1. If the roots of the quadratic equation $x^2-(a+1)x+a=0$ are α and β, then the value of $\alpha^2+\beta^2$ is:
   (a) a^2+2a+1
   (b) a^2-2a+1
   (c) a^2
   (d) a^2+1
2. For the quadratic equation $x^2+2bx+c=0$, if $1/\alpha+1/\beta=2/b$, then c is:
   (a) b^2
   (b) $2b$
   (c) b
   (d) $4b$
3. The equation whose roots are the squares of the roots of $x^2-6x+8=0$ is:
   (a) $x^2-14x+36=0$
   (b) $x^2-36x+64=0$
   (c) $x^2-8x+16=0$
   (d) $x^2-4x+16=0$
4. If α and β are the roots of $x^2-px+q=0$, then the equation with roots α^3,β^3 is:
   (a) $x^2-p^3x+3pqx-q^3=0$
   (b) $x^2-q^3x+p^3=0$
   (c) $x^2-3pqx+q^3=0$
   (d) $x^2-(p^3-3pq)x+q^3=0$
5. The sum of the cubes of the roots of the equation $x^2-3x+2=0$ is:
   (a) 9
   (b) 8
   (c) 10
   (d) 6
6. If α and β are the roots of $x^2+x+1=0$, then $\alpha^2+\beta^2$ equals:
   (a) 1
   (b) -1
   (c) 2
   (d) -2
7. The product of the roots of the equation $x^2-(k+1)x+k=0$ for which the sum of the squares of the roots is minimum is:
   (a) 1
   (b) k
   (c) $k+1$
   (d) $2k$
8. If $x^2-4x+m=0$ has roots α and β, then the value of $\alpha^3+\beta^3$ is:
   (a) $64-12m$
   (b) $64+12m$
   (c) $48+12m$
   (d) $48-12m$
9. For the quadratic equation $ax^2+bx+c=0$, if $\alpha-\beta=d$, then d^2 is:
   (a) b^2-4ac

(b) $4ac - b^2$

(c) $2ac - b^2$

(d) $b^2 + 4ac$

10. If the roots of the equation $x^2 - 10cx + 21c^2 = 0$ are in the form of α/c"'$latex and β/c, then the value of c is:

(a) 2

(b) 5

(c) 7

(d) 10

11. The equation with roots $2\alpha + 3$ and $2\beta + 3$, where α and β are the roots of $x^2 - 7x + 10 = 0$, is:

(a) $x^2 - 17x + 70 = 0$

(b) $x^2 - 14x + 49 = 0$

(c) $x^2 - 17x + 34 = 0$

(d) $x^2 - 14x + 24 = 0$

12. If $x^2 - (a+1)x + a = 0$ has roots of the form α and $1/\alpha$, then a is:

(a) 1

(b) 0

(c) -1

(d) 2

13. The roots of the equation $x^2 - 12x + 35 = 0$ are α and β. The value of $\frac{1}{\alpha} + \frac{1}{\beta}$ is:

(a) $\frac{12}{35}$

(b) $\frac{35}{12}$

(c) 12

(d) 35

14. If the roots of $x^2 - 9x + 20 = 0$ are α and β, then $\alpha/\beta + \beta/\alpha$ is:

(a) $\frac{81}{20}$

(b) $\frac{20}{9}$

(c) 9

(d) $\frac{9}{20}$

15. The quadratic equation whose roots are the reciprocals of the roots of $x^2 - 3x + 2 = 0$ is:

(a) $x^2 - 2x + 3 = 0$

(b) $2x^2 - 3x + 1 = 0$

(c) $3x^2 - 2x + 1 = 0$

(d) $x^2 - 3x + 1 = 0$

16. If the sum of the cubes of the roots of the equation $x^2 - ax + b = 0$ is equal to 9, then a and b must satisfy:

(a) $a^3 - 3ab = 9$

(b) $3a^3 - b^2 = 9$

(c) $a^3 - 3a^2b = 9$

(d) $3a^3 - 9b = 9$

17. Given the equation $x^2 - 8x + 15 = 0$, the equation whose roots are the squares of the original roots is:

(a) $x^2 - 15x + 64 = 0$
(b) $x^2 - 64x + 225 = 0$
(c) $x^2 - 225x + 64 = 0$
(d) $x^2 - 64x + 15 = 0$

