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Q1. $[(a+b)^2+(a-b)^2]/[a^2+b^2]$ =
A. 1 B. 2 C. 3 D. 4

Q2. $[(a+b)^2-(a-b)^2]/ab$ =
A. 1 B. 2 C. 3 D. 4

Q3. If $a+b+c=0$ then $(a^3+b^3+c^3)/abc$ =
A. 1 B. 2 C. 3 D. 4

Q4. If $5^{\sqrt{x}}+12^{\sqrt{x}}=13^{\sqrt{x}}$ then value of x is,
A. 0 B. 1 C. 2 D. 4

Q5. For any real number x the maximum value of $4-6x-x^2$ is,
A. 7 B. 11 C. 13 D. 17

Q6. If $2b+1/b=2$, then value of $8b^3+1/b^3$ is,
A. 0 B. 1 C. 2 D. 4

Q7. If $x(x-3)=-1$ then the value of $x^3(x^3-18)$ will be,
A. 0 B. -1 C. -2 D. None

Q8. If $1.5x=0.04y$ then the value of $(y^2-x^2)/(y^2+2xy+x^2)$ will be,
A. 71/77 B. 72/77 C. 73/77 D. None

Q9. If $x=\sqrt{5}+2$, then the value of $(2x^2-3x-2)/(3x^2-4x-3)$ is,
A. 0.125 B. 0.425 C. 0.625 D. None

Q10. If $x=5^{n-1}+5^{-n-1}$ where n is real, the minimum value of x is,
A. 1/5 B. 2/5 C. 3/5 D. 4/5

Q11. If $a=\sqrt{[7+2\sqrt{12}]}$ and $b=\sqrt{[7-2\sqrt{12}]}$, then value of a^3+b^3 is,
A. 41 B. 52 C. 63 D. 74

Q12. If $x^3+y^3=9$ and $x+y=3$ then the value of x^4+y^4 is,
A. 17 B. 18 C. 19 D. None

Q13. If $x^{1/3}+y^{1/3}-z^{1/3}=0$ then value of $(x+y-z)^3+27xyz$ is,
A. 0 B. 1 C. 2 D. 4

Q14. If $(a-4)^2+(b-9)^2+(c-3)^2=0$, then the value of $\sqrt{(a+b+c)}$ is,
A. 1 B. 2 C. 3 D. 4

Q15. If x=100.48, y=100.70 and $xz=y^2$, then approximate value of z is
A. 1.9 B. 2.9 C. 3.9 D. 4.9

Q16. If $a+b+c=0$ then the value of is, $\frac{a2+b2+c2}{a2-bc}$
A. 0 B. 1 C. 2 D. 4

Q17. The number of possible values of x in the equation, $\sqrt{(x^2-x+1)}+1/\sqrt{(x^2-x+1)}=2-x^2$ is,
A. 1 B. 2 C. 3 D. 4

Q18. The value of $\sqrt{(x-4)^2} + \sqrt{(x-2)^2}$, where $2<x<3$, is,
A. 1 B. 2 C. 3 D. 4

Q19. If $4y-3x=13$ and $xy=14$, then $64y3-27x3$ is,
A. 8739 B. 8749 C. 8759 D. 8769

Q20. If $x^2+2=2x$ then the value of $x^4-x^3+x^2+2$ will be,
A. 0 B. 1 C. 2 D. 4

Q21. If $x=(0.09)^2$, $y=1(0.09)^2$ and $z=(1-0.09)^2-1$, then which of the following relations is true?,
A. z<x<y B. z<y<x C. x<y<z D. None

Q22. If $x+2/x=1$, then $(x^2+x+2)/[x^2(1-x)]$ is,
A. 1 B. 2 C. 3 D. 4

Q23. If $a/(1-a)+b/(1-b)+c/(1-c)=1$, then the value of $1/(1-a)+1/(1-b)+1/(1-c)$,
A. 1 B. 2 C. 3 D. 4

Q24. If $x=(\sqrt{2}+1)/(\sqrt{2}-1)$ and $xy=1$ find the value of $(2x^2+3xy+2y^2)/(2x^2-3xy+2y^2)$.
A. 73/65 B. 71/65 C. 69/65 D. 67/65

Q25. Find the value of α when the expression $x^2y^2+\alpha x+1/y2$ is a perfect square.
A. 1 B. 2 C. 3 D. 4

Q26. The area in square unit of triangle formed by the graphs of x=4, y=3 and 3x+4y=12is,
A. 3 B. 5 C. 6 D. None

Q27. If $(x+1/x)^2=3$ then the value of,
$x^{206}+x^{200}+x^{90}+x^{84}+x^{18}+x^{12}+x^6+1$ is,
A. 0 B. 5 C. 7 D. None

Q28. If $n=7+3\sqrt{5}$, then the value of $\sqrt{n} + 1/\sqrt{n}$ is,
A. $(9+\sqrt{5})/2\sqrt{2}$ B. $(7+\sqrt{5})/2\sqrt{2}$ C. $(9+\sqrt{6})/2\sqrt{2}$ D. $(9+\sqrt{5})/2$

Q29. If $p+1/p=5$, then the value of $(p^4+1/p^2)/(p^2-3p+1)$ is,
A. 104 B. 110 C. 117 D. 125

Q30. If $\sqrt{2}x-\sqrt{3}y=0$ and $\sqrt{7}x+\sqrt{2}y=0$ then the value of $x+y$ is,
A. 0 B. 2 C. 3 D. 4

Q31. If $x+1/x=-2$, then the value of $x^{2n+1}+1/x^{2n+1}$ where n is a positive integer is,
A. 1 B. -2 C. 3 D. -4

Q32. Find the remainder when $x5-9x2+12x-14$ is divided by $(x-3)$.
A. 180 B. 182 C. 184 D. None

Q33. If $x^3+3/x=4(a^3+b^3)$ and $3x+1/x^3=4(a^3-b^3)$, then a^2-b^2 is,
A. 1 B. -2 C. 3 D. -4

Q34. If x=2015, y=2014 and z=2013 then the value of $x^2+y^2+z^2-xy-yz-zx$ is,
A. 3 B. 5 C. 7 D. None

Q35. If $x=20, y=19$, the value of $(x^2+y^2+xy)/(x^3-y^3)$ is,
A. 1 B. 2 C. 3 D. 4

Q36. If $(x+y):(y+z):(z+x)=6:7:8$ and $x+y+z=14$, then value of z is,
A. 3 B. 6 C. 9 D. None

Q37. If $a:b=2/9:1/3$, $b:c=2/7:5/14$ and $d:c=7/10:3/5$ find the value of $a:b:c:d$.
A. 16:24:30:35 B. 15:24:30:35 C. 16:25:30:35 D. 16:24:33:35

Q38. If x is real then the minimum value of $4x^2-x-1$ is,
A. -1 B. -2 C. -4 D. -17/4

Q39. If $p=1+\sqrt{2}+\sqrt{3}$, then $p+1/(p-1)$ is,
A. $1+3\sqrt{3}$ B. $1+2\sqrt{3}$ C. $1+\sqrt{3}$ D. None

Q40. If a and b are positive integers such that $a^2-b^2=19$ then a+b is,
A. 3 B. 6 C. 10 D. 19

Q41. If $a-b=3$, and $a^3-b^3=117$, then absolute value of $(a+b)/(a-b)$ is,
A. 3/7 B. 5/4 C. 7/3 D. None

Q42. If $x=\sqrt[3]{5}+2$, then the value of $x^3-6x^2+12x-13$, is,
A. 0 B. 1 C. 2 D. None

Q43. If $p/a+q/b+r/c=1$, and $a/p+b/q+c/r=0$, where p, q, r, a, b and c are non-zero, the value of $p^2/a^2+q^2/b^2+r^2/c^2$ is,
A. 0 B. 1 C. 2 D. None

