SSC Quantitative Aptitude Solutions

101. $\frac{1}{3}\left[\left(1-\frac{1}{4}\right)+\left(\frac{1}{4}-\frac{1}{7}\right)+\left(\frac{1}{7}-\frac{1}{10}\right)+\left(\frac{1}{10}-\frac{1}{13}\right)+\left(\frac{1}{13}-\frac{1}{16}\right)\right]$

$=\frac{1}{3}\left[1-\frac{1}{16}\right] \quad =\frac{1}{3}\left[\frac{15}{16}\right] \quad =\frac{5}{16}$

102. $=\dfrac{\frac{1}{5}+999\times 99+\frac{494}{495}\times 99}{4}$

$=\dfrac{\frac{1}{5}+(1000-1)\times 99+\frac{494}{5}}{4} \quad =\dfrac{\frac{494}{5}+(99000-99)}{4}$

$=\frac{99000}{4}\Rightarrow 24750$

103. $=\left(2-\frac{1}{3}\right)\left(2-\frac{3}{5}\right)\left(2-\frac{5}{7}\right)....\left(2-\frac{997}{999}\right)$

$=\frac{5}{3}\times\frac{7}{5}\times\frac{9}{7}\times....\times\frac{1001}{999} \quad =\frac{1001}{3}$

104. $=\frac{m+n}{m-n}=\dfrac{\frac{m}{n}+1}{\frac{m}{n}-1}\Rightarrow\frac{14+1}{14-1}\Rightarrow\frac{15}{13}\Rightarrow 1\frac{2}{13}$

105. n = 12 + 1 = 13

Initial average, a = 17kg

Last average, b =17 – 2 = 15 kg

Weight of class teacher = 13 (17–15) + 15

= 13 × 2 + 15

= 14 Kg

106. P = a km/h; Q = 25 km; R = 30 km

x = 3 km/h; Y = 5km/hr; Z = 10km/h

∴ Required average speed

$$= \frac{P+Q+R}{\frac{P}{x}+\frac{Q}{y}+\frac{R}{x}} \Rightarrow \frac{9+25+30}{\frac{9}{3}+\frac{25}{5}+\frac{30}{10}}$$

$$= \frac{64}{11} \Rightarrow 5\frac{9}{11}\,\text{km/h}$$

107. Sum of 4 integers = 73.5 × 4

= 294

Sum of remaining two integers = 294 – (108 + 29) = 157

it remaining two integers be x and y, then x + y = 157

and, x – y = 15

Solving these equations, x = 86; y = 71

Small integer = 71.

108. $$\frac{a}{3}=\frac{b}{5}=\frac{c}{7}=k$$

$$\frac{a+b+c}{b}=\frac{(3+5+7)k}{5k}=\frac{15}{5}=3$$

109. 1st number = x

2nd number = y

70% of x = $y \times \frac{3}{5}$

$\Rightarrow \frac{x \times 70}{100} = y \times \frac{3}{5}$

$\Rightarrow \frac{x}{y} = \frac{3}{5} \times \frac{10}{7} \Rightarrow \frac{6}{7}$

x:y = 6:7

110. Fixed amount be Rs. x

Cost of each unit be Rs. y

540 y + x = 1800 – (i)

620 + x = 2040 – (ii)

on solving (i) and (ii) we get, x = 180, y = 3 now, for 500 units ⇒ (180 + 500* 3) = Rs. 1680.

111. Net effect = $\left[-12 - 4 + \frac{(-12)(-4)}{100}\right]\%$

= – 15.52%

112 - 116. Let the number of magajine – readers in city P be x Then,

(100 –75)% of x = 6000

$\Rightarrow \frac{25}{100}$ x = 6000 ⇒ x = 24000

No. of readers in P, reading only one magazine a week = (24000 – 6000)

⇒ 18000

similary find all the values, thus we have the table.

City	No.of Magazine Readers	No. of Readers Reading only one Magazine a week
P	24000	18000
Q	17500	14000
R	7500	4500
S	6000	3300
T	5600	1400

112. The lowest number of magazine - readers is 5600, i.e; City T.

113. The heighest number of Magazine - readers who read only one Magazine a week is 18000, i.e; City P.

114. Highest number of Magazine readers is 24000.

115. Readers in City Q is 14000 (only 1 in week)

116. Totla no. of readers reading only 1 in a week.= ⇒ 41200

117. Original Price be. Rs.x

$\therefore$ (100 – r) % of (100 + r) % of x = 1

$$\Rightarrow \frac{(100-r)}{100}\times\frac{(100+r)}{100}\times x = 1 \Rightarrow x = \frac{10000}{(10000-r^2)}$$

118. $$\Rightarrow P = \frac{140}{100}\times A = \frac{140}{100}\left(\frac{180}{100}M\right) = \left(\frac{140}{100}\times\frac{80}{100}\times 100\right)\%\text{ of } M \Rightarrow 112\%\text{ of } M$$

119. $(x^m + a^m)$ is divisible by (x + a) when M is odd

$\therefore$ Common factor = (41 + 43)

120. Original number be 10x + y

given, (10y + x) – (10x + y) = 27

and x + y = 3 – (1)

Now, 9y – 9x = 27 – (2)

Solving (1)..(2) we get, x = 5, y = 8

∴ Required number = 58.

