



## Algebra Practice Questions For SSC CHSL PDF

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## Instructions

For the following questions answer them individually

### Question 1

Find the value of  $1 + \frac{1\frac{1}{2}}{1+1+2}$

- A  $\frac{6}{5}$
- B  $\frac{8}{5}$
- C  $\frac{8}{7}$
- D  $\frac{7}{6}$

**Answer:** B

**Explanation:**

$$\begin{aligned} 1 + \frac{1\frac{1}{2}}{1+1+2} &= 1 + \frac{1\frac{1}{2}}{1+2} \\ &= 1 + \frac{1\frac{2}{2}}{1+3} \\ &= 1 + \frac{\frac{1}{2}}{3} \\ &= 1 + \frac{3}{5} \\ &= \frac{8}{5} \end{aligned}$$

### Question 2

Find the value of  $1 + \frac{1\frac{1}{2}}{1+1+6}$

- A  $\frac{17}{5}$
- B  $\frac{19}{6}$
- C  $\frac{20}{13}$
- D  $\frac{17}{13}$

**Answer:** C

**Explanation:**

$$\begin{aligned} 1 + \frac{1\frac{1}{2}}{1+1+6} &= 1 + \frac{1\frac{1}{2}}{1+7} \\ &= 1 + \frac{1\frac{6}{6}}{1+7} \end{aligned}$$

$$= 1 + \frac{1}{7}$$

$$= 1 + \frac{7}{13}$$

$$= \frac{20}{13}$$

**Question 3**

Find the value of  $1 + \frac{1\frac{1}{3}}{1+1+2}$

**A**  $\frac{13}{5}$

**B**  $\frac{17}{6}$

**C**  $\frac{17}{5}$

**D**  $\frac{12}{7}$

**Answer:** D

**Explanation:**

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

$$= 1 + \frac{1\frac{2}{3}}{1+5}$$

$$= 1 + \frac{1}{5}$$

$$= 1 + \frac{5}{7}$$

$$= \frac{12}{7}$$

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**Question 4**

Find the value of  $\sqrt{3\sqrt{3\sqrt{3}\dots}}$

**A** 9

**B** 3

**C** 27

**D** 1.2

**Answer:** B

**Explanation:**

Let  $\sqrt{3\sqrt{3\sqrt{3}\dots}} = x$



- B 3
- C 27
- D 16

**Answer: B**

**Explanation:**

Let  $\sqrt{6 + \sqrt{6 + \sqrt{6 + \dots}}} = X$

Then,  $\sqrt{6 + X} = X$

Squaring on both sides,

$$6 + X = X^2$$

$$\Rightarrow X^2 - X - 6 = 0$$

$$\Rightarrow X^2 - 3X + 2X - 6 = 0$$

$$\Rightarrow X(X - 3) + 2(X - 3) = 0$$

$$\Rightarrow (X - 3)(X + 2) = 0$$

$$\Rightarrow X = 3 \text{ or } X = -2$$

X cannot be negative when all the terms are positive.

Hence,  $X = 3$

**Question 8**

**Find the value of**  $\sqrt{30 + \sqrt{30 + \sqrt{30 + \dots}}}$

- A 12
- B 15
- C 6
- D 18

**Answer: C**

**Explanation:**

Let  $\sqrt{30 + \sqrt{30 + \sqrt{30 + \dots}}} = X$

Then,  $\sqrt{30 + X} = X$

Squaring on both sides,

$$30 + X = X^2$$

$$\Rightarrow X^2 - X - 30 = 0$$

$$\Rightarrow X^2 - 6X + 5X - 30 = 0$$

$$\Rightarrow X(X - 6) + 5(X - 6) = 0$$

$$\Rightarrow (X - 6)(X + 5) = 0$$

$$\Rightarrow X = 6 \text{ or } X = -5$$

X cannot be negative when all the terms are positive.

Hence,  $X = 6$

**Question 9**

**Find the value of**  $\sqrt{42 + \sqrt{42 + \sqrt{42 + \dots}}}$

- A 11
- B 7

C 6

D 10

**Answer:** B

**Explanation:**

$$\text{Let } \sqrt{42 + \sqrt{42 + \sqrt{42 + \dots}}} = X$$

$$\text{Then, } \sqrt{42 + X} = X$$

Squaring on both sides,

$$42 + X = X^2$$

$$\Rightarrow X^2 - X - 42 = 0$$

$$\Rightarrow X^2 - 7X + 6X - 42 = 0$$

$$\Rightarrow X(X - 7) + 6(X - 7) = 0$$

$$\Rightarrow (X - 7)(X + 6) = 0$$

$$\Rightarrow X = 7 \text{ or } X = -6$$

X cannot be negative when all the terms are positive.