Q44. If $x^2-4x+1=0$, then x^3+1/x^3 is,
A. 41 B. 52 C. 63 D. 74

Q45. If $2x^2-7xy+3y^2=0$, then the value of $x:y$ is,
A. 3:1 B. 1:2 C. 2:3 D. A and B

Q46. If equation $2x^2-7x+12=0$ has two roots α and β, then the value of $\alpha/\beta+\beta/\alpha$ is,
A. 1/48 B. 1/24 C. 1/12 D. None

Q47. If $9\sqrt{x}=\sqrt{12}+\sqrt{147}$ then the value of x is,
A. 1 B. 2 C. 3 D. 4

Q48. If $p+2p/3+p/2+p/7=9/7$, then the value of p is,
A. 30 B. 36 C. 42 D. 48

Q49. When the expression $12x^3-13x^2-5x+7$ is divided by $3x+2$ the remainder is,
A. 0 B. 1 C. 2 D. None

Q50. If $x+1/x=3$ then the value of x^5+1/x^5 is,
A. 121 B. 122 C. 123 D. 125

Q51. If p=124, then the value of $[p(p^2+3p+3)+1]^{1/3}$ is,
A. 0 B. 125 C. 216 D. None

Q52. The expression x^4-2x^2+k will be a perfect square if value of k is,
A. 1 B. -2 C. 3 D. -4

Q53. One of the factors of $(a^2-b^2)^3+(b^2-c^2)^3+(c^2-a^2)^3$ is,

A. (b−c)(b−c) B. (a+b)(a−b)

C. (a+b)(a+b) D. (a−b)(a−b)

Q54. If $6+1/x=x$, then the values of x^4+1/x^4 is,
A. 6000 B. 1442 C. 1222 D. None

Q55. If $x^4+1/x^4=119$ and $x>1$, then positive value of x^3-1/x^3 is,
A. 16 B. 26 C. 36 D. 46

Q56. If x=2.361, y=3.263, and z=5.624, then the value of $x^3+y^3-z^3+3xyz$ is,
A. 0 B. 1 C. 2 D. None

Q57. If $x^2+1/x^2=66$, then the value of $(x^2-1+2x)/x$ is,
A. 10,-6 B. 10,6 C. 12,4 D. None

Q58. If $(x+1/x)^2=3$ then the value of $(x^{72}+x^{66}+x^{54}+x^{36}+x^{24}+x^6+1)$ is,
A. 1 B. $1/\sqrt{3}$ C. $-\sqrt{3}$ D. None

Q59. Find the minimum value of $2x^2-(x-3)(x+5)$, where x is real,
A. 10 B. 12 C. 14 D. None

Q60. If x+y=7 then the value of x^3+y^3+21xy is,
A. 100 B. 121 C. 343 D. None

Q61. If $3x+1/2x=5$, then the value of $8x^3+1/27x^3$ is,
A. 620/81 B. 720/27 C. 820/27 D. None

Q62. If $2a+1/3a=6$, then find the value of the expression $3a+1/2a$ is,
A. 0 B. 3 C. 6 D. 9

Q63. If $p^3+3p^2+3p=7$ then the value of p^2+2p is,
A. $\sqrt{3}$ B. 3 C. 9 D. None

Q64. If $x^2+y^2-2x+6y+10=0$, then (x^2+y^2) is,
A. 0 B. 10 C. 20 D. None

Q65. If $x=\sqrt{3}/2$ then the value of $[\sqrt{(1+x)}+\sqrt{(1-x)}]/[\sqrt{(1+x)}-\sqrt{(1-x)}]$ will be,
A. $\sqrt{3}$ B. $1/\sqrt{3}$ C. $-\sqrt{3}$ D. None

Q66. If $x^3+y^3=9$ and $x+y=3$, then value of $1/x+1/y$ will be,
A. 1/2 B. 2/3 C. 3/2 D. 4/3

Q67. If $x^2=2$, then $x+1$ is,
A. $(x-2)/(3-2x)$. B. $(x-4)/(3-2x)$. C. $(x-1)/(3-2x)$. D. None

Q68. If $x+1/16x=1$, then the value of $64x^3+1/64x^3$ is,
A. 30 B. 41 C. 52 D. None

Q69. If $a^2+b^2+1/a^2+1/b^2=4$ then a^2+b^2 is,
A. 0 B. 1 C. 2 D. None

Q70. If $a+b+c=6$, $a^2+b^2+c^2=14$ and $a^3+b^3+c^3=36$, then the value of abc is,
A. 0 B. 2 C. 4 D. 6

Q71. If $(x-a)(x-b)=1$ and $(a-b)+5=0$, then $(x-a)^3-1/(x-a)^3$ is
A. 100 B. 140 C. 200 D. 280

Q72. If a, b and c are non-zero and $a+1/b=1$ and $b+1/c=1$, the value of abc is,
A. 0 B. -1 C. -2 D. None

Q73. If $x^2+y^2+z^2=xy+yz+zx$, then the value of, $(4x+2y-3z)/2x$ is,
A. 1/10 B. 2/15 C. 3/2 D. None

Q74. If $a^4+a^2b^2+b^4=8$ and $a^2+ab+b^2=4$, then the value of ab is,
A. 0 B. 1 C. 2 D. None

Q75. If $a+b+c=2s$, then $[s^2+(s-a)^2+(s-b)^2+(s-c)^2]/(a^2+b^2+c^2)$ is,
A. 0 B. 1 C. 2 D. None

Q76. If $ax^2+bx+c=a(x-p)^2$, then the relation between a, b and c can be expressed as,
A. $b^2=4ac$ B. $b^2=ac$ C. $a+b=c$ D. None

Q77. If a:b=2:3 and b:c=4:5, then the value of a2:b2:bc is,
A. 1 B. -2 C. 3 D. -4

Q78. If $x=5-\sqrt{21}$, then value of $\sqrt{x}/[\sqrt{(32-2x)}-\sqrt{21}]$ is,
A. $[\sqrt{7}-\sqrt{3}]/\sqrt{2}$ B. $[\sqrt{7}-\sqrt{3}]/\sqrt{3}$ C. $[\sqrt{7}+\sqrt{3}]/\sqrt{2}$ D. None

Q79. The terms a, 1, and b are in AP and the terms 1, a and b are in GP. Find the values of a and b, where $a \neq b$.
A. -2, 4 B. -2, 5 C. -3, 5 D. None

Q80. The value of $a=b^2/(b-a)$, then the value of a^3+b^3 is,
A. 0 B. 1 C. 2 D. None

Q81 The minimum value of $(a-2)(a-9)(a-2)(a-9)$ is,
A. 27/4 B. -49/4 C. 81/4 D. None

Q82. If a=11 and b=9, then the value of, $(a^2+b^2+ab)/(a^3-b^3)$ is,
A. 1 B. 1/2 C. 1/3 D. 1/4

Q83. The factors of $(a^2+4b^2+4b-4ab-2a-8)$ are,
A. $(a-2b-4)(a-2b+2)$ B. $(a+2b-4)(a+2b+2)$
C. $(a+2b-1)(a-2b+1)$ D. $(a-2b-1)(a-2b+1)$None

Q84. The value of $a=b^2/(b-a)$, then the value of a^3+b^3 is,
A. 0 B. 1 C. 2 D. None

Q85. If $xy(x+y)=1$, then $1/(x^3y^3)-x^3-y^3$ is,
A. 0 B. 1 C. 2 D. 3

Q86. If $a+b+c=6$, $a^2+b^2+c^2=14$ and $a^3+b^3+c^3=36$, then the value of abc is,
A. 0 B. 3 C. 6 D. 9

Q87. If $x\neq0$, $y\neq0$ and $z\neq0$, and $1/x^2+1/y^2+1/z^2=1/xy+1/yz+1/zx$, then the relation between x, y and z is,
A. x=y=z B. x>y>z C. x<y<z D. None

Q88. If a:b=3:2, then the ratio of, $(2a^2+3b^2):(3a^2-2b^2)$ is,
A. 1 B. -2 C. 3 D. -4

.

