

No calculators will be allowed and no partial credit will be given.

1. Differentiate the function $f(x) = 4x^3 + 9x - 5$. Express your answer in terms of elementary functions.
2. Let $y = e^t + t^8 - 2t^{\frac{3}{2}}$. Find $\frac{dy}{dt}$. Express your answer in terms of elementary functions.
3. Let $y = \sec(t) + 2t^6$. Find $\frac{dy}{dt}$. Express your answer in terms of elementary functions.
4. Differentiate the function $g(x) = 2 \sec(x) + e^x + 3x^3$. Express your answer in terms of elementary functions.
5. Differentiate the function $f(x) = e^2x + \pi^2$. Express your answer in terms of elementary functions.
6. Differentiate the function $f(x) = (5x^3 + 3x^2 + 3)(5x^5 + 7x + 2)$. Express your answer in terms of elementary functions.
7. Let $y = \left(3t^{\frac{5}{2}} + 1\right)e^t$. Find $\frac{dy}{dt}$. Express your answer in terms of elementary functions.
8. Differentiate the function $f(x) = 3e^x \cos(x)$. Express your answer in terms of elementary functions.
9. Differentiate the function $f(t) = -3t^5 \ln(t)$. Express your answer in terms of elementary functions.
10. Differentiate the function $h(x) = \frac{e^x}{e^x + 3x^3 + 1}$. Express your answer in terms of elementary functions.
11. Differentiate the function $f(t) = \frac{5e^t}{\sin(t)}$. Express your answer in terms of elementary functions.
12. Differentiate the function $f(x) = \frac{6 \sin(x)}{x^3}$. Express your answer in terms of elementary functions.
13. Let $y = \frac{4t^3}{\sin(t)}$. Find $\frac{dy}{dt}$. Express your answer in terms of elementary functions.

1. $12x^2 + 9$
2. $e^t + 8t^7 - 3\sqrt{t}$
3. $\sec(t) \tan(t) + 12t^5$
4. $2 \sec(x) \tan(x) + e^x + 9x^2$
5. e^2
6. $(15x^2 + 6x)(5x^5 + 7x + 2) + (5x^3 + 3x^2 + 3)(25x^4 + 7)$
7. $\left(3t^{\frac{5}{2}} + 1\right) e^t + \frac{15t^{\frac{3}{2}} e^t}{2}$
8. $3e^x \cos(x) - 3e^x \sin(x)$
9. $-15t^4 \ln(t) - 3t^4$
10. $\frac{e^x}{e^x + 3x^3 + 1} - \frac{e^x(e^x + 9x^2)}{(e^x + 3x^3 + 1)^2}$
11. $\frac{5e^t}{\sin(t)} - \frac{5e^t \cos(t)}{(\sin(t))^2}$
12. $\frac{6 \cos(x)}{x^3} - \frac{18 \sin(x)}{x^4}$
13. $\frac{12t^2}{\sin(t)} - \frac{4t^3 \cos(t)}{(\sin(t))^2}$