

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

1. Differentiate the function $f(x) = (2x^3 - 4x + 9)^4$. Express your answer in terms of elementary functions.
2. Let $y = (x^3 + 2)^{\frac{4}{5}}$. Find $\frac{dy}{dx}$. Express your answer in terms of elementary functions.
3. Let $z = (\cos(t))^4$. Find $\frac{dz}{dt}$. Express your answer in terms of elementary functions.
4. Differentiate the function $g(x) = \sqrt{3e^{2x} + 2}$. Express your answer in terms of elementary functions.
5. Differentiate the function $f(x) = \frac{3}{(\ln(x))^3}$. Express your answer in terms of elementary functions.
6. Let $y = \frac{4}{(\ln(x))^{\frac{3}{5}}}$. Find $\frac{dy}{dx}$. Express your answer in terms of elementary functions.
7. Let $y = -\ln(\sin(t) + 5)$. Find $\frac{dy}{dt}$. Express your answer in terms of elementary functions.
8. Differentiate the function $g(x) = e^{-4x} \cos(2x)$. Express your answer in terms of elementary functions.

1. $4(6x^2 - 4)(2x^3 - 4x + 9)^3$

2. $\frac{12x^2}{5(x^3 + 2)^{\frac{1}{5}}}$

3. $-4(\cos(t))^3 \sin(t)$

4. $\frac{3e^{2x}}{\sqrt{3e^{2x} + 2}}$

5. $-\frac{9}{x(\ln(x))^4}$

6. $-\frac{12}{5x(\ln(x))^{\frac{8}{5}}}$

7. $-\frac{\cos(t)}{\sin(t) + 5}$

8. $-2e^{-4x} \sin(2x) - 4e^{-4x} \cos(2x)$