 12 = 160/x

$x^2 + 12x - 160 = 0$
$x^2 + 20x - 8x - 160 = 0$
(x + 20) (x − 8) = 0

x = -20, 8

Since the number is natural, so we consider only positive value.

6. The product of two successive integral multiples of 5 is 300. Then the numbers are:
(A) 25, 30

(B) 10, 15

(C) 30, 35

(D) 15, 20

Answer: (D)
Explanation:
Let the consecutive integral multiple be 5n and 5(n + 1) where n is a positive integer.

According to the question:

5n × 5(n + 1) = 300

⇒ $n^2 + n - 12 = 0$
⇒ (n – 3) (n + 4) = 0

⇒ n = 3 and n = – 4.

As n is a positive natural number so n = – 4 will be discarded.

Therefore the numbers are 15 and 20.

7. The value of $\sqrt{6+\sqrt{6+\sqrt{6 \ldots\ldots}}}$

(A) 3.5

(B) 4

(C) 3

(D) – 3

Answer: (C)
Explanation:

Let $\sqrt{6+\sqrt{6+\sqrt{6........}}} = y$

Then

$$\sqrt{6+\sqrt{6+\sqrt{6........}}} = y$$
$$\Rightarrow \sqrt{6+y} = y$$
$$6+y = y^2$$
$$\Rightarrow y^2 - y - 6 = 0$$
$$\Rightarrow y^2 - (3-2)y - 6 = 0$$
$$\Rightarrow y^2 - 3y + 2y - 6 = 0$$
$$\Rightarrow y(y-3) + 2(y-3) = 0$$
$$\Rightarrow (y-3)(y+2) = 0$$
$$\Rightarrow y = 3, -2$$

Since y cannot be negative as negative square root is not real so y = 3.

8. If $p^2x^2 - q^2 = 0$, then x =?
(A) ± q/p

(B) ±p/q

(C) p

(D) q

Answer:(A)
Explanation:
$p^2x^2 - q^2 = 0$
$\Rightarrow p^2x^2 = q^2$
$\Rightarrow x = \pm p/q$

9. The positive root of $\sqrt{3x^2+6} = 9$ is:

(A) 3

(B)5

(C) 4

(D) 7

Answer:(B)
Explanation:

$$\sqrt{3x^2+6}=9$$
$$\Rightarrow 3x^2+6=81$$
$$\Rightarrow 3x^2=75$$
$$\Rightarrow x^2=25$$
$$\Rightarrow x=\pm 5$$

10. If $x^2(a^2+b^2)+2x(ac+bd)+c^2+d^2=0$ has no real roots, then
(A) ad≠bc

(B) ad<bc

(C) ad>bc

(D) all of these

Answer: (D)
Explanation:
If equation has no real roots then discriminant of the equation must be less than zero.

$$\Rightarrow 2^2(ac+bd)^2-4(a^2+b^2)(c^2+d^2)<0$$
$$\Rightarrow 4a^2c^2+4b^2d^2+8acbd<4a^2c^2+4b^2d^2+4a^2d^2+4b^2c^2$$
$$\Rightarrow 2acbd<a^2d^2+b^2c^2$$
$$\Rightarrow 2acbd<(ad-bc)^2+2acbd$$
$$\Rightarrow (ad-bc)^2>0$$
$$\Rightarrow ad\neq bc \text{ and } ad<bc \text{ or } ad>bc$$

11. If the one root of the equation $4x^2-2x+p-4=0$ be the reciprocal of other. Then value of p is
(A) 8

(B) – 8

(C) – 4

(D) 4

Answer:A
Explanation:
If one root is reciprocal of other, then product of roots is:

$$\alpha \times \frac{1}{\alpha} = \frac{p-4}{4}$$
$$4 = p - 4$$
$$p = 8$$

12. Rohini had scored 10 more marks in her mathematics test out of 30 marks, 9 times these marks would have been the square of her actual marks. How many marks did she get in the test?
(A) 14
(B) 16

(C) 15
(D) 18

Answer: (C)
Explanation:
Let her actual marks be x

Therefore,

$9 (x + 10) = x^2$
$\Rightarrow x^2 - 9x - 90 = 0$
$\Rightarrow x^2 - 15x + 6x - 90 = 0$
$\Rightarrow x(x - 15) + 6 (x - 15) = 0$

$\Rightarrow (x + 6) (x - 15) = 0$

Therefore x = – 6 or x =15

Since x is the marks obtained, $x \neq -6$. Therefore, x = 15.