Q89. If $xy(x+y)=1$, then $1/(x^3y^3)-x^3-y^3$ is,
A. 0 B. 1 C. 2 D. 3

Q90. If $a^{1/3}=11$ then a^2-331a is
A. 1333100 B. 1331000 C. 13333310 D. None

Q91. If $a=xy/(x+y)$, $b=xz/(x+z)$ and $c=yz/(y+z)$, where aa, bb and cc are all non-zero numbers, then the value of x is,
A. 2abc/(ac+bc−ab) B. 2abc/(ac-bc−ab)
C. 2abc/(ac+bc−ab) D. 2abc/(ac+bc+ab)

Q92. If $a^2-4a-1=0$, then $a^2+1/a^2+3a-3/a$ is,
A. 20 B. 30 C. 50 D. None

Q93. If $x(3-2/x)=3/x$, and $x\neq0$ then x^2+1/x^2 is,
A. 0 B. 11/9 C. 22/9 D. None

Q94. If $a+1/(a-2)=4$, then $(a-2)^2+1/(a-2)^2$ is,
A. 0 B. 1 C. 2 D. None

Q95. If a2+b2+c2=2(a−b−c)−3, then 4a−3b+5c is,
A. 1 B. 2 C. 3 D. None

Q96. If $x^2+y^2+z^2=xy+yz+zx$, then the value of z+xy is,
A. 0 B. 2 C. 3 D. None

Q97. If $\sqrt{(4x-9)}+\sqrt{(4x+9)}=5+\sqrt{7}$, find the value of *x*.
A. 1 B. 2 C. 3 D. 4

Q98. If $2(x^2+1/x^2)-(x-1/x)-7=0$, then the two values of x are,
A. 2,-1/2 B. 3,-2 C. 3,1/3 D. None

Q99. If $x=(\sqrt{2}+1)^{-1/3}$, then the value of (x^3-1/x^3)
A. 0 B. 1 C. -2 D. -3

Q100. If $x^{x\sqrt{x}} = (x\sqrt{x})^x$ then xx is equal to,

A. 1/4 B. 4/9 C. 9/4 D. 16/9

Q101. If $a+1/b=1$ and $b+1/c=1$, then value of $c+1/a$ is,

A. 1 B. 2 C. 3 D. 4

Q102. If $a+1/b=1$ and $b+1/c=1$, then value of $c+1/a$ is,

A. 1 B. 2 C. 3 D. 4

----------ANSWER----------

Q1.B	Q2.D	Q3.C	Q4.D	Q5.C
Q6.A	Q7.B	Q8.C	Q9.C	Q10.B
Q11.B	Q12.A	Q13.A	Q14.D	Q15.B
Q16.C	Q17.B	Q18.B	Q19.B	Q20.A
Q21.A	Q22.A	Q23.D	Q24.B	Q25.B
Q26.C	Q27.A	Q28.A	Q29.B	Q30.A
Q31.B	Q32.C	Q33.A	Q34.A	Q35.A
Q36.B	Q37.A	Q38.D	Q39.B	Q40.D
Q41.C	Q42.A	Q43.B	Q44.B	Q45.A
Q46.B	Q47.C	Q48.C	Q49.B	Q50.C
Q51.B	Q52.A	Q53.B	Q54.B	Q55.C
Q56.A	Q57.A	Q58.A	Q59.C	Q60.D
Q61.C	Q62.D	Q63.B	Q64.B	Q65.A
Q66.C	Q67.C	Q68.C	Q69.C	Q70.D
Q71.B	Q72.B	Q73.C	Q74.B	Q75.B
Q76.A	Q77.B	Q78.A	Q79.A	Q80.A
Q81.B	Q82.B	Q83.A	Q84.A	Q85.D
Q86.C	Q87.A	Q88.B	Q89.D	Q90.B
Q91.C	Q92.B	Q93.C	Q94.C	Q95.A
Q96.B	Q97.D	Q98.A	Q99.C	Q100.C
Q101.A	102.A			

Q1.B

Q2.D

Q3.C

Q4.D

Q4 Solution:-

we know:

$12^2 + 5^2 = 13^2$

Comparing with

$5^{\sqrt{x}}+12^{\sqrt{x}}=13^{\sqrt{x}}$ we get $\sqrt{x} = 2 \Rightarrow x = 4$

Q5.C

Q5 Solution:-

Given:

$4-6x-x^2$

$= 4+9-9-6x-x^2$

$=13 -(9 + 6x + x^2)$

$=13 - (3 + x)^2$

Clearly value of expression will be maximum when $(3 + x)^2$ is minimum, its minimumu value is zero so value of expression will be maximum as 13

Q6.A

Q6 Solution:-

x^3+y^3, we get,

Q7.B

Q7 Solution:-

$x+1/x=3$

Or, $x^2+1/x^2+2x.1/x=9.$

Or, $x^2+1/x^2+2=9.$

Or, $x^2+1/x^2=9-2=7.$

Now we can get the sum of cubed inverses,

$x^3+1/x^3=(x+1/x)(x^2-1+1/x^2)$

$=3\times(7-1)=3x6$

$=18.$

$x^6 + 1 = 18x^3$

$x^6-18x^3=-1$

Or, $x^3(x^3-18)=-1$

Q8.C

Q8 Solution:-

$1.5x=0.04y,$

Or, $3/2x=4/100y,$

Or, $x/y=2/75.$

Now:

$(y^2-x^2)/(y^2+2xy+x^2)=[(x+y)(y-x)]/(x+y)^2$

$=(y-x)/(x+y)=(1-x/y)/(1+x/y)$

$=(1-2/75)/(1+2/75)$

=73/77

Q9.C

Q9 Solution:-

Working on the target expression now,

$(2x^2-3x-2)/(3x^2-4x-3)$

$=[2x(x-1/x-3/2)]/[3x(x-1/x-4/3)] =[2(4-3/2)]/[3(4-4/3)]$

=5/8

=0.625

Q10.B

Q10 Solution:-

$x=5^{n-1}+5^{-n-1} \geq 2.\sqrt{5^{n-1}.5^{-n-1}}=2.\sqrt{5^{n-1-n-1}}=2\sqrt{.5^{-2}} =2/\sqrt{5^2}=2/5$ $[a+b\geq 2\sqrt{ab}]$

Q11.B

Q11 Solution:-

$a^3 + b^3 = (a+b)(a^2-ab+b^2)$

$a^2=7+2\sqrt{12}$ and $b^2=7-2\sqrt{12}$, and so, $a^2+b^2=14$.

Again, $ab=7^2-4\times12=1$, and so, $(a^2-ab+b^2)=13$.

Now we have to transform a+b and find its value.

$a^2+b^2=14$ and $ab=1$,

So,

$2a^2+2ab+b^2=(a+b)^2$

=14+2

=16

And so, $a^3 + b^3 = (a+b)(a^2-ab+b^2)=4(16-3)=4\times13=52$.

Q12.A

Q12 Solution:-

$x^3+y^3=(x+y)\times(x^2-xy+y^2)$

$9=3\times[(x+y)^2-3xy]=3\times(9-3xy)=27-9xy$

Or, $9xy=27-9=18$.

Or $xy = 2$

Now

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

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

$= [(x+y)^2 - 2xy]^2 - 2(xy)^2$

$= [3^2 - 2.2]^2 - 2(2)^2$

$= (9 - 4)^2 - 2.4$

$=5^2-8$

=25-8

= 17.

