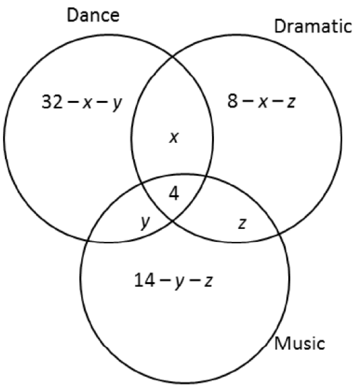
61. **c)** $\{0\} \subset A^c$ w.r.t. x
{0} is a set
So it is subset-only

62. **a)** 3



Total = 45
$32 + 8 + 14 + 4 - x - y - z = 45$
$x + y + z = 13$

63. **b)** $[2, \infty)$
$\frac{a^x + a^{-x}}{2} \geq \sqrt{a^x . a^{-x}}$
$a^x + a^{-x} \geq 2.$

64. **a)** $x \in \phi$
$1 - x \geq 0$ and $x - 5 \geq 0$
$x \leq 1$ and $x \geq 5$
$x \in \phi$

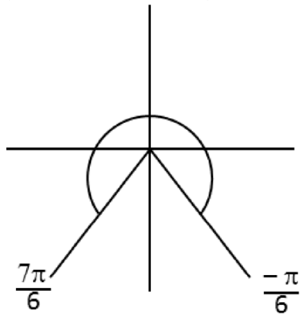
65. **d)** **R – {2}**
$y = \frac{2x+1}{x-5}$
$xy - 5y = 2x + 1$
$x = \frac{1+5y}{y-2}$
$x \in R$ so $y \neq 2$
$y \in R - \{2\}$

66. **b)** $\left[\frac{1}{3}, 3\right]$
$(1 - y)\, x^2 - (1 + y)x + (1 - y) = 0, x \in R$
$D \geq 0.$

67. **a)** $(1, \infty)$
$x^2 - x = y(1 - ax)$
$x^2 + (ay - 1)\, x - y = 0$
$x \in R, D \geq 0$
$(ay - 1)^2 + 4y \geq 0$
$a^2y^2 + (4 - 2a)\, y + 1 \geq 0$
$(4 - 2a)^2 - 4a^2 \leq 0$
$a \geq 1$
if $a = 1$; $y = \frac{x^2 - x}{1 - x} = x$ but $x \neq 1$
so range is $R - \{1\}$
so $a \in (1, \infty)$

68. **c)** $[-4, 4]$
$D \geq 0$
$\Rightarrow a^2 - 4 . 4 \geq 0 \Rightarrow a^2 \geq 16$
$a \in [-4, 4]$

69. a) $\left(2n\pi - \frac{\pi}{6}, 2n\pi + \frac{7\pi}{6}\right), n \in z$



$1 + 2 \sin x > 0$
$\sin x < -\frac{1}{2}$
so $x \in \left(\frac{-\pi}{6}, \frac{7\pi}{6}\right)$
$x \in \left(2n\pi - \frac{\pi}{6}, 2n\pi + \frac{7\pi}{6}\right), n \in z$

70. **a)** The smallest set of Y is {3, 5, 9}
Clearly option a is correct

71. **b)** B = C

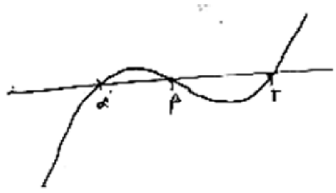
72. **d)** None of these
x = min ; when $A \subseteq B \Rightarrow x = 6$
y = min ; when $A \cap B = \phi \Rightarrow y = 0$
$\therefore x + y = 6$

73. **c)** 512
No. of subsets is A × B
i.e. $2^{n(A \times B)} = 2^{n(A).n(B)} = 2^{3\times3} = 2^9 . = 512$

74. **a)** A relation but not a function
Clearly it is a relation but not a function
$\therefore a_3$ has two different images

75. **b)** 300
A = {5, 10, 15, 20 …. 100}
B = {20, 40, 60, 80, 100}
$B \subseteq A$
so $A \cap B = B$
so Ans is B

76. **b)** Onto but not one-one
Let $\alpha < \beta < \gamma$



Clearly the graph cuts x-axis at more than one points it is not one-one

But onto since it takes all values in $(-\infty, \infty)$.

77. **a)** $P(A \times B) = S_R$

By definition

78. **d)** R

as$(\sin x) \geq 0$

$\sin x \in [-1, 1] \subset \left[\frac{-\pi}{2}, \frac{\pi}{2}\right] \quad \forall x \in R$

so $\forall$ x, $\cos(\sin x) \geq 0$

so, Domain is R

79. **c)** f is one-one and onto on R

$f'(x) = 3x^2 + 5 \geq 0 \quad \forall x \in R$

so $f(x)$ in one-one

and $f(x)$ is odd degree polynomial so it is onto on R.

80. **c)** $f(x)$ is one-one and onto for odd values of n

Same explanation like as in 79

81. **b)** One-one and onto both

$\frac{n-3}{2}$ covers all positive integers including '0'

$-\frac{n}{2}$ covers all negative integers

So it is one – one and onto

82. **d)** All the above represent symmetric difference

By def all satisfies

83. **a)** $\left(2n\pi + \frac{\pi}{6}\right), n \in z$

$x \in 1^{st}$ quadrant

$x = \frac{\pi}{6}$

General solution $x = 2n\pi + \frac{\pi}{6}, n \in I$

84. **a)** [1, 3]

$f(x) = |\sin x - 2|$

$-1 \leq \sin x \leq 1$

$-3 \leq \sin x - 2 \leq -1$

$|\sin x - 2| \in [1, 3]$

85. **c)** 74

$92 = 50 + 60 - x$

$x = 18$

$\therefore (50 - 18) + 60 - 18$

$= 32 + 42 = 74$

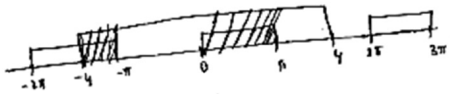
86. **a)** $[4, \infty)$

$f(x) = \left|\sqrt{x-4} - 1\right| - \left|\sqrt{x-4} + 1\right|$

domain is : $x \geq 4$. $[4, \infty)$

87. **c)** $[-4, -\pi] \cup [0, \pi]$

$\sin x \geq 0$ and $16 - x^2 \geq 0$ as $x \in [-4, 4]$



88. **b)** $\left[\frac{7}{3}, \frac{10}{3}\right]$

$f(x) = 2 + \frac{1}{\left(\sin x + \frac{1}{2}\right)^2 + \frac{3}{4}}$

Maximum : when $\sin x + \frac{1}{2} = 0 \Rightarrow 2 + \frac{4}{3}$

Minimum : when $\sin x = 1 \Rightarrow 2 + \frac{1}{3}$

89. **d)** None of these

$\frac{\sin x + \cos x + \tan x + \cot x + \sec x + \text{cosec} x}{6} \geq \sqrt[6]{1}$

(when all supposed to be considered as +ve)

So,

$\sin x + \cos x + \tan x + \cot x + \sec x + \text{cosec}\, x \geq 6$

But equality holds when all are equal, which is impossible.

In case of – ve no chance to satisfy

$\therefore$ so, no solution.

90. **a)** 52

$f(n+1) - f(n) = \frac{n}{2}$

$n = 1, 2, 3 \ldots. 101$, on adding we get

$f(101) - f(1) = \frac{100}{2}$

$f(101) = f(1) + 50$

$f(101) = 52$