Hence,  $X = 7$

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**Question 10**

**Find the value of**  $\sqrt{20 - \sqrt{20 - \sqrt{20 - \dots}}}$

A 8

B 4

C 6

D 10

**Answer:** B

**Explanation:**

$$\text{Let } \sqrt{20 - \sqrt{20 - \sqrt{20 - \dots}}} = X$$

$$\text{Then, } \sqrt{20 - X} = X$$

Squaring on both sides,

$$20 - X = X^2$$

$$\Rightarrow X^2 + X - 20 = 0$$

$$\Rightarrow X^2 - 4X + 5X - 20 = 0$$

$$\Rightarrow X(X - 4) + 5(X - 4) = 0$$

$$\Rightarrow (X - 4)(X + 5) = 0$$

$$\Rightarrow X = 4 \text{ or } X = -5$$

Hence, Option B is correct answer.

**Question 11**

**Find the value of**  $\sqrt{56 - \sqrt{56 - \sqrt{56 - \dots}}}$

A 9

B 8

C 11

D 14

**Answer: B**

**Explanation:**

$$\text{Let } \sqrt{56 - \sqrt{56 - \sqrt{56 - \dots}}} = X$$

$$\text{Then, } \sqrt{56 - X} = X$$

Squaring on both sides,

$$56 - X = X^2$$

$$\Rightarrow X^2 + X - 56 = 0$$

$$\Rightarrow X^2 - 8X + 7X - 56 = 0$$

$$\Rightarrow X(X - 8) + 7(X - 8) = 0$$

$$\Rightarrow (X - 8)(X + 7) = 0$$

$$\Rightarrow X = 8 \text{ or } X = -7$$

Hence, Option B is correct answer.

**Question 12**

If  $2X + \frac{2}{X} = 6$ , then find the value of  $X^5 + \frac{1}{X^5}$

A 123

B 121

C 116

D 107

**Answer: A**

**Explanation:**

$$\text{Given } 2X + \frac{2}{X} = 6$$

$$\Rightarrow 2\left(X + \frac{1}{X}\right) = 6$$

$$\Rightarrow X + \frac{1}{X} = 3 \text{ --> (1)}$$

Squaring (1) on both sides

$$\left(x + \frac{1}{x}\right)^2 = 9$$

$$\Rightarrow x^2 + \frac{1}{x^2} + 2 \times x \times \frac{1}{x} = 9$$

$$\Rightarrow x^2 + \frac{1}{x^2} + 2 = 9$$

$$\Rightarrow x^2 + \frac{1}{x^2} = 7 \text{ --> (2)}$$

Cubing (1) on both sides

$$\left(x + \frac{1}{x}\right)^3 = 27$$

$$\Rightarrow x^3 + \frac{1}{x^3} + 3 \times x \times \frac{1}{x} \times \left(x + \frac{1}{x}\right) = 27$$

$$\Rightarrow x^3 + \frac{1}{x^3} + 3 \times 3 = 27$$

$$\Rightarrow x^3 + \frac{1}{x^3} = 27 - 9 = 18 \text{ --> (3)}$$

Multiplying (2) and (3)

$$x^2 + \frac{1}{x^2} \times x^3 + \frac{1}{x^3} = 18 \times 7$$

$$\Rightarrow x^5 + \frac{1}{x^5} + x^2 \times \frac{1}{x^3} + x^3 \times \frac{1}{x^2} = 126$$

$$\Rightarrow x^5 + \frac{1}{x^5} + x + \frac{1}{x} = 126$$

Substituting  $x + \frac{1}{x} = 3$  in above equation

$$\Rightarrow x^5 + \frac{1}{x^5} + 3 = 126$$

$$\Rightarrow x^5 + \frac{1}{x^5} = 123$$

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### Question 13

If  $3X + \frac{3}{X} = 6$ , then find the value of  $X^6 + \frac{1}{X^6}$

A 4

B 3

C 9

D 2

Answer: D

### Explanation:

Given  $3X + \frac{3}{X} = 6$

$$\Rightarrow 3\left(X + \frac{1}{X}\right) = 6$$

$$\Rightarrow X + \frac{1}{X} = 2$$

Squaring on both sides

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

$$\Rightarrow x^2 + \frac{1}{x^2} + 2 \times x \times \frac{1}{x} = 4$$

$$\Rightarrow x^2 + \frac{1}{x^2} + 2 = 4$$

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

Cubing on both sides

$$\left(x^2 + \frac{1}{x^2}\right)^3 = 8$$

$$x^6 + \frac{1}{x^6} + 3 \times x^2 \times \frac{1}{x^2} \times \left(x^2 + \frac{1}{x^2}\right) = 8$$

$$\Rightarrow x^6 + \frac{1}{x^6} + 3 \times 2 = 8$$

$$\therefore x^6 + \frac{1}{x^6} = 8 - 6 = 2$$

### Question 14

If  $a+b = 5$  and  $a-b = 1$ , Then find the value of  $ab$

A 4

B 6



C 8

D 12

**Answer:** B

**Explanation:**

Given,  $a+b = 5$

$a-b = 1$

Then,  $2a = 6 \implies a = 3$

Substituting  $a = 3$  in above equation

$\implies b = 2$

Hence,  $ab = 3 \times 2 = 6$

**Question 15**

If  $(a - b)^2 = 16$  and  $(a + b)^2 = 36$ , then find the value of  $\frac{ab}{a+b}$