Q13.A

Q13 Solution:-

We are given:

$x^{1/3}+y^{1/3}=z^{1/3}$

Now cubing both sides we get,

$x+3x^{1/3}y^{1/3}(x^{1/3}+y^{1/3})+y=z$

or, $(x+y-z)=-3x^{1/3}y^{1/3}z^{1/3}$

Cubing again both sides, $(x+y-z)^3=-27xyz$.

So answer is 0.

Q14.D

Q14 Solution:-

In our given problem we have,

$(a-4)=0$,

Or, $a=4$.

$(b-9)=0$,

Or, $b=9$, and

$(c-3)=0$,

Or, $c=3$.

So,

$\sqrt{(a+b+c)}=\sqrt{16}=4$.

Q15.B

Q15 Solution:-

Putting the value of x and y in the third equation we get,

(100.48)z=(100.70)2=101.40(100.48)z=(100.70)2=101.40.

So, 0.48z=1.400.48z=1.40,

Or, z=1.400/48=.35/12=2.9(Approx)

Q16.C

Q16 Solution:-

We have

b + c = -a

Squaring we get $b^2 + c^2 + 2bc = a^2$.

$b^2 + c^2 + 2bc = a^2 - 2bc$

S0 $a^2 + b^2 + c^2 = a^2 + b^2 + c^2 - 2bc = a^2 + a^2 - 2bc = 2a^2 - 2bc = 2(a^2 - bc)$

Putting in , $\frac{a2+b2+c2}{a2-bc}$ we get $\frac{2(a2-bc)}{(a2-bc)} = 2$

Q17.B

Q17 Solution:-

$p=\sqrt{(x^2-x+1)}$

$\sqrt{(x^2-x+1)}+1/\sqrt{(x^2-x+1)}$

$=(p+1/p)$,

$=(p^2+1)/p$.

Q18.B

Q18. Solution:-

As given 2<x<3 ,x-2 and 4-x is positive.

So,

$\sqrt{(x-4)^2} + \sqrt{(x-2)^2}$

$=x-2+4-x$

$=2$.

Q19.B

Q19. Solution:-

$4y-3x=13$,

Or, $(p-q)^2=p^2-2pq+q^2=169$,

Or, $p^2+pq+q^2=169+3pq$, the term $3pq$ added to both sides,

Or, $p^2+pq+q^2=169+504=673$.
So,
$64y^3-27x^3=p^3-q^3$
$=(p-q)(p^2+pq+q^2)$
$=13\times673$
$=8749$.

Q20.A
Q20 Solution:-
Given $x^2-2x=-2$.
Given expression:- $x^2(x^2-2x)+2x^3-x^3+2x=x^3-2x^2+2x= x(x^2-2x)+2x=-2x+2x=0$

Q21.A
Q21 Solution:-
By substitution, $p=0.09$, where $p<1$ we have the transformed given equations as,
$x=p^2$,
$y=1p^2$, and
$z=(1-p)^2-1=p^2-2p$.
When comparing x with y we can conclude that,
$y>x$, as $p<1$ (dividing 1 by a value less than 1 makes y larger than 1, whereas x is less than 1).
Comparing x with z we can conclude that,
$x>z$, as p is positive.
These two conclusions are sufficient to finally form the desired comparative relation between the three variables as,
$y>x>z$,
Or, $z<x<y$.

Q22.A
Q22 Solution:-
$x+2/x=1$
Or, $x^2-x+2=0$.
$(x^2+x+2)/[x^2(1-x)]=(x^2-x+2+2x)/[x^2(1-x)] = (0+2x)/[x^2(1-x)]$
$=2x/[x^2(1-x)]$
$=2/x(1-x)$
$=2/(x-x^2)$
$=2/(x-x^2) -1 + 1$
$=(x^2-x+2)/(x-x^2) + 1$
$=0/(x-x^2) + 1$ [As $(x^2-x+2) = 0$]
$=0+1$
$=1$

Q23.D
Q23. Solution:-
Adding 3 to both sides of the first expression we get,
$3+a/(1-a)+b/(1-b)+c/(1-c)=4$,
Or, $[1+a/(1-a)]+[1+b/(1-b)]+[1+c/(1-c)]=4$
Or, $1/(1-a)+1/(1-b)+1/(1-c)=4$.

Q24.B
Q24 Solution:-
$x+y=(\sqrt{2}+1)/(\sqrt{2}-1) + (\sqrt{2}-1)/(\sqrt{2}+1)$

$=[(\sqrt{2}+1)^2+(\sqrt{2}-1)^2]/(2-1)$
$=2.(2+1)/1$
$=6$

Now

$x^2+y^2 = (x+y)^2-2xy=6^2-2.1=36-2=34$
$=71/65.$
$(2x^2+3xy+2y^2)/(2x^2-3xy+2y^2).=(2.34+3)/(2.34-3)=71/65$

Q25.B

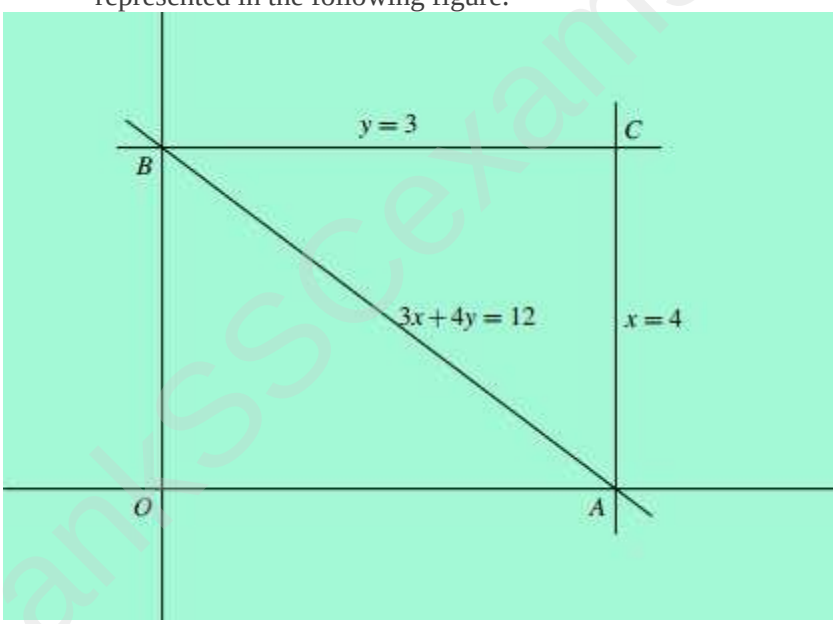
Q25 Solution:-

$a^2=(xy)^2$ and
$b^2=(1/y)^2$.
For the quadratic equation to be a perfect square then the mid-term must be,
$2ab=2\times xy\times 1/y=x$.
Thus for the given equation to be a perfect square,
$\alpha x=2x$,
Or, $\alpha=2$
$=3$

Q26.C

Q26 Solution:-

at x=0 and y=3 and the x-axis and the first straight line at x=4 and y=0. The situation is represented in the following figure.



Solution - Simplifying actions:

Area of the triangle $\triangle ABC$
$=(1/2)$(Area of rectangle OABC)
$=(1/2).(4\times 3)$
$=6$ square units

Q27.A

Q27 Solution:-

$(x+1/x)^2=3$

Or, $x^2+1/x^2+2=3$,

Or, $x^2+1/x^2-1=0$.

Using our sum of cubes expression concept,

$x^3+1/x^3=(x+1/x)(x^2-1+1/x^2)$

$=0$

This is a great simplifying resource and let us use it now on the four pairs of terms in the target expression,

$x^{206}+x^{200}+x^{90}+x^{84}+x^{18}+x^{12}+x^6+1$

$=x^{203}(x^3+1/x^3)+x^{87}(x^3+1/x3)+x^{15}(x^3+1/x^3)+x^3(x^3+1/x^3)$

$=0$.

