

Math 121 – Gateway Exam Sample Problems

- $f(x) = -\frac{2}{3}x^3 + x^2 + 12x + 9$
- $f(x) = x^{\frac{7}{3}} - 8x^{\frac{4}{3}} + 56$
- $g(t) = t^{\frac{2}{3}} - t^{-\frac{1}{4}} + \pi$
- $f(x) = \frac{2}{3}x^{\frac{3}{2}} - (\sqrt[3]{4})x + \frac{2}{x^2}$
- $h(r) = 3r^2 + 4r + \frac{1}{r}$
- $f(x) = -x^{\frac{3}{4}} + x^{-\frac{3}{4}}$
- $f(t) = 2t^3 + 6t - \frac{4}{t^2}$
- $f(x) = x^{\frac{5}{4}} - 10x^{\frac{1}{4}} + 1$
- $f(x) = \frac{1}{x} + \frac{1}{x^2} + \frac{1}{x^3}$
- $p(x) = 16x^3 + \frac{17}{\sqrt{x}} - 10x^{3.1416} + \pi^2$
- $f(x) = (x^2 + 2x + 5)(x^3 + 1)$
- $h(t) = \sqrt{t}(t^2 + 1)$
- $f(x) = x^{-\frac{1}{2}}(1 + x^2 + 3x)$
- $h(x) = (x^{\frac{4}{5}} + x^{-\frac{4}{5}})(5x^4 - 10\pi^2)$
- $g(x) = (x^3 - 3x^{\frac{1}{3}} + 5)(x^4 + 5x^2 - 2\sqrt{x})$
- $f(x) = (x^3 + 3x^2 + 2)(x^5 + 6x^2 - 3x + 5)$
- $h(w) = (w^{-\frac{1}{3}} - 3w^6)(4w^2 - 2w + 7)$
- $g(y) = (\sqrt{y} - 2)(1 - y^2)$
- $F(x) = (3x^2 + (\sqrt{7})x - \pi^2) \left(\frac{x^4}{3} - \frac{x^2}{\sqrt{10}} \right)$
- $H(t) = (2t - 1)(4 - 0.5t + \frac{t^{\frac{3}{2}}}{9.6})$
- $k(x) = \frac{3x - 2}{x - 1}$
- $f(x) = \frac{x^4 - 3x^2 + 2}{x^2 - 2}$
- $f(x) = \frac{x^3 - 1}{\sqrt[3]{x}}$
- $f(x) = \frac{3x}{1 - 2x^2}$
- $k(x) = \frac{x^3 - 2x + 4}{2x^2 + 1}$
- $g(t) = \frac{1 + t + t^2}{t - t^3}$
- $r(u) = \frac{5 + u^2}{1 - u^3}$
- $g(t) = \frac{t^3 - 3t - 2}{t^2 + 1}$
- $f(x) = \frac{3x}{\sqrt{x} + 2}$
- $m(y) = \frac{1 - 4y^2}{6y^2 + 1}$
- $f(x) = \sqrt[3]{x^4 - 7x}$

32. $u(t) = \frac{1}{\sqrt{t^2 + 2t - 1}}$
33. $f(x) = (x^4 + 2x^2 + 2)^2$
34. $f(x) = (5x^3 + 5x)^9$
35. $f(t) = \frac{1}{\sqrt{3t^2 + 2t + 2}}$
36. $h(s) = (1 + \sqrt{s})^{-\frac{1}{2}}$
37. $f(x) = (x^2 + 1)^{-10}$
38. $f(x) = \sqrt{1 + x^3}$
39. $g(r) = \frac{1}{\sqrt{r^3 + 2r}}$
40. $m(u) = \sqrt{1 + \sqrt{u}}$
41. $f(x) = (1 + (x^2 + 2)^{\frac{1}{2}})^{\frac{1}{3}}$
42. $h(w) = (1 + \sqrt{w^3 + 3})^4$
43. $g(t) = (t^3 - 1)^4(1 + t + t^2)^{-4}$
44. $h(s) = [(s + 2)^3(2 - s)]^3$
45. $f(x) = (1 - 2x)^3(2x^2 - x)^4$
46. $h(s) = \sqrt{\frac{s^2 + s - 2}{s + 2}}$
47. $f(x) = \frac{5 - x}{2(x - 2)^{\frac{5}{2}}}$
48. $f(x) = \left(\frac{x - 3}{x^2 + 7}\right)^4$
49. $g(u) = \frac{2u - 3}{\sqrt{u^2 - 3u + 4}}$
50. $F(y) = \left(\frac{1 - 3y}{4 + y - 2y^2}\right)^2$
51. $f(9x) = (x^2 + 3x)e^x$
52. $f(x) = \frac{e^{x^2}}{e^{x-1}}$
53. $f(x) = \frac{e^{-x}}{x}$
54. $f(x) = x^2e^{-x}$
55. $f(x) = e^{-\frac{1}{x^2}}$
56. $f(x) = 3^{-5x}$
57. $f(x) = x^22^x$
58. $f(x) = x^4 + 4^x$
59. $f(x) = 3^{x^2+1}$
60. $f(x) = \left(\frac{1}{2}\right)^x$
61. $f(x) = e^{\sqrt{x+x^2+2}}$
62. $f(x) = \frac{1 + e^{2x}}{2 - e^{2x}}$
63. $f(x) = e^x \ln x$
64. $f(x) = \ln(3xe^x)$
65. $f(x) = \ln\left(\frac{x - 1}{x^2 + 1}\right)$
66. $f(x) = \ln\left(\frac{e^x}{1 + e^x}\right)$
67. $f(x) = x^2 \ln(2x) + x \ln(3x) + 4 \ln(x)$
68. $f(x) = \ln \frac{1}{x} - \frac{1}{\ln x}$
69. $f(x) = x \ln \sqrt{x} + \ln(x^{-2})$
70. $f(x) = (\ln 7x)^{1/2}$
71. $w(t) = 17 - \frac{\cos t}{17}$
72. $g(y) = 2 \sin y - \tan y$
73. $h(a) = 3 \sin a - 2 \cos a$
74. $f(y) = \frac{\sin y}{y}$

75. $m(t) = t \tan t$
76. $p(u) = \frac{\tan u}{1 - \tan u}$
77. $g(v) = (\sin v - v \cos v)^{-17}$
78. $H(x) = \frac{\sin^2 x + \cos x}{x^2 + x}$
79. $f(t) = (1 + \sqrt{\sin t})(1 - 2\sqrt{\cos t})$
80. $F(y) = \tan(17 + y)$
81. $h(r) = 4 \cos^7(2 - 4r)$
82. $l(y) = \sin \sqrt{y} + \sqrt{\sin y}$
83. $m(x) = (\cos(1 - x^2))^{3/2}$
84. $F(t) = 4t^3 - \frac{6}{t} + \frac{2}{\sin(3t^2 + 1)}$
85. $h(x) = (x^2 + x - 1)^5 \sin(5x)$
86. $f(s) = \frac{\tan(2s)}{\cos(1 - 2s)}$
87. $h(y) = (\sin y^2)(\sin^2 y)$
88. $K(x) = \left(1 - \frac{\sin(\pi - x)}{\tan(\pi + x)}\right)^{2/3}$
89. $H(x) = \frac{\sin \sqrt{3 - x}}{\sqrt{\tan(4 - x)}}$
90. $l(t) = (1 + (2t + 3 \tan(4t))^{-1/2})^{4/3}$
91. $F(t) = \sin(\tan(\pi t))$
92. $G(x) = \tan(\cos(ex))$
93. $m(b) = \cos(\sin(\sqrt{2}b))$
94. $k(s) = \cos(\pi \sin(1 - s^2))$
95. $g(t) = \sin^2(t^2 + \tan t)$
96. $R(x) = 2 \sin\left(\frac{1}{\cos x}\right)$
97. $M(x) = \sqrt{\tan(\sin(4x))}$
98. $F(y) = 1 + \sqrt{\pi + \cos(\sin(ey))}$
99. $f(x) = \ln(\sin x)$
100. $f(x) = e^{3 \cos(2x)}$