121. The number 6 x 2 must be divisible by 8.

∴ x = 3, as 632 is divisible by 8.

122. Required numbers are 102, 108, 114,... 996

They are in A.P. a = 102, d = 6, l = 996

let number of teams be n, then,

A + (n –1) d = 996

∴n = 150

123. By hit and trail, we put x = 5 and y = 1 so that (3x + 7y) is divisible by 11.

by substituting values of x and y in options we get only

(4x – 9y) divisible by 11.

124. Largest size of the tail is HCF of 378 and 525 Cm = 21Cm

125. Required number= HCF of (1356–12), (1868–12) and (2764–12)

126. LCM of 252, 308, and 198 = 2772.

They will meet at starting point in 2772 sec, i.e. 46 min 12 sec.

127. $a^4 - b^4 = (a + b)(a - b)(a^2 + b^2)$, a and b are odd +ve integers. if two +ve integers are odd, then their sum, difference and sum of their squares is even.

∴ $(a - b)(a + b)(a^2 + b^2)$ is always divisible by $(2)^3 = 8$

128. $(6x^2 + 6x) = 6x(x + 1)$ which is clearly divisible by 6 and 12 as x (x + 1) is even

129. Required number = HCF of 400 and 360 = 40

130. $\left(\sqrt{x}+\frac{1}{\sqrt{x}}\right)^2 = x = \frac{1}{x}+2 = 2+2 = 4$

$\therefore \left(\sqrt{x}+\frac{1}{\sqrt{x}}\right) = 2$

131. Distance between Raipur and somgarh = Average Speed $\times$ time

$\frac{69\times 35}{60}\text{km} \Rightarrow \frac{161}{4}\text{km}$

New Speed = (69 + 36) km/h = 105 km/h

$\text{Time} = \frac{\text{distance}}{\text{speed}} = \frac{161}{4\times 105}\text{km/h} \Rightarrow 23\text{min}$

132. Let average after 11^{th} innings = x.

Then, 11x + 90 = 12 (x – 5) x = 150

$\therefore$ Average after 12th innings

$\Rightarrow$ (x – 5) = 145

133. When n is even, $(x^n - a^n)$ is completely divisible by (x + a).

$\therefore (17^{200} - 1^{200})$ is divisible by 18.

$\therefore 17^{200}$ is divided by 18, we get remainder as 1

134. Sum of temperatures on 1st, 2nd, 3rd, 4th days = (58 × 4) = 232 degress – (i)

Sum of temperatures in 2nd, 3rd, 4th, 5th days = (60 × 4) = 240 degress – (ii)

(ii)–(i) we get,

Temp. On 5^{th} day – Temp. on 1^{st} day = 8 degress

let the temperature on 1st and 5th days be 7x and 8x degress

8x – 7x = 8 $\Rightarrow$ x = 8

$\therefore$ Temp on 5th day = 64 degress

135. $\log_{10} 80 = \log_{10}(8\times10) = \log_{10} 8 + \log_{10}{}^{10} \Rightarrow 310g\ {}_{10}{}^{2+1} = 3(0.3010) + 1$

$= 1.9030$

136. $\log\frac{a}{b} + \log\frac{b}{a} = 10g(a+b)$

$\Rightarrow \log(a+b) = \log\left(\frac{a}{b}\times\frac{b}{a}\right) = \log 1$

$\Rightarrow a + b = 1$

137. Series pattern

+13, +26, + 39, +52, +65

$\therefore$ Missing term = 132 + 65 = 197

138. Series Pattern,

$22 + 1^2 = 22 + 1 = 23$

$23 + 2^2 = 23 + 4 = 27$

$27 + 3^2 = 27 + 9 = 36$

$36 + 4^2 = 36 + 19 = 52$

Should come in place of 58

$52 + 5^2 = 52 + 25 = 77$

139. Let no. of correct answers is x

no. of worng answers is y then,

$4x – y = 200 – (1)$

$x + y = 200 – (2)$

Solving (1) and (2), x = 80

140. Given equations are,

$6x + 3y = 7xy$

and, 3x + 9y = 11xy

Solving (1) and 92), x = 1 and y = 3/2

141. Here, — —

to have infinitely many solutions,

$$\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{C_1}{C_2}$$

$$\text{so,} \frac{k}{12} = \frac{3}{k} = \frac{k-3}{k}$$

$$\frac{k}{12} = \frac{3}{k} \Rightarrow k = \pm 6$$

$$\frac{3}{k} = \frac{k-3}{k} \Rightarrow k = 6$$

$\therefore$ K = 6

142. $x^2 - 3x + 1 = 0$

$x^2 + 1 = 3x$

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

$$\frac{x^2}{x} + \frac{1}{x} = 3 \Rightarrow x + \frac{1}{x} = 3$$