Q28.A

Q28 Solution:-

$n=7+3\sqrt{5}$

$=(14+6\sqrt{5})/2$

$=(1/2)(3+\sqrt{5})^2$,

Or, $\sqrt{n}= (3+\sqrt{5})/\sqrt{2}$. ----------(i)

Inversing we get:

$1/\sqrt{n}=\sqrt{2}/(3+\sqrt{5})$

$=\sqrt{2}(3-\sqrt{5})/4$, [rationalization multiplying numerator and denominator by $3-\sqrt{5}$]

$=(3-\sqrt{5})/2\sqrt{2}$. ----------(ii)

Adding equation (i) and (ii)

$\sqrt{n}+1/\sqrt{n}=(9+\sqrt{5})/2\sqrt{2}$.

Q29.B

Q29 Solution:-

Let us take care of the numerator expression first.

$p+1/p=5$

Or, $p2-1+1p2=25-3=22$.

So,

$p3+1/p3=(p+1/p)(p2-1+1/p^2)$

$=5\times22$

$=110$.

Thus numerator $=110p$.

Expanding the given expression and rearranging we get,

$p2-5p+1=0$.

So denominator is,

$p2-3p+1=2p$.

Finally then the desired value of the target expression is,

$(p^4+1/p^2)/(p^2-3p+1) = 110p/2p=55$.

Q30.A

Q30 Solution:-

Given:-

$\sqrt{2}x-\sqrt{3}y=0$

Or, $\sqrt{(4x/3)}-\sqrt{2}y=0$. [Dividing by $\sqrt{3}$]

Adding this equation with the second equation $\sqrt{7}x+\sqrt{2}y=0$ we get,

$\sqrt{(4x/3)}+\sqrt{7}x=0$,

Or, $\sqrt{x}(\sqrt{(4/3)}+\sqrt{7})=0$.

So,

$\sqrt{x}=0 \Rightarrow x=0$ and substituting it in any of the two equations we get $y=0$ also.

So $x+y=0+0=0$.

Q31.B

Q31 Solution:-

$x+1/x=-2$

Squaring both sides and rearranging,

$x^2+1=-2x$

$x^2+1+2x=,$

Or, $(x+1)^2=0,$

Or, $x+1=0.$

Or, $x=-1.$

$x^{2n+1}+1/x^{2n+1}$

$=(-1)^{2n+1}+1/(-1)^{2n+1}$

$= -1 -1$

$=-2$

Q32.C

Q32 Solution:-

Put x-3=0 or x=3

$3^5-9.3^2+12.3-14$

343-9.9_+36-14⇒184.

Q33.A

Q33 Solution:-

First we add the two equations giving,

$8a^3=x^3+3/x+3x+1/x^3$

$=x^3+3(x^2\times 1/x)+3(x\times 1/x^2)+1/x^3$

$=(x+1/x)^3$

Or, $(x+1/x)=2a$

In the same way, we would get,

$(x-1/x)=2b$

Squaring the two and subtracting we get,

$4(a^2-b^2)=4,$

Or, $a^2-b^2 = 1.$

Q34.A

Q34 Solution:-

We reproduce from the remembrance of rich algebraic concepts,

$(x-y)^2+(y-z)^2+(z-x)^2$

$=2(x^2+y^2+z^2-xy-yz-zx).$

So,

$(x^2+y^2+z^2-xy-yz-zx)=(1/2)(1+1+4)$

Q35.A

Q35 Solution:-

$x^3-y^3=(x-y)(x^2+xy+y^2).$

$= (x^2+y^2+xy)/(x^3-y^3)$

$=(x^2+y^2+xy)/ (x-y)(x^2+xy+y^2)$

$=1/(x-y)$

=120−19
=1.

Q36.B
Q36 Solution:-
Let x+y=6k ----------(i)
y+z=7k
z+x=8k
Adding all 2x+2y+2z=21k
x+ y+ z=21k/2 ---------(ii)
14=21k/2
K=4/3
(ii) – (i) gives
Z=9k/2=9x2/3=6

Q37.A
Q37 Solution:-
Normalizing the first ratio values we have,
a:*b*=2/9:1/3,
Or, multiplying the ratio values by 9,
a:*b*=2:3.
Normalizing the second ratio values,
b:*c*=2/7:5/14
b:*c*=4:5. [multiplying the values by 14]
Similarly normalizing the third ratio values by multiplying the values by 10,
d:*c*=7/10:3/5=7:6.
To join *a*:*b*=2:3 and *b*:*c*=4:5 we identify *b* as the common quantity. The values corresponding to *b* in the two ratios being 3 and 4, the target equalization value of this quantity will be the LCM of the two values, that is, 3×4=12.
We now transform the two ratios to equalize the values corresponding to quantity *b* as 12,
a:*b*=2:3=8:12, and
b:*c*=4:5=12:15.
Joining the two ratios we get,
a:*b*:*c*=8:12:15.
Now we have to join this ratio with the third ratio, *d*:*c*=7:6.
To join the first step we have to take is to bring the common quantity *c* in this case to the numerator of the third ratio,
d:*c*=7:6,
Or, *c*:*d*=6:7.
a:*b*:*c*=8:12:15=16:24:30, and
c:*d*=6:7=30:35.
=>
a:*b*:*c*:*d*=16:24:30:35.

Q38.D
Q38 Solution:-
$4x^2-x-1$
$=(2x)^2-2\times2x\times(1/4)+(1/4)^2-1-(1/4)^2$
$=(2x-1/4)^2-17/16.$

So the mininmum value of the given expression will be −17/16 when 2x=14.

Q39.B
Q39 Solution:-

$p+1/(p-1)$
$=1+(p-1)+1/(p-1)$
$=1+q+1/q$, where $q=p-1$
$p=1+\sqrt{2}+\sqrt{3}$,
Or, $p-1=q=\sqrt{3}+\sqrt{2}$.
And $1/q=1/(\sqrt{3}+\sqrt{2})$
$1/q=\sqrt{3}-\sqrt{2}$. [Rationalizing the surd expression on the]
So the sum of inverses is,
$q+1/q=2\sqrt{3}$.
Finally then the target expression,
$p+1/(p-1)=1+q+1/q=1+2\sqrt{3}$.

Q40.D
Q40 Solution:-

$a^2-b^2=(a+b)(a-b)=19$
As 19 is a prime number and a and b are positive integers, So there is only one possibility that a−b=1 and a+b=19.
So, a=10 and b=9.

Q41.C
Q41 Solution:-

$(a-b)^3=a^3-b^3-3ab(a-b)$,
Or, $9ab=117-27=90$,
So $ab=10$, and
$(a+b)^2=(a-b)^2+4ab=49$,

Q42.A
Q42 Solution:-

$x=\sqrt[3]{5}+2$,
Or, $(x-2)^3=5$
Or, $x^3-6x^2+12x-8=5$,
Or, $x^3-6x^2+12x-13=0$.

Q43.B
Q43 Solution:-

substituting x=p/a, y=q/b and z=r/c.
The given expressions are then transformed to,
$x+y+z=1$ and $1/x+1/y+1/z=0$.
Given $1/x+1/y+1/z=0$.
Or, $xy+yz+zx=0$, a simple result.
Now we take up the first expression intending to square it, as the target has the squares,
$x+y+z=1$,
Or, $(x+y+z)^2=1$.
Or, $x^2+y^2+z^2+2(xy+yz+zx)=1$
Or, $x^2+y^2+z^2=1$.

