

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

1. Differentiate the function $f(x) = (2x^2 - 4x + 9)^5$. Express your answer in terms of elementary functions.
2. Let $z = e^{6t^4}$. Find $\frac{dz}{dt}$ at $t = 1$. Express your answer in simplified form.
3. Let $h(x) = (\sin(x) + 3x)^4$. Evaluate $h'(\frac{\pi}{2})$ and express your answer in simplified form.
4. Differentiate the function $g(x) = e^{-4x} \cos(4x)$. Express your answer in terms of elementary functions.
5. Let $y = (x^3 + 2)^{\frac{5}{6}}$. Find $\frac{dy}{dx}$. Express your answer in terms of elementary functions.
6. Let $g(x) = -2 \sin(x^2)$. Evaluate $g'(\sqrt{\pi})$ and express your answer in simplified form.
7. Differentiate the function $f(x) = \cos(\cos(7x))$. Express your answer in terms of elementary functions.
8. Let $z = \sin(t^2)$. Find $\frac{dz}{dt}$. Express your answer in terms of elementary functions.
9. Differentiate the function $g(x) = \sqrt{7e^{2x} + 4}$. Express your answer in terms of elementary functions.

1. $5(4x - 4)(2x^2 - 4x + 9)^4$
2. $24e^6$
3. $12\left(\frac{3\pi}{2} + 1\right)^3$
4. $-4e^{-4x}\sin(4x) - 4e^{-4x}\cos(4x)$
5. $\frac{5x^2}{2(x^3 + 2)^{\frac{1}{5}}}$
6. $4\sqrt{\pi}$
7. $7\sin(7x)\sin(\cos(7x))$
8. $2t\cos(t^2)$
9. $\frac{7e^{2x}}{\sqrt{7e^{2x} + 4}}$