

Math 151A : Calculus and Analytic Geometry I
Gateway Exam Practice Problems (Taken from last year's gateway exams)

Compute the derivative of each of the following functions. You must 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.** You don't have to do them all if you don't want all of the extra credit.

Each problem is worth 1 extra credit point, to be added on top of your homework total.

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 $g'(t)$.