For each of the questions 1 – 8, find the derivative of the given function.

(10 points)  1. \( f(x) = 4x^5 + 3\sqrt{t^7} - \frac{3}{\sqrt{t}} - \frac{4}{t^8} \)

\[ f'(x) = \]

(10 points)  2. \( g(t) = 3e^{4t} - 8.3 \ln 5t \)

\[ g'(t) = \]

(10 points)  3. \( y = 5.1 \arcsin 2x - 3 \arctan \frac{x}{5} \)

\[ y' = \]

(10 points)  4. \( h(w) = \frac{5}{\sqrt{16 - w^2}} \)

\[ h'(w) = \]
5. \( r(\theta) = e^{\tan 5\theta} \)
\( r'(\theta) = \)

6. \( f(t) = \ln(2 + e^{-3t^2}) \)
\( f'(t) = \)

7. \( h(w) = \ln \left( \frac{5w^3 + \cos w}{3 + e^{2w}} \right) \)
\( h'(w) = \)

8. \( y = (x^8 + 5)^5 e^{3x^4} \)
\( y' = \)
For each of the questions 9 – 20, find an indefinite integral or the definite integral, as indicated.

(10 points) \(9. \int (5 - 4z)^6 \, dz = \)

(10 points) \(10. \int (2y^2 + 3)^5 \, y \, dy = \)

(10 points) \(11. \int (3e^{2x} + 1)^5 \, e^{2x} \, dx = \)

(10 points) \(12. \int 4 \sin 5t - 2(\sec 3t)^2 \, dt = \)
13. \[ \int \frac{11x}{144 + x^2} \, dx = \] (10 points)

14. \[ \int \frac{3}{25 + 4x^2} \, dx = \] (10 points)

15. \[ \int (\sin 2y)e^{\cos 2y} \, dy = \] (10 points)

16. \[ \int \frac{1}{t\sqrt{t^2 - 1}} \, dt = \] (10 points)
(10 points) 17. \[ \int_{-1}^{1} \frac{1}{\sqrt{4 - a^2}} \, da = \]

(10 points) 18. \[ \int_{0}^{3} \frac{y}{\sqