

Gateway Questions

1. Evaluate the function $f(x) = 3x^2 - 3x + 1$ for $x = -1$.
2. Evaluate the function $f(x) = 3x^2 - 3$ for $x = -1$.
3. Evaluate the function $f(x) = 3x^2 - 6x$ for $x = b - 1$.
4. Evaluate the function $g(t) = 3t^2 - 3$ for $t = a + h$.
5. Evaluate the function $v(t) = 3t + 3$ for $t = a + h$.
6. Evaluate the function $g(t) = 6t - 3$ for $t = d - 2$.
7. Evaluate the function $f(x) = 6x + 3$ for $x = t + 2$.
8. Evaluate the function $f(y) = \frac{6y - 1}{y}$ for $y = c + 3$.
9. Evaluate the function $f(y) = \frac{3y + 3}{3y - 3}$ for $y = m + k$.
10. Evaluate the function $h(s) = 3 - s - \frac{1}{2}s^2$ for $s = j - 2$.
11. Solve $P = S - Srt$ for r .
12. Solve $2rx + 5 = 6(r - x)$ for x .
13. Solve $\frac{1}{f} = \frac{3}{d_0} + \frac{5}{d_1}$ for f .
14. Solve $3ax - 5d = b(x - a)$ for x .
15. Solve $v = \frac{v_1 + v_2}{1 + \frac{v_1 v_2}{c^2}}$ for v_1 .
16. Solve $v = \frac{d + e}{1 + \frac{de}{c^2}}$ for e .
17. Solve $x + y = \sqrt{x^2 + y^2 + 3}$ for y .
18. Solve $Q_\omega = m_\omega c_\omega (T_f - T_\omega)$ for T_ω .
19. Solve $y - y_1 = m(x - x_1)$ for x .
20. Solve $\frac{x}{a} + \frac{y}{b} = 1$ for x .
21. Solve $x^{\frac{1}{3}} + 2x^{\frac{1}{6}} - 15 = 0$ for x .
22. Solve $(h - 1)^{\frac{1}{3}} - 6(h - 1)^{\frac{1}{6}} + 5 = 0$ for h .
23. Solve $10x^{\frac{1}{2}} = x + 25$ for x .
24. Solve $14z^{\frac{3}{2}} + 29z^{\frac{5}{2}} - 15z^{\frac{7}{2}} = 0$ for z .
25. Solve $z^{\frac{7}{2}} - 8z^{\frac{5}{2}} = -16z^{\frac{3}{2}}$ for z .

26. Solve $-21z^{\frac{1}{2}} + 41z^{\frac{3}{2}} - 10z^{\frac{5}{2}} = 0$ for z .
27. Solve $(13x^2 - 11)^3 - (13x^2 - 11) = 0$ for x .
28. Solve $(x + 11)^3 = 125$ for x .
29. Solve $(x - 7)^3 + 27 = 0$ for x .
30. Solve $2x^{\frac{1}{2}} = 24$ for x .
31. Solve $\sqrt{x - 2} - 6 = 0$ for x .
32. Solve $\sqrt{x - 2} + 6 = 7$ for x .
33. Solve $\sqrt{2 - t} = 6$ for t .
34. Solve $c = 4 + \sqrt{4 - c}$ for c .
35. Solve $r = \sqrt{r - 3} + 3$ for r .
36. Solve $4x = \sqrt{56x + 312}$ for x .
37. Solve $b = \sqrt{12b - 35}$ for b .
38. Solve $\sqrt{6 - y} + \sqrt{5y + 6} = 6$ for y .
39. Solve $\sqrt{2x + 7} - \sqrt{2x - 9} = 2$ for x .
40. Solve $\sqrt{m + 7} + \sqrt{m - 5} = 6$ for m .
41. Solve $a^4 - 7a^2 = -10$ for a .
42. Solve $9x^4 = 30x^2 - 25$ for x .
43. Solve $3x^4 - 13x^2 - 10 = 0$ for x .
44. Solve $2x^4 - 13x^2 + 15 = 0$ for x .
45. Solve $x^4 - 8x^2 + 15 = 0$ for x .
46. Solve $(\frac{g - 2}{g})^2 - 7(\frac{g - 2}{g}) + 6 = 0$ for g .
47. Solve $(\frac{f + 3}{f})^2 - 10(\frac{f + 3}{f}) + 9 = 0$ for f .
48. Solve $10(\frac{x + 5}{x})^2 + 7(\frac{x + 5}{x}) + 1 = 0$ for x .
49. Solve $6(\frac{g}{g + 2})^2 - 7(\frac{g}{g + 2}) + 1 = 0$ for g .
50. Solve $4(\frac{g}{g + 4})^2 - 4(\frac{g}{g + 4}) + 1 = 0$ for g .
51. Solve $e^{4x}e^{4x} = (e^x)^xe^{-9}$ for x .
52. Solve $2^{7t+1} = 2^{t^2+11}$ for t .

