Geometric Progression MCQs - Exercises 6.6 and 6.7 (Class 11 Mathematics)

Prepared for Entry Test Preparation

Multiple Choice Questions

1. The 6th term of the G.P. $2, 4, 8, \ldots$ is:

(a) 32

(b) 64

(c) 128

(d) 256

2. The 10th term of the G.P. $1 + i, 2i, -2 + 2i, \ldots$ is:

(a) -16

(b) -32

(c) -64

(d) -128

3. The 8th term of the G.P. $1 + i, 2, 2(1 - i), \ldots$ is:

(a) $8(1 - i)$

(b) $16(1 - i)$

(c) $8(1 + i)$

(d) $16(1 + i)$

4. A machine depreciates 10% annually. If its initial value is Rs. 20,000, its value after 3 years is:

(a) Rs. 14580

(b) Rs. 15390

(c) Rs. 16200

(d) Rs. 17010

5. Which term of the G.P. $x^2 - y^2, x + y, \frac{x+y}{x-y}, \ldots$ is $\frac{x+y}{(x-y)^7}$?

(a) 8th

(b) 9th

(c) 10th

(d) 11th

6. If a, b, c, d are in G.P., the common ratio of $a - b, b - c, c - d$ is:

(a) r

(b) r^2

(c) $\frac{1}{r}$

(d) $\frac{1}{r^2}$

7. The reciprocals of the G.P. $a_1, a_1r^2, a_1r^4, \ldots$ form a G.P. with common ratio:

(a) r

(b) r^2

(c) $\frac{1}{r}$

(d) $\frac{1}{r^2}$

8. The n-th term of a G.P. with $\frac{a_5}{a_3} = \frac{9}{4}$, $a_2 = \frac{4}{3}$ is:

(a) $\left(\frac{3}{2}\right)^n$

(b) $\left(\frac{2}{3}\right)^n$

(c) $(-1)^n \left(\frac{2}{3}\right)^n$

(d) $(-1)^n \left(\frac{3}{2}\right)^n$

9. Three G.P. terms with sum 13 and product 27 are:

(a) $1, 3, 9$

(b) $9, 3, 1$

(c) $3, 6, 4$

(d) $1, 4, 8$

10. Four G.P. terms with sum 16 and A.M. of 2nd and 4th terms 6 are:

(a) $1, 2, 4, 8$

(b) $2, 4, 8, 16$

(c) $1, 3, 9, 27$

(d) $4, 8, 16, 32$

11. If $\frac{1}{a}, \frac{1}{b}, \frac{1}{c}$ are in G.P., the common ratio is:

(a) $\sqrt{\frac{a}{b}}$

(b) $\sqrt{\frac{b}{c}}$

(c) $\pm\sqrt{\frac{a}{c}}$

(d) $\pm\sqrt{\frac{c}{a}}$

12. Three A.P. terms sum to 15. Subtracting 1, 3, 2 from them forms a G.P. The numbers are:

(a) $2, 5, 8$

(b) $3, 5, 7$

(c) $4, 5, 6$

(d) $1, 5, 9$

13. The G.M. between -3 and 12 is:

(a) ± 6

(b) $\pm 6i$

(c) $\pm 3\sqrt{2}$

(d) $\pm 3\sqrt{2}i$

14. The G.M. between $-4i$ and $16i$ is:

(a) ± 8

(b) $\pm 8i$

(c) $\pm 4\sqrt{2}$

(d) $\pm 4\sqrt{2}i$

15. Two G.M.s between 2 and 54 are:

(a) $6, 18$

(b) $4, 16$

(c) $8, 24$

(d) $9, 27$

16. Three G.M.s between 1 and 81 are:

(a) $3, 9, 27$

(b) $2, 8, 32$

(c) $-3, 9, -27$

(d) $-2, 8, -32$

17. For what n is $\frac{a^n+b^n}{a^{n-1}+b^{n-1}}$ the positive G.M. between a and b?

(a) 0

(b) $\frac{1}{2}$

(c) 1

(d) $\frac{3}{2}$

18. The A.M. of two numbers exceeds their positive G.M. by 1, and their sum is 10. The numbers are:

(a) $2, 8$

(b) $3, 7$

(c) $4, 6$

(d) $5, 5$

19. The A.M. of two numbers is 4, and their positive G.M. is 3. The numbers are:

(a) $1, 7$

(b) $2, 6$

(c) $3, 5$

(d) $4, 4$

20. Four real G.M.s between 2 and 64 are:

(a) $4, 8, 16, 32$

(b) $6, 12, 24, 48$

(c) $8, 16, 32, 64$

(d) $2, 4, 8, 16$

Solutions and Explanations

1. Answer: b 64 *Explanation*: $a_1 = 2$, $r = 2$, $n = 6$. $a_6 = 2 \cdot 2^{6-1} = 64$. (Ex. 6.6, Q1).

2. Answer: c -64 *Explanation*: $a_1 = 1 + i$, $r = \frac{2i}{1+i}$, $n = 10$. $a_{10} = (1 + i)\left(\frac{2i}{1+i}\right)^9 = 2^9 \cdot \frac{i^9}{(1+i)^8} = -512$. (Ex. 6.6, Q3).

3. Answer: a $8(1-i)$ *Explanation*: $a_1 = 1+i$, $r = \frac{2}{1+i}$, $n = 8$. $a_8 = (1+i)\left(\frac{2}{1+i}\right)^7 = 2^7 \cdot \frac{1}{(1+i)^6} = 8(1-i)$. (Ex. 6.6, Q4).