Q44.B
Q44 Solution:-
$x^2-4x+1=0$
Or, $x^2+1=4x$
Or, $x+1/x=4$
We have
$x^3+1/x^3=(x+1/x)(x^2-1+1/x^2) = 4((x+1/x)^2-3) = 4\times(4^2 - 3)=4\times(16-3)=4\times13=52$

Q45.A
Q45 Solution:-
Factorising we get
$2x^2-7xy+3y^2=(2x-y)(x-3y)=0.$
So Either $2x=y$
Or $x=3y.$
Either $x:y=1:2$ and in the second case,
Or $x:y=3:1.$

Q46.B
Q46 Solution:-
As α and β are the two roots we can write,
$2x^2-7x+12=0,$
Or, $x^2-72x+6$
$=(x-\alpha)(x-\beta)$
$=x^2-x(\alpha+\beta)+\alpha\beta$
$=0.$
Equating coefficients of like powers,
$\alpha+\beta=7/2$ and $\alpha\beta=12/2=6.$
Taking up the target expression now,
$\alpha/\beta+\beta/\alpha=(\alpha^2+\beta^2)/\alpha\beta$
$=[(\alpha+\beta)^2-2\alpha\beta]/\alpha\beta$
$=(49/4-12)/6$
$=1/24.$

Q47.C
Q47 Solution:-
$9\sqrt{x}=\sqrt{12}+\sqrt{147}=2\sqrt{3}+7\sqrt{3}=9\sqrt{3}$
So, $\sqrt{x}=\sqrt{3}$
$x=3$

Q48.C
Q48 Solution:-
Essentially this problem turns out to be an evaluation of sum of fractions,
$p+2p/3+p/2+p/7=9/7,$
Or, $p(1+2/3+1/2+1/7)=9/7,$
Or, $p(42+28+21+6)/42=9/7,$
Or, $p(97/42)=9/7,$
Or, $p=42.$

Q49.B
Q49 Solution:-
$12x^3-13x^2-5x+7$

$=4x^2(3x+2)-8x^2-13x^2-5x+7$
$=4x^2(3x+2)-7x(3x+2)+14x-5x+7$
$=4x^2(3x+2)-7x(3x+2)+3(3x+2)-6+7$
$=4x^2(3x+2)-7x(3x+2)+3(3x+2)+1.$
Thus remainder will be 1.

Q50.C
Q50 Solution:-
To get the sum of inverse squares,
$x+1/x=3,$
Or, $x^2+1/x^2=3^2-2=7.$
Carrying on further to get sum of inverse cubes,
$x^3+1/x^3=(x+1/x)(x^2-1+1/x^2)$
$=3\times(7-1)=18$
Now
$(x^2+1/x^2)(x^3+1/x^3)$
$=(x^5+1/x^5)+(x+1/x)$
Or, $7\times18=(x^5+1/x^5)+3,$
Or, $(x^5+1/x^5)=126-3=123$

Q51.B
Q51 Solution:-
$[p(p^2+3p+3)+1]^{1/3}$
$=(p^3+3p^2+3p+1)^{1/3}$
$=[(p+1)^3]^{1/3}$
$=p+1$
$=124+1=125.$

Q52.A
Q52 Solution:-
x^4-2x^2+k
$= x^4-2x^2+1 + k - 1$
$=(x^2 -1)^2 +k -1$
Clearly above expression will be perfect square if k-1=0 that is k =1.

Q53.B

assume, p−q=x, q−r=y and r−p=z transforming the target expression again to,

$x^3+y^3+z^3$, but we have one additional helping expression, x+y+z=0.
We know under these conditions,
$x^3+y^3+z^3=3xyz$, that is all three of $x=a^2-b^2$, $y=b^2-c^2$ and $z=c^2-a^2$ are factors of the given expression. Out of the choices we detect only a2−b2a2−b2 in product form.

Q54.B
Q54 Solution:-
$x-1/x=6,$
Or, squaring both sides,
$x^2-2+1/x^2=36$
Or, $x^2+1/x^2=38.$
Squaring both sides again,

$x^4+2+1/x^4=38^2=1444$,
Or, $x^4+1/x^4=1444-2=1442$.

Q55.C
Q55 Solution:-
We have,
$x^4+1/x^4=119$
Or, $x^4+2+1/x^4=121$
Or, $(x^2+1/x^2)^2=121$
Or, $x^2+1/x^2=11$,
Again, $x^2+1/x^2=11$
Or, $x^2-2+1/x^2=9$
Or, $(x-1/x)=3$, as $x>1$, $1/x<x$ and $x-1/x$ is positive (it could have been -3).
Now from the target expression we have,
$x^3-1/x^3=(x-1/x)(x^2+1+1/x^2)$
$=3\times(11+1)=36$

Q56.A
Q56 Solution:-
We have $x+y=z$
Or, $x^3+y^3+3xy(x+y)=z^3$
Or, $x^3+y^3-z^3+3xyz=0$.

Q57.A
Q57 Solution:-
$x^2+1/x^2=66$,
Or, $x^2-2+1/x^2=64$,
Or, $(x-1/x)^2=82$
Or, $x-1/x=\pm8$
So, $x-1/x+2=\pm8+2=10,-6$.

Q58.A
Q58 Solution:-
$(x+1/x)^2=3$,
Or, $x^2+2+1/x^2=3$
Or, $x^2+1/x^2=1$,
Or, $x^2+1/x^2-1=0$.

Now, $x^3+1/x^3=(x+1/x)(x^2-1+1/x^2)=0$.

$=(x^{72}+x^{66}+x^{54}+x^{36}++x^{24}+x^6+1)$
$=x^{69}(x^3+1/x^3)+x^{54}+x^{36}+x^{24}+x^6+1$
$=x^{54}+x^{36}+x^{24}+x^6+1$.
$=x^{54}+x^{36}+x^{24}+x^6+1$
$=x^{54}+x^{48}-x^{48}-x^{42}+x^{42}+x^{36}+x^{24}+x^6+1$
$=x^{51}(x^3+1/x^3)-x^{45}(x^3+1/x^3)+x^{42}+x^{36}+x^{24}+x^6+1$
$=x^{42}+x^{36}+x^{24}+x^6+1$.
$=x^{24}+x^{18}-x^{18}-x^{12}+x^{12}+x^6+1$
$=1$, as taking common x^{21},x^{15} and x^3 will make three pairs of terms combine to 0.

Q59.C

Q59 Solution:-

$2x^2-(x-3)(x+5)$
$=2x^2-(x^2+5x-3x-15)$
$=2x^2-x^2-2x+15$
$=x^2-2x+15$
$=(x-1)^2+14.$
Minimum value of $(x-1)^2$ is 0.
So Minimum value will be 0+14=14.

Q60.D

Q60 Solution:-

$(x+y)^3=x^3+y^3+3xy(x+y)$
$=x^3+y^3+3xy\times7$
$=x^3+y^3+21xy,$
Or, $7^3=x^3+y^3+21xy,$
Or, $x^3+y^3+21xy=343.$

Q61.C

Q61 Solution:-

$3x+12x=5,$
Multiplying both sides by 2/3 for making the coefficients between the given and the target expressions conform we have,
$2x+1/3x=10/3.$
So by the sum of cubes expression,
$(2x)^3+(1/3x)^3$
$=(2x+1/3x)((2x+1/3x)2-3\times2x\times1/3x)$
$=10/3((10/3)^2-2)$
$=10/3(82/9)$
$=820/27$

Q62.D

Q62 Solution:-

$2a+1/3a=6$
Or, $a+1/6a=3$ [Dividing by 2]
Or, $3a+1/2a=9.$ [Multiplying by 3]

Q63.B

Q63 Solution:-

$p^3+3p^2+3p=7,$
Or, $p^3+3p^2+3p+1=8,$
Or, $(p+1)^3=2^3,$
Or, $p+1=2,$
Or, $(p+1)^2=p^2+2p+1=4.$
So finally,
$p^2+2p=3.$

Q64.B

Q64 Solution:-

We have
$x^2+y^2-2x+6y+10=0,$
Or, $(x^2-2x+1)+(y^2+6y+9)=0,$

Or, $(x-1)^2+(y+3)^2=0$,
$x-1=0$, and $y+3=0$,
Or, $x=1$, and $y=-3$,
Or, $x^2+y^2=1+9=10$