18. If the quadratic equation $x^2 + px + q = 0$ has roots α and β such that $\alpha^2 + \beta^2 = 1$, then:

(a) $p^2 - 2q = 1$
(b) $p^2 + 2q = 1$
(c) $2p^2 - q = 1$
(d) $2p + q^2 = 1$

19. The roots of $x^2 - (k+3)x + k = 0$ are real and distinct if k satisfies:

(a) $k > 3/4$
(b) $k < 9/4$
(c) $k > 9/4$
(d) $k < 3/4$

20. If the roots of $x^2 - 4x + m = 0$ are α^2 and β^2, then the roots of $x^2 - 2mx + m^2 - 4 = 0$ are:

(a) α and β
(b) $-\alpha$ and $-\beta$
(c) 2α and 2β
(d) $-\alpha^2$ and $-\beta^2$

21. Given the roots of the quadratic equation $x^2 - (a+1)x + a = 0$ are equal, the value of a is:

(a) $\frac{1}{4}$
(b) $\frac{1}{2}$
(c) 1
(d) 2

22. If the quadratic equation $x^2 - (3+\sqrt{5})x + 3\sqrt{5} - 4 = 0$ has roots α and β, then $\alpha^3 + \beta^3$ equals:

(a) $27 + 9\sqrt{5}$
(b) $18 + 6\sqrt{5}$
(c) $27 - 9\sqrt{5}$
(d) $18 - 6\sqrt{5}$

23. The roots of the equation $x^2 - 6x + 8 = 0$ are α and β. Find the equation with roots $\alpha + 2$ and $\beta + 2$.

(a) $x^2 - 10x + 20 = 0$
(b) $x^2 - 10x + 16 = 0$
(c) $x^2 - 10x + 12 = 0$
(d) $x^2 - 6x + 12 = 0$

24. The equation $x^2 - 5x + 6 = 0$ has roots α and β. The equation whose roots are $\frac{1}{\alpha+2}$ and $\frac{1}{\beta+2}$ is:

(a) $x^2 - \frac{5}{6}x + \frac{1}{6} = 0$
(b) $x^2 - \frac{5}{6}x - \frac{1}{6} = 0$
(c) $x^2 + \frac{5}{6}x + \frac{1}{6} = 0$

(d) $x^2+\frac{5}{6}x-\frac{1}{6}=0$

25. If α and β are the roots of the equation $x^2-7x+10=0$, then the sum of the reciprocals of $\alpha^2+\alpha+1$ and $\beta^2+\beta+1$ is:

(a) $\frac{7}{10}$

(b) $\frac{10}{7}$

(c) $\frac{14}{10}$

(d) $\frac{10}{14}$

26. The roots of $x^2+x-1=0$ are α and β. The value of $\alpha^2/\beta+\beta^2/\alpha$ is:

(a) 1

(b) -1

(c) $\sqrt{5}$

(d) $-\sqrt{5}$

27. The quadratic equation whose roots are $\alpha+\beta$ and $\alpha\beta$, where α and β are the roots of $x^2-3x+1=0$, is:

(a) $x^2-4x+3=0$

(b) $x^2-x-3=0$

(c) $x^2-3x+2=0$

(d) $x^2+x-3=0$

Answers to Symmetric Functions in Quadratic Equations

1. Answer: (B) $a^2 - 2a + 1$
2. Answer: (A) b^2
3. Answer: (A) $x^2 - 14x + 36 = 0$
4. Answer: (C) $x^2 - (p^3 - 3pq)x + q^3 = 0$
5. Answer: (B) 8
6. Answer: (C) 2
7. Answer: (A) 1
8. Answer: (D) $48 - 12m$
9. Answer: (A) $b^2 - 4ac$
10. Answer: (C) 7
11. Answer: (C) $x^2 - 17x + 34 = 0$
12. Answer: (A) 1
13. Answer: (B) $\frac{35}{12}$
14. Answer: (A) $\frac{81}{20}$
15. Answer: (B) $2x^2 - 3x + 1 = 0$
16. Answer: (A) $a^3 - 3ab = 9$
17. Answer: (B) $x^2 - 64x + 225 = 0$
18. Answer: (A) $p^2 - 2q = 1$
19. Answer: (C) $k > 9/4$
20. Answer: (A) α and β
21. Answer: (B) $\frac{1}{2}$
22. Answer: (A) $27 + 9\sqrt{5}$
23. Answer: (C) $x^2 - 10x + 12 = 0$
24. Answer: (A) $x^2 - \frac{5}{6}x + \frac{1}{6} = 0$
25. Answer: (B) $\frac{10}{7}$
26. Answer: (C) $\sqrt{5}$
27. Answer: (C) $x^2 - 3x + 2 = 0$