A  $\frac{5}{6}$

B  $\frac{8}{11}$

C  $\frac{6}{7}$

D  $\frac{7}{6}$

**Answer:** A

**Explanation:**

Given  $(a - b)^2 = 16$  and  $(a + b)^2 = 36$

$(a + b)^2 = (a - b)^2 + 4ab$

$36 = 16 + 4ab$

$\implies 4ab = 20$

$ab = 5$

$(a + b)^2 = 36$

$\implies a + b = 6$

Hence,  $\frac{ab}{a+b} = \frac{5}{6}$

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**Question 16**

If  $x - \frac{1}{x} = 3$ , then  $x^3 - \frac{1}{x^3} = ?$

A 24

B 28

C 36

D 42

**Answer:** C

**Explanation:**

Given  $x - \frac{1}{x} = 3$

Cubing on both sides

$$\left(x - \frac{1}{x}\right)^3 - 3 \times \left(x - \frac{1}{x}\right) = 27$$

$$\Rightarrow \left(x - \frac{1}{x}\right)^3 - 3 \times \left(x - \frac{1}{x}\right) = 27$$

$$\Rightarrow \left(x - \frac{1}{x}\right)^3 - 9 = 27$$

$$\Rightarrow \left(x - \frac{1}{x}\right)^3 = 36$$

### Question 17

Find the value of  $1 + \frac{1}{1 - \frac{1}{1 + \frac{1}{1 - \frac{1}{7}}}}$

A  $\frac{15}{7}$

B  $\frac{19}{8}$

C  $\frac{20}{7}$

D  $\frac{17}{8}$

Answer: C

### Explanation:

$$1 + \frac{1}{1 - \frac{1}{1 + \frac{1}{1 - \frac{1}{7}}}} = 1 + \frac{1}{1 - \frac{1}{1 + \frac{1}{\frac{6}{7}}}}$$

$$= 1 + \frac{1}{1 - \frac{1}{1 + \frac{7}{6}}}$$

$$= 1 + \frac{1}{1 - \frac{1}{\frac{13}{6}}}$$

$$= 1 + \frac{1}{1 - \frac{6}{13}}$$

$$= 1 + \frac{1}{\frac{7}{13}}$$

$$= 1 + \frac{13}{7}$$

$$= \frac{20}{7}$$

### Question 18

If  $a = 48$ ,  $b = 16$ ,  $c = -64$ , then find the value of  $\frac{a^3 + b^3 + c^3}{abc}$

A 176

B 64

C 3

D 12

Answer: C

### Explanation:

Given  $a = 48$ ,  $b = 16$ ,  $c = -64$

Then,  $a + b + c = 48 + 16 - 64 = 0$

We know that if  $a + b + c = 0$ , then  $a^3 + b^3 + c^3 = 3abc$

Hence,  $\frac{a^3 + b^3 + c^3}{abc} = \frac{3abc}{abc} = 3$

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### Question 19

If  $a = 17$ ,  $b = -4$ ,  $c = -13$ , then find the value of  $\frac{3a^3 + 3b^3 + 3c^3}{4abc}$

A 3

B  $\frac{3}{4}$

C 1

D  $\frac{9}{4}$

**Answer: D**

**Explanation:**

Given  $a = 17, b = -4, c = -13$

Then  $a+b+c = 0$ .

We know that if  $a+b+c = 0$ , then  $a^3+b^3+c^3 = 3abc$

Then,  $\frac{3a^3+3b^3+3c^3}{4abc} = \frac{3(a^3+b^3+c^3)}{4abc} = \frac{3(3abc)}{4abc} = \frac{9}{4}$

**Question 20**

If  $(2^x)(2^y) = 16$  and  $(3^x)(9^y) = 27$ , then find  $(x,y)$

A (4,0)

B (3,2)

C (5,-1)

D (6,-2)

**Answer: C**

**Explanation:**

Given  $(2^x)(2^y) = 16$

$\Rightarrow 2^{x+y} = 2^4$

$\Rightarrow x+y = 4$  -- (1)

$(3^x)(9^y) = 27$

$\Rightarrow (3^x)((3^2)^y) = 3^3$

$\Rightarrow (3^x)(3^{2y}) = 3^3$

$\Rightarrow 3^{x+2y} = 3^3$

$\Rightarrow x+2y = 3$  -- (2)

Solving (1) and (2)

$\Rightarrow y = -1$

Substituting  $y = -1$  in (1)  $\rightarrow x = 5$

Therefore,  $(x,y) = (5,-1)$

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