4. Answer: b Rs. 15390 *Explanation*: $V_0 = 20000$, $p = 10\%$, $n = 3$. $V_3 = 20000 \cdot (0.9)^3 = 15390$. (Ex. 6.6, Q5).

5. Answer: b 9th *Explanation*: $a_1 = x^2 - y^2$, $r = \frac{1}{x-y}$, $a_n = \frac{x+y}{(x-y)^7}$. Solve: $\frac{x+y}{(x-y)^7} = (x^2 - y^2) \cdot \left(\frac{1}{x-y}\right)^{n-1} \implies n = 9$. (Ex. 6.6, Q6).

6. Answer: a r *Explanation*: $b = ar$, $c = ar^2$, $d = ar^3$. $\frac{b-c}{a-b} = \frac{c-d}{b-c} = r$. (Ex. 6.6, Q7(i)).

7. Answer: d $\frac{1}{r^2}$ *Explanation*: Terms: a_1, a_1r^2, a_1r^4. Reciprocals: $\frac{1}{a_1}, \frac{1}{a_1r^2}, \frac{1}{a_1r^4}$. Ratio: $\frac{1}{r^2}$. (Ex. 6.6, Q8).

8. Answer: b $\left(\frac{2}{3}\right)^n$ *Explanation*: $\frac{a_5}{a_3} = \frac{9}{4} \implies r^2 = \frac{9}{4} \implies r = \pm\frac{3}{2}$. $a_2 = \frac{4}{3} \implies a_1r = \frac{4}{3}$. For $r = \frac{3}{2}$, $a_1 = \frac{8}{9}$. $a_n = \frac{8}{9} \cdot \left(\frac{3}{2}\right)^{n-1} = \left(\frac{2}{3}\right)^n$. (Ex. 6.6, Q9).

9. Answer: a $1, 3, 9$ *Explanation*: Terms: $\frac{a}{r}, a, ar$. $a^3 = 27 \implies a = 3$. $\frac{3}{r} + 3 + 3r = 13 \implies r = 3, \frac{1}{3}$. Numbers: $1, 3, 9$. (Ex. 6.6, Q10).

10. Answer: a $1, 2, 4, 8$ *Explanation*: $a(1 + r + r^2 + r^3) = 16$, $\frac{ar+ar^3}{2} = 6 \implies ar(1 + r^2) = 12$. Solve: $r = 2$, $a = 1$. Terms: $1, 2, 4, 8$. (Ex. 6.6, Q11).

11. Answer: c $\pm\sqrt{\frac{a}{c}}$ *Explanation*: $\frac{1/b}{1/a} = \frac{1/c}{1/b} \implies r^2 = \frac{a}{c} \implies r = \pm\sqrt{\frac{a}{c}}$. (Ex. 6.6, Q12).

12. Answer: a $2, 5, 8$ *Explanation*: A.P.: $a-d, a, a+d$. $3a = 15 \implies a = 5$. G.P.: $a-d-1, a-3, a+d-2$. Solve: $d = 3$. Numbers: $2, 5, 8$. (Ex. 6.6, Q13).

13. Answer: b $\pm 6i$ *Explanation*: G.M. = $\pm\sqrt{(-3)\cdot 12} = \pm\sqrt{-36} = \pm 6i$. (Ex. 6.7, Q1(i)).

14. Answer: a ± 8 *Explanation*: G.M. = $\pm\sqrt{(-4i)\cdot 16i} = \pm\sqrt{-64} = \pm 8$. (Ex. 6.7, Q1(ii)).

15. Answer: a $6, 18$ *Explanation*: G.P.: $2, G_1, G_2, 54$. $2 \cdot r^3 = 54 \implies r = 3$. $G_1 = 2\cdot 3 = 6$, $G_2 = 2\cdot 3^2 = 18$. (Ex. 6.7, Q2).

16. Answer: a $3, 9, 27$ *Explanation*: G.P.: $1, G_1, G_2, G_3, 81$. $1 \cdot r^4 = 81 \implies r = 3$. $G_1 = 3$, $G_2 = 9$, $G_3 = 27$. (Ex. 6.7, Q3).

17. Answer: b $\frac{1}{2}$ *Explanation*: $\frac{a^n+b^n}{a^{n-1}+b^{n-1}} = \sqrt{ab} \implies a^{n-1/2} = b^{n-1/2} \implies n = \frac{1}{2}$. (Ex. 6.7, Q6).

18. Answer: b $3, 7$ *Explanation*: A.M. = $\frac{a+b}{2}$, G.M. = $\sqrt{ab}$. $\frac{a+b}{2} - 1 = \sqrt{ab}$, $a+b = 10$. Solve: $b^2 - 10b + 9 = 0 \implies b = 3, 7$. Numbers: $3, 7$. (Ex. 6.7, Q7).

19. Answer: b $2, 6$ *Explanation*: $a + b = 8$, $ab = 9$. Solve: $b^2 - 8b + 9 = 0 \implies b = 2, 6$. Numbers: $2, 6$. (Ex. 6.7, Q8).

20. Answer: a $4, 8, 16, 32$ *Explanation*: G.P.: $2, G_1, G_2, G_3, G_4, 64$. $2 \cdot r^5 = 64 \implies r = 2$. $G_1 = 4$, $G_2 = 8$, $G_3 = 16$, $G_4 = 32$. (Ex. 6.7, Q4).