March 4, 2026 **Group Work 2** MTH151

Each group member should write their own name at the top of this page **in their own handwriting**. Group members should **take turns being the one writing the solutions**, and this should be clear by differences in handwriting. Show all work as you would do on any quiz or exam.

1. Find the derivative

$$\frac{d}{dx}\left[\frac{1}{\sqrt{x}} + \sqrt[4]{x}\right]$$

2. Find the derivative

$$\frac{d}{dx}\left[\frac{3x^2 + x^3}{x}\right]$$

3. Find the derivative

$$\frac{d}{dt}\left[t^3 + e^3\right]$$

4. Find the derivative

$$\frac{d}{dx}\left[(10x^2+7x-2)(2-x^2)\right]$$

5. Find the derivative

$$\frac{d}{du}\left[\frac{6u^4-5u}{u+1}\right]$$

6. Find the derivative

$$\frac{d}{dr}\left[\frac{ae^r}{b+e^r}\right]$$

7. Find the equation of the tangent line to the curve

$$y = x + xe^x$$

at the point $(0, 0)$.

8. Find the equation of the tangent line to the curve

$$y = \frac{x^2}{1+x}$$

at the point $\left(1, \frac{1}{2}\right)$

9. Find the derivative

$$\frac{d}{dt}\left[\frac{t\sin(t)}{1+t}\right]$$

10. Find the derivative

$$\frac{d}{d\theta}\left[\theta\cos(\theta)\sin(\theta)\right]$$

11. Find the derivative

$$\frac{d}{dx}\left[\frac{1}{\sqrt[3]{x^2-1}}\right]$$

12. Find the derivative

$$\frac{d}{dx}\left[e^{x^2-x}\right]$$

13. Find the derivative

$$\frac{d}{dx}\left[5^{\sqrt{x}}\right]$$

14. Find the derivative

$$\frac{d}{dz}\left[(1-4z)^2\sqrt{z^2+1}\right]$$

15. Find the derivative

$$\frac{d}{dx}\left[\sqrt{\frac{x}{x+1}}\right]$$

16. Find the derivative

$$\frac{d}{dx}\left[\frac{t^2}{\sqrt{t^3+1}}\right]$$

17. Find the derivative

$$\frac{d}{dx}\left[\sqrt{x+\sqrt{x+\sqrt{x}}}\right]$$

18. Find the equation of the tangent line to the curve

$$y = 2^x$$

at the point $(0, 1)$.

19. Find the equation of the tangent line to the curve

$$y = xe^{-x^2}$$

at the point $(0, 0)$