53. Solve $7^{4r+1} = 7^{r^2}7^5$ for r .
54. Solve $(e^{2m})^{4m} = e^{3-2m}$ for m .
55. Solve $(7^{7x})^x = (7^{49})^x$ for x .
56. Solve $\ln(7x - 3) = \ln(23) + \ln(2)$ for x .
57. Solve $\ln(x + 3) - \ln(x) = 1$ for x .
58. Solve $\ln(x) = \ln(64) - 2\ln(x)$ for x .
59. Solve $\ln(4p) + \ln\left(p + \frac{7}{4}\right) = \ln(2)$ for p .
60. Solve $\ln(3x) + \ln\left(x - \frac{2}{3}\right) = \frac{1}{2}\ln(64)$ for x .
61. Given $f(x) = x^2 + 3$ and $g(x) = \sqrt{x} - 3$, find the value of $(f - g)(4)$.
62. Given $f(x) = x^2 + 3$ and $g(x) = \sqrt{x} - 3$, find the value of $(f + g)(4)$.
63. Given $f(x) = x^2 + 3$ and $g(x) = \sqrt{x} - 3$, find the value of $(g - f)(4)$.
64. Given $f(x) = x^2 + 3$ and $g(x) = \sqrt{x} - 3$, find the value of $\left(\frac{g}{f}\right)(a)$.
65. Given $f(x) = x^2 + 3$ and $g(x) = \sqrt{x} - 3$, find the value of $(gf)(x)$.
66. Given $f(x) = x^2 + 3$ and $g(x) = \sqrt{x} - 3$, find the value of $3g(c)$.
67. Given $f(x) = x^2 + 3$ and $g(x) = \sqrt{x} - 3$, find the value of $g(f(x))$.
68. Given $f(x) = x^2 + 3$ and $g(x) = \sqrt{x} - 3$, find the value of $g(f(x + y))$.
69. Given $f(x) = x^2 + 3$ and $g(x) = \sqrt{x} - 3$, find the value of $g(f(\sqrt{2}))$.
70. Given $f(x) = x^2 + 3$ and $g(x) = \sqrt{x} - 3$, find the value of $f(g(a + h))$.
71. Given $g(x) = \frac{1}{x + 3}$ and $f(x) = \sqrt{x}$, find $f(g(x))$.
72. Given $g(x) = \frac{x - 1}{x + 1}$ and $f(x) = x^2$, find $f(g(x))$.
73. Given $g(x) = 9x + \frac{2}{x - 1}$ and $f(x) = 1 + 2x$, find $f(g(x))$.
74. Given $g(x) = \frac{3}{x} - x$ and $f(x) = \frac{x}{3} + x$, find $f(g(x))$.
75. Given $f(x) = x^2 + 4x - 5$ and $g(x) = x - c$, find $f(g(x))$.
76. Given $g(x) = 5x^2 - 2$ and $f(x) = \sqrt{x} + 1$, find $f(g(x))$.
77. Given $g(x) = \sqrt{x^2 - 5x}$ and $f(x) = x^2 + 1$, find $f(g(x))$.
78. Given $f(x) = 3x - 2$ and $g(x) = x + 1$, find $f(g(x))$.

79. Given $f(x) = x^2 + x^{\frac{1}{2}}$ and $g(x) = x^4$, find $f(g(x))$.
80. Given $f(x) = x^{\frac{1}{3}} + x^{\frac{1}{2}}$ and $g(x) = x^3$, find $f(g(x))$.
81. Find the inverse function of $f(x) = \frac{1}{3x+2}$.
82. Find the inverse function of $f(s) = \frac{-7}{3s+2}$.
83. Find the inverse function of $m(t) = \frac{2t+5}{3t}$.
84. Find the inverse function of $v(t) = \frac{7t+2}{3t-5}$.
85. Find the inverse function of $g(t) = \frac{7}{2t-3}$.
86. Find the inverse function of $y(x) = \frac{x^3-2}{x^3+5}$.
87. Find the inverse function of $f(x) = \sqrt{7x+2}$.
88. Find the inverse function of $u(t) = \frac{5}{\sqrt{2t}}$.
89. Find the inverse function of $g(y) = \sqrt{3y} + 7$.
90. Find the inverse function of $u(r) = 5 + \sqrt{2r-3}$.
91. Simplify, within its domain, as much as possible $\frac{(x^2+9)(x-3)^2}{x^4-81}$.
92. Simplify, within its domain, as much as possible $\frac{xy+2zy}{x^2+4xz+4z^2}$.
93. Simplify, within its domain, as much as possible $\frac{x^2+xy}{x^2+xy-3x-3y}$.
94. Simplify, within its domain, as much as possible $\frac{2x^3-6x^2+x-3}{x-3}$.
95. Simplify, within its domain, as much as possible $\frac{x^3+5x^2+6x}{x^3-4x}$.
96. Simplify as much as possible $\frac{3}{x+2} + \frac{3}{x-2} + \frac{1}{x^2-4}$.
97. Simplify as much as possible $\frac{-1}{x} + \frac{3}{x^2+1} + \frac{1}{x^3+x}$.
98. Simplify as much as possible $\sqrt{3x-1} - \frac{x+4}{\sqrt{3x-1}}$.
99. Simplify as much as possible $\frac{x}{x+y} - \frac{y}{x}$.
100. Simplify as much as possible $\frac{x+h}{x+h+1} - \frac{x}{x+1}$.