13. A train travels at a certain average speed for a distance of 63 km and then travels a distance of 72 km at an average speed of 6 km/h more than its original

speed. If it takes 3 hours to complete the total journey, what is its original average speed?
(A) 42 km/hr

(B) 44 km/hr

(C) 46 km/hr

(D) 48 km/hr

Answer: (A)
Explanation:
Let the original speed be x,

Then according to question

$$\frac{63}{x}+\frac{72}{x+6}=3$$
$$\Rightarrow \frac{21}{x}+\frac{24}{x+6}=1$$
$$\Rightarrow \frac{21(x+6)+24x}{x(x+6)}=1$$
$$\Rightarrow 21x+126+24x=x^2+6x$$
$$\Rightarrow x^2-39x-126=0$$
$$\Rightarrow x^2-(42-3)x-126=0$$
$$\Rightarrow x^2-42x+3x-126=0$$
$$\Rightarrow x(x-42)+3(x-42)=0$$
$$\Rightarrow (x+3)(x-42)=0$$

This gives x = -3 and x = 42

Since speed cannot be negative, so we ignore −3,

Therefore original average speed is 42 km/hr.

14. Satvik observed that in a clock, the time needed by the minute hand of a clock to show 3 PM was found to be 3 min less than $t^2/4$ minutes at t minutes past 2 PM. Then t is equal to
(a) 14
(b) 15

(c) 16

(d) None of these

Answer: (A)
Explanation: We know that the time between 2 PM to 3 PM = 1 hr = 60 min
Given that at t minutes past 2 PM, the time needed by the minute's hand of a clock to show 3 PM was found to be 3 minutes less than $t^2/4$minutes
Therefore,

$$t+\left(\frac{t^2}{4}-3\right)=60$$

$$4t+t^2-12=240$$

$$t^2+4t-252=0$$

$$t^2+18t-14t-252=0$$

$$(t+18)(t-14)=0$$

$$t=14\,\text{min}$$

15. A takes 6 days less than B to finish a piece of work. If both A and B together can finish the work in 4 days, find the time taken by B to finish the work.
(A)12 days

(B) 12 ½ Days

(C) 13 days

(D) 15days

Answer: (A)
Explanation: Let B alone finish the work in x days.
Therefore, A alone can finish the work in (x – 6) days

A's one day work = 1/x-6

B's one day work = 1/x

Given that (A + B) can finish the work in 4 days.

Therefore, A’s one day work + B’s one day work = (A + B)’s one day work

$$\frac{1}{x-6}+\frac{1}{x}=\frac{1}{4}$$

$$\Rightarrow \frac{x+x-6}{x(x-6)}=\frac{1}{4}$$

$$\Rightarrow 4(2x-6)=x(x-6)$$

$$\Rightarrow 8x-24=x^2-6x$$

$$\Rightarrow x^2-14x+24=0$$

$$\Rightarrow x^2-12x-2x+24=0$$

$$\Rightarrow x(x-12)-2(x-12)=0$$

$$\Rightarrow (x-2)(x-12)=0$$

$$\Rightarrow \text{Either } x=2 \text{ or } x=12$$

As, $x \neq 2$, because if x = 2 , then A alone can finish work in (2 – 6) = – 4 days which is not possible.

Therefore we consider x = 12.

This implies B alone can finish work in 12 days and A alone will finish the work in 12 – 6 = 6 days.