Q65.A
Q65 Solution:-
$\sqrt{1+x}=\sqrt{1+\sqrt{3}/2}$
$=(\sqrt{2}+\sqrt{3})/2$
$=(\sqrt{4}+2\sqrt{3})/2$
$=(\sqrt{3}+1+2\sqrt{3})/2$
$=1/2\sqrt{(\sqrt{3}+1)^2}$
$=1/2(\sqrt{3}+1)$.
Similarly,
$\sqrt{1-x}=1/2(\sqrt{3}-1)$.
Now, $[\sqrt{1+x}+\sqrt{1-x}]/[\sqrt{1+x}-\sqrt{1-x}]$
$=[\sqrt{3}+1+\sqrt{3}-1]/[\sqrt{3}+1-\sqrt{3}+1]$, the 1/2 canceled out.
$=2\sqrt{3}/2$
$=\sqrt{3}$

Q66.C
Q66 Solution:-
We have,
$1/x+1/y=(x+y)/xy=3/xy$. We need only to get the value of xy.
Now we turn our attention to the given expressions, especially the first one.
$x^3+y^3=9=(x+y)(x^2-xy+y^2)$
$=3(x^2+2xy+y^2-3xy)$
$=3((x+y)^2-3xy)$
Or, $9-3xy=3$,
Or, $xy=2$.
So, $1/x+1/y=3/xy=3/2$.

Q67.C
Q67 Solution:-
Given:
$x^2=2$
Or, $2x^2=4$
Or, $3x-2x^2+3-2x=x-1$
Or, $(x+1)(3-2x)=x-1$
Or, $x+1=(x-1)/(3-2x)$,

Q68.C
Q68 Solution:-
Given,
$x+1/16x=1$,
Or, $4x+1/4x=4$, [multiplying each terms by 4]
Or, $(4x+1/4x)^2=16$, [squaring both sides]
Or, $(16x^2+1/16x^2)=14$.
Again,
$64x^3+1/64x^3$
$=(4x+1/4x)(16x^2-4x.1/4x+1/16x^2)$

$=(4x+1/4x)(16x^2+1/16x^2-1)$
$=4x(14-1)$
$=4\times13$
$=52$

Q69.C
Q69 Solution:-
$a^2+b^2+1/a^2+1/b^2=4,$
Or, $(a^2-2+1/a^2)+(b^2-2+1/b^2)=0,$
Or, $(a-1/a)^2+(b-1/b)^2.$
And so, $a=1/a$, or, $a^2=1$, and,
$b=1/b$, or, $b^2=1,$
Or, $a^2+b^2=2$

Q70.D
Q70 Solution:-
We have,
$a^3+b^3+c^3= a^3+b^3+c^3 -3abc+3abc=(a+b+c)\times(a^2+b^2+c^2-ab-bc-ca)+3abc.$
Or, $a^3+b^3+c^3=(a+b+c)\times(a^2+b^2+c^2-ab-bc-ca)+3abc,$
Or, $36=6(14-ab-bc-ca)+3abc.$
Given,
$(a+b+c)^2=36$
$=a^2+b^2+c^2+2(ab+bc+ca),$
Or, $ab+bc+ca=11.$
So, $36=6(14-(ab+bc+ca))+3abc,$
Or, $36=6(14-11)+3abc,$
Or, $3abc=18,$
Or, $abc=6.$

Q71.B
Q71 Solution:-
Clearly,
$(x-a)-(x-b)=5$
$(x-a)(x-b)=1,$
$(x-b)=1/(x-a).$
$(x-a)-(x-b)=5,$
Or, $(x-a)-1/(x-a)=5,$
$p-1/p=5,$ [Let p =x-a]
Squaring both sides we get,
$p^2+1/p^2=25+2=27$
$p^3-1/p^3 =(p-1/p)(p^2+1/p^2+1)$
$=5\times(27+1)=140$

Q72.B
Q72.Solution:-
We are given:
$a+1/b=1$
Or, $ab+1=b$ ----------(i)
And, $b+1/c=1$
Or, $bc+1=c.$
Or, $bc-c= -1$ ----------(ii)

Or, abc+c=bc, [Multiplying eq (i) by c]
Or, abc=bc−c=−1 [As we have bc-c= -1 from equation Number (ii)]

Q73.C
Q73 Solution:-
Cleraly
$2(x^2+y^2+z^2)=2(xy+yz+zx)$, [multiplying given expression by 2]
Or, $(x-y)^2+(y-z)^2+(z-x)^2=0$
Again the use of Principle of sum of squares.
So, $(x-y)=(y-z)=(z-x)=0$
Or, $x=y=z$
So, $(4x+2y-3z)/2x=3x/2x=3/2$

Q74.B
Q74 Solution:-
$a^4+a^2b^2+b^4+2ab(a^2+ab+b^2)= 8 + 2x4 = 16$,
Or, $8+2ab\times4=16$, [$a^4+a^2b^2+b^4=8$ and $a^2+ab+b^2=4$]
Or, $8ab=8$,
Or, $ab=1$.

Q75.B
Q75 Solution:-
We have,
$s^2 + (s-a)^2+(s-b)^2+(s-c)^2=4s^2+a^2+b^2+c^2-2s(a+b+c)$
$=4s^2+a^2+b^2+c^2-2s(a+b+c)$
$=4s^2+a^2+b^2+c^2-2s.2s$ [substituting the value of a+b+c=2s]
$=4s^2+a^2+b^2+c^2-4s^2$
$=a^2+b^2+c^2$
So,
$[s^2 + (s-a)^2+(s-b)^2+(s-c)^2]/(a^2+b^2+c^2)$
$=(a^2+b^2+c^2)/(a^2+b^2+c^2)$
$=1$

Q76.A
Q76. Solution:-
Let, $ax^2+bx+c=a(x-p)^2$
$=ax^2-2pax+ap^2$.
ax^2 cancels out and equating coefficients of xx and the constants on both sides of the equation we get,
$b=-2pa$, and $c=ap^2$.
$b=-2pa$,
Or, $p=-b^2/a$.
Putting this value in the second equation we get,
$c=a(-b/2a)^2=b^2/4a$.
Or, $b^2=4ac$.

Q77.B
Q77 Solution:-
we have a:b=2:3 which gives, $a^2:b^2=4:9$.
But the second ratio we don't square. Instead we multiply numerator and denominator by b to get, $b^2:bc=4:5$.

Now we have the common middle term of b2 same in both the transformed ratios.
To join these two ratios, the ratio values corresponding to b2 have to be equalized to the LCM of their values in two ratios, which is 4×9=36.
Transforming thus, the two ratios are changed to,
$a^2:b^2=16:36$, and $b^2:bc=36:45$.
Now we can join these two ratios to get the desired ratio,
$a^2:b^2:bc=16:36:45$.

Q78.A
Q78 Solution:

Q79.A
Q79 Solution:

AP or Arithmetic Progression of three terms specifies that the difference between any two adjacent terms will be a constant. Thus from the first expression we get,

ATP

$1-a=b-1$

or, $a+b=2$ ----------(i)

Again ATP

$a/1=b/a$ ----------(ii)

Or, $a^2=b$.

=> $a^2 = 2-a$

Solving we get a=1 or -2

Putting in Equation (i) we get b=1 or 4

So answer is (1,1) or (-2,4)

Since $a \neq b$

So our answer will be -2, 4

Q80.A
Q80 Solution:-

$a=b^2/(b-a)$,

Or, $ab-a^2=b^2$,

Or, $a^2-ab+b^2=0$.

