

Computerize Gateway Exam Question samples

One question from each category will appear on your exam.

Differentiate each of the following functions.

Power Rule:

1. $f(x) = -\frac{2}{3}x^3 + x^2 + 12x + 9$
2. $f(x) = x^{\frac{7}{3}} - 8x^{\frac{4}{3}} + 56$
3. $g(t) = t^{\frac{2}{3}} - t^{-\frac{1}{4}} + \pi$
4. $f(x) = \frac{2}{3}x^{\frac{3}{2}} - (\sqrt[3]{4})x + \frac{2}{x^2}$
5. $h(r) = 3r^2 + 4r + \frac{1}{r}$
6. $f(x) = -x^{\frac{3}{4}} + x^{-\frac{3}{4}}$
7. $f(t) = 2t^3 + 6t - \frac{4}{t^2}$
8. $f(x) = x^{\frac{5}{4}} - 10x^{\frac{1}{4}} + 1$
9. $f(x) = \frac{1}{x} + \frac{1}{x^2} + \frac{1}{x^3}$
10. $p(x) = 16x^3 + \frac{17}{\sqrt{x}} - 10x^{3.1416} + \pi^2$

Product Rule or Product Tricks:

11. $f(x) = (x^2 + 2x + 5)(x^3 + 1)$
12. $h(t) = \sqrt{t}(t^2 + 1)$
13. $f(x) = x^{-\frac{1}{2}}(1 + x^2 + 3x)$
14. $h(x) = (x^{\frac{4}{5}} + x^{-\frac{4}{5}})(5x^4 - 10\pi^2)$
15. $g(x) = (x^3 - 3x^{\frac{1}{3}} + 5)(x^4 + 5x^2 - 2\sqrt{x})$
16. $f(x) = (x^3 + 3x^2 + 2)(x^5 + 6x^2 - 3x + 5)$
17. $h(w) = (w^{-\frac{1}{3}} - 3w^6)(4w^2 - 2w + 7)$
18. $g(y) = (\sqrt{y} - 2)(1 - y^2)$
19. $F(x) = (3x^2 + \sqrt{7}x - \pi^2)\left(\frac{x^4}{3} - \frac{x^2}{\sqrt{10}}\right)$

$$20. H(t) = (2t - 1)\left(4 - 0.5t + \frac{t^{\frac{3}{2}}}{9.6}\right)$$

Quotient Rule:

21. $k(x) = \frac{3x - 2}{x - 1}$
22. $f(x) = \frac{x^4 - 3x^2 + 2}{x^2 - 2}$
23. $f(x) = \frac{x^3 - 1}{\sqrt[3]{x}}$
24. $f(x) = \frac{3x}{1 - 2x^2}$
25. $k(x) = \frac{x^3 - 2x + 4}{2x^2 + 1}$
26. $g(t) = \frac{1 + t + t^2}{t - t^3}$
27. $r(u) = \frac{5 + u^2}{1 - u^3}$
28. $g(t) = \frac{t^3 - 3t - 2}{t^2 + 1}$
29. $f(x) = \frac{3x}{\sqrt{x} + 2}$
30. $m(y) = \frac{1 - 4y^2}{6y^2 + 1}$

Chain Rule:

31. $f(x) = \sqrt[3]{x^4 - 7x}$
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. $m(u) = \sqrt{1 + \sqrt{u}}$

Combination of Chain/product/Quotient Rules:

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

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. $F(y) = \left(\frac{1 - 3y}{4 + y - 2y^2}\right)^2$

Exponential Rules:

51. $f(x) = (x^2 + 3x)e^x$

52. $f(x) = \frac{e^{x^2}}{e^{x-1}}$

53. $f(x) = \frac{e^{-x}}{x}$

54. $f(x) = x^2 e^{-x}$

55. $f(x) = e^{-\frac{1}{x^2}}$

56. $f(x) = 3^{-5x}$

57. $f(x) = x^2 2^x$

58. $f(x) = x^4 + 4^x$

59. $f(x) = 3^{x^2+1}$

60. $f(x) = \left(\frac{1}{2}\right)^x$

More Exponential and Logarithmic Rules:

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. $f(x) = \ln\left(\frac{1}{x}\right) - \frac{1}{\ln(x)}$

69. $f(x) = x \ln(\sqrt{x}) + \ln(x^{-2})$

70. $f(x) = (\ln(7x))^{\frac{1}{2}}$

Trig Rules:

71. $w(t) = 17 - \frac{\cos(t)}{17}$

72. $g(y) = 2 \sin(y) - \tan(y)$

73. $h(a) = 3 \sin(a) - \cos(a)$

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. $f(t) = \left(1 + \sqrt{\sin(t)}\right) \left(1 - 2\sqrt{\cos(t)}\right)$

80. $F(y) = \tan(17 + y)$

90. $K(x) = \left(1 - \frac{\sin(\pi - x)}{\tan(\pi + x)}\right)^{\frac{2}{3}}$

More Trig Rules:

81. $h(r) = 4 \cos^7(2 - 4r)$

82. $l(y) = \sin(\sqrt{y}) + \sqrt{\sin(y)}$

83. $m(x) = (\cos(1 - x^2))^{\frac{3}{2}}$

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. $H(x) = \frac{\sin(\sqrt{3 - x})}{\sqrt{\tan(4 - x)}}$

89. $l(t) = \left(1 + (2t + 3 \tan(4t))^{-\frac{1}{2}}\right)^{\frac{4}{3}}$

More Trig Rules With Exponential and Logarithmic Rules:

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. $f(x) = e^{3 \cos(2x)}$