

Find the derivatives of the following functions.

1. $f(x) = t^2\sqrt{3+t}$

2. $f(x) = \frac{3x^2 - 2x}{\ln(x)}$

3. $f(x) = \sqrt{\tan(x)}$

4. $f(x) = \sin(3t)\cos(2t)$

5. $f(x) = \frac{2}{x}\sin\left(\frac{1}{\sqrt{x}}\right)$

6. $f(x) = e^{\sin(x)}\cos(2-x)$

7. $f(x) = \frac{2}{(2e^{-4t})^2}$

8. $f(x) = \cos(\sec(\tan(x^2)))$

9. $f(x) = \frac{e^{2x}}{1 + \sqrt{x}}$

10. $f(x) = \sin(2)x$

11. $f(x) = e^{\sqrt{2x}}$

12. $f(x) = (t^2 + t)(t^3 - 2t)(3t^2 - 4)$