

Math 151.02 : Calculus
Gateway Exam Practice Problems (Taken from earlier gateway exams)

Compute the derivative of each of the following functions. Show your work. (You do not need to simplify your answers.) Be very careful with notation, signs, parentheses, etc. **NO PARTIAL CREDIT WILL BE GIVEN.**

1. $y = 3x^\pi + \frac{e}{\sqrt[3]{x}} - 2\pi^3$, find $y'(x)$

2. $f(t) = \tan(t^2)e^{\sin t}$, compute $\frac{df}{dt}$

3. $g(v) = \ln(\cos(3v))$, find $g'(v)$

4. $h(x) = \arctan\left(\sqrt{\frac{1+x}{1-x}}\right)$, compute $\frac{dh}{dx}$

5. $z = \frac{(2y + 3)^5 \sin y}{6y^2 - e^{y^2}}$, compute $z'(y)$

6. $s(t) = 4^{\cos^3(5t)} \ln(t^4 - 8)$, compute $s'(t)$

7. $y = 4x^e + \frac{\sqrt{2}}{5}$, compute $\frac{dy}{dx}$

8. $f(t) = \cos(\sin(5t^2))$, find $f'(t)$

9. $g(v) = e^{\tan v} \ln(v^3)$, compute $g'(v)$.

10. $h(x) = \sqrt{\ln\left(\frac{2-x}{4+x}\right)}$, compute $h'(x)$

11. $z = \frac{y^3 - 7 \cos y}{(e^{-2y})(3 - 2y)^6}$, compute $\frac{dz}{dy}$

12. $s(t) = 2^{\sin^4(e^t)} \arcsin(t^5 + 6)$, compute $\frac{ds}{dt}$

13. $y = \frac{e^x}{\pi} - x^{e\pi} + \pi^e$, compute $\frac{dy}{dx}$

14. $f(t) = \frac{\arctan(t^2)}{t^{-3} - t}$, compute $f'(t)$

15. $g(p) = (\ln(p) + 1) \tan(3p)$, compute $g'(p)$

16. $q(x) = \ln(\cos(2^x))$, compute $q'(x)$

17. $t(s) = \frac{1}{\arcsin(7s^2)\sqrt[4]{3e^{\pi s} + 1}}$, compute $\frac{dt}{ds}$

18. $z = \sin^2\left(\frac{e^{2y-4}}{\ln(3y)}\right)$, compute $\frac{dz}{dy}$

19. $f(x) = (2x^3 + 4x^2 - 7x + 1)^7 + 15x^4 - 8$, compute $f'(x)$.

20. $g(t) = (3t^3 - 2t)\arcsin(t^2)$, compute $g'(t)$.