

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

1. Differentiate the function $f(x) = (3x^3 - 4x^2 + 11)^3$. Express your answer in terms of elementary functions.
2. Let $y = (x^4 + 11)^{\frac{2}{3}}$. Find $\frac{dy}{dx}$. Express your answer in terms of elementary functions.
3. Let $z = (\cos(t))^3$. Find $\frac{dz}{dt}$. Express your answer in terms of elementary functions.
4. Differentiate the function $g(x) = \sqrt{7e^{-2x} + 2}$. Express your answer in terms of elementary functions.
5. Differentiate the function $f(x) = \frac{5}{(\ln(x))^2}$. Express your answer in terms of elementary functions.
6. Let $y = -\frac{3}{(\ln(x))^{\frac{3}{5}}}$. Find $\frac{dy}{dx}$. Express your answer in terms of elementary functions.
7. Let $y = -2 \ln(\sin(t) + 2)$. Find $\frac{dy}{dt}$. Express your answer in terms of elementary functions.
8. Differentiate the function $g(x) = e^{-4x} \sin(3x)$. Express your answer in terms of elementary functions.

1. $3(9x^2 - 8x)(3x^3 - 4x^2 + 11)^2$

2. $\frac{8x^3}{3(x^4 + 11)^{\frac{1}{3}}}$

3. $-3(\cos(t))^2 \sin(t)$

4. $-\frac{7e^{-2x}}{\sqrt{7e^{-2x} + 2}}$

5. $-\frac{10}{x(\ln(x))^3}$

6. $\frac{9}{5x(\ln(x))^{\frac{8}{5}}}$

7. $-\frac{2\cos(t)}{\sin(t) + 2}$

8. $3e^{-4x} \cos(3x) - 4e^{-4x} \sin(3x)$