

Math 131: Calculus 1

Practice Problems for the Derivative Skills Exam

Did *is a word of achievement;*

Won't *is a word of retreat;*

Might *is a word of bereavement;*

Can't *is a word of defeat;*

Ought *is a word of duty;*

Try *is a word of each hour;*

Will *is a word of beauty;*

Can *is a word of power.*

–anonymous

Differentiate each of the following functions.

1. Use the limit definition of the derivative: $g(t) = 5t - 6t^2$

2. Use the limit definition of the derivative: $p(q) = \frac{1}{q+2}$

3. Use the limit definition of the derivative: $T(w) = \sqrt{w-1}$

4. $f(x) = \cos(x) + \sin(x) + \tan(x) + \arctan(x) + \arcsin(x)$

5. $n(x) = \tan(x) \sin(2x)$

6. $g(t) = t - \frac{1}{t}$

7. $y = f(x)g(x)$

8. $g(x) = 3x^{1/3} + xe^x + 2e - \ln(x^{2/5} + 8)$

9. $y = \arcsin(e^x) - 7^{\cos(x)}$

10. $m(\lambda) = \lambda^{5/2} - \sqrt{3\lambda}$

11. $y = (2x^3 + x^2 - 1)^3$

12. $g(x) = \ln(1 + x^2)$

$$13. g(x) = \frac{\arctan(x)}{x}$$

$$14. h(x) = \sin(x^2)$$

$$15. y = \frac{x^{14} - 9}{24x^{10} + x^{-3}}$$

$$16. y = \frac{f(x)}{g(x)}$$

$$17. g(x) = (\cos[x])^{2/3} e^{3x+2}$$

$$18. y = \frac{x}{\sqrt{4-3x}}$$

$$19. g(x) = \frac{x^3}{\cos(x^4)}$$

$$20. y = \ln[f(x) + g(x)]$$

$$21. f(x) = e^{x^2+x^3}$$

$$22. r(t) = (4t^3 + 3t^2 + 5)^6(3t + 4)$$

$$23. f(x) = (0.06)^x$$

$$24. f(x) = \tan(e^2x)$$

$$25. y = [f(x)]^4$$

$$26. y = x^{99} - 9x + 99^x$$

$$27. f(y) = (y^3 + 1)(y + 3)$$

$$28. y = x^3g(x)$$