As,we know $a^3+b^3=(a+b)(a^2-ab+b^2)$,

So, $a^3+b^3=(a+b)(a^2-ab+b^2)$,

$=(a+b).0$

Q81.B
Q81 Solution:

We have,

$(a-2)(a-9)=a^2-11a+18$

$=[a^2-2\times(11/2)a+(11/2)2]-(11/2)^2+18$

$=(a-11/2)^2-49/4$

Clearly it will be minimum when $(a-11/2)^2$ is minimum that is 0.

So Minimum it's value is: -49/4

Q82.B
Q82 Solution:-

$(a^2+b^2+ab)/(a^3-b^3) = (a^2+b^2+ab)/[(a-b)(a^2+ab+b^2)]$ [As $a^3-b^3=(a-b)(a^2+ab+b^2)$]

$=1/(a-b)=1/(11-9) = 1/2$

Q83.A

Q84.A
Q84 Solution:-
$a=b^2/(b-a)$,
Or, $ab-a^2=b^2$,
Or, $a^2-ab+b^2=0$.
As,
$a^3+b^3=(a+b)(a^2-ab+b^2)$,
$=(a+b).0$
$=0$

Q85.D
Q85 Solution:-
$x+y=1/xy$
Or, $(x+y)^3=1/x^3y^3$
Or, $x^3+y^3+3xy(x+y)=1/x^3y^3$
Or, $1/x^3y^3-x^3-y^3=3xy(x+y)=3$

Q86.C

Q87.A
Q87 Solution:-
Given:
$1/x^2+1/y^2+1/z^2=1/xy + 1/yz + 1/zx$
Let $1/x =a$, $1/y =b$ and $1/z = c$.
So we get
$a^2+b^2+c^2=ab+bc+ca$
Or, $2(a^2+b^2+c^2)=2(ab+bc+ca)$
Or, $a^2 - 2ab+b^2+b^2-2bc+c^2+c^2-2ca+a^2$
Or, $(a-b)^2+(b-c)^2+(c-a)^2=0$
Or, $a=b=c$
Or, $x=y=z$
$=0$

Q88.B
Q88 Solution:-
$a:b=3:2$
Or, $2a=3b$,
Or, 4a2=9b2
2a2+3b2=12(4a2+6b2)
=12(9b2+6b2)
=12×15b2.
$3a^2-2b^2=1/4(12a^2-8b^2)$
$=14(27b^2-8b2)$
=14×19b2.
Taking the ratio of the two,
$2a2+3b2:3a2-2b2=30:19$
Q89.D
Q89 Solution:-

x+y=1/xy
Or, $(x+y)^3=1/x^3y^3$
Or, $x^3+y^3+3xy(x+y)=1/x^3y^3$
Or, $1/x^3y^3-x^3-y^3=3xy(x+y)=3$

Q90.B
Q90 Solution:-
$a^2-331a=a(a-331)$.
Let's now find the value of a.
$a^{1/3}=11$
Or, $a=11^3=1331$
$a(a-331)=1331(1331-331)=1331x1000$

Q91.C
Q91Solution:-
$a=xy/(x+y)$,
Or, $1/a=(x+y)/xy=1/x+1/y$. ----------(i)
Similarly,
$1/b=(x+z)/xz=1/x+1/z$ ----------(ii)and
$1/c=(y+z)/yz=1/y+1/z$. ----------(iii)
Adding all the equations we get,
$1/a+1/b+1/c=2/x+2/y+2/z$ ----------(iv)
(iv) – 2x(iii) gives
$2/x=1/a+1/b+1/c-2/c$
$2/x=(bc+ac+ab-2ab)/abc$
$X=2abc/(ac+bc-ab)$

Q92.B
Q92 Solution:-
Given:
$a^2-4a-1=0$
Or, $a-4-1/a=0$
Or, $a-1/a=4$
Or, $a^2-2+1/a^2=16$ [squaring]
Or, $a^2+1/a^2=18$
Now.
$a^2+1/a^2+3a-3/a$
$= a^2+1/a^2+3(a-1/a)$
$=18+3\times4=18+12$
$=30$

Q93.C
Q93 Solution:-
Given:
$x(3-2/x)=3/x$,
Or, $3-2/x=3/x^2$
Or, $3-2/x-3/x^2=0$
Or, $3x-3/x-2=0$
Or, $x-1/x=2/3$
$x^2+1/x^2-2=4/9$ [Squaring the equation]
$x^2+1/x^2 = 22/9$

Q94.C
Q94.Solution:-
We are given:
$a+1/(a-2)=4$
Or, $(a-2)+1/(a-2)=2$
And we are to find the value of
$(a-2)^2+1/(a-2)^2$
Let a-2 = p
So Now we are to find the value of
p^2+1/p^2 with condition that $p+1/p=2$
We are given:
$p+1/p=2$
Or, $(p+1/p)^2=4$,
Or, $p^2+2+1/p^2=4$,
Or, $p^2+1/p^2=2$.

Q95.A
Q95 Solution:-
We analyze the given expression and gather friendly terms on the LHS,
$a^2+b^2+c^2=2(a-b-c)-3$,
Or, $(a-1)2+(b+1)2+(c+1)2=0$
As the sum of squares is 0, each of the squares must be 0.
So, $a=1$, $b=-1$ and $c=-1$.
Thus the target expression is,
$4a-3b+5c=4+3-5=2$.

Q96.B
Q96 Solution:-
Given:
$x^2+y^2+z^2=xy+yz+zx$
Or, $2x^2+2y^2+2z^2-2xy-2yz-2zx=0$
Or, $(x-y)^2+(y-z)^2+(z-x)^2=0$

Q97.D
Q97 Solution:-
Raising the given equation to the power of 2,
$[\sqrt{(4x-9)}+\sqrt{(4x+9)}]^2=(5+\sqrt{7})^2$,
Or, $8x+2\sqrt{(16x^2-81)}=32+10\sqrt{7}$.
Equating the non-square-root terms of LHS and RHS,
$8x=32$,
Or, $x=4$.

Q98.A
Q98.Solution:-
Let $(x-1/x)=p$.
Squaring both sides,
$(x^2+1/x^2-2)=p^2$,
Or, $(x^2+1/x^2)=p^2+2$.
$2(x^2+1/x^2)-(x-1/x)-7=0$,
Or, $2(p^2+2)-p-7=0$,

Or, $2p^2-p-3=0$, a very simple quadratic equation.
Or, $(2p-3)(p+1)=0$.
So we get
$p=3/2$,
Or, $p=3/2$. By reverse substitution of the original expression value of pp,
$x-1/x=3/2$,
Or, $2x^2-3x-2=0$,
Or, $(2x+1)(x-2)=0$,
So values of x, as, 2 and $-1/2$.

Q99.C
Q99 Solution:-

Q100.C
Q100 Solution:-
Given:$x^{x\sqrt{x}} = (x\sqrt{x})^x=(x^{3/2})^x=x^{3x/2}$.
Now equating powers on both sides, we get,
$x\sqrt{x} = 3x/2$
$\sqrt{x} = 3/2$
or $x=9/4$.

Q101.A
Q101 Solution:-
Finding b in terms of a from the first equation,
$a+1/b=1$
Or, $1/b=1-a$,
Or, $b=1/1-a$.
Substituting this value in the second equation,
$b+1/c=1$,
Or, $1/(1-a)+1/c=1$,
Or, $1/c=1-1/(1-a)=-a/(1-a)$,
Or, $c=-1-a/a$,
Or, $c+1/a=1$
Or, Value of a+b=7

Q102.A
Q102 Solution:-
Finding b in terms of a from the first equation,
$a+1/b=1$
Or, $1/b=1-a$,
Or, $b=1/1-a$.
Substituting this value in the second equation,
$b+1/c=1$,
Or, $1/(1-a)+1/c=1$,
Or, $1/c=1-1/(1-a)=-a/(1-a)$,
Or, $c=-1-a/a$,
Or, $c+1/a=1$
Or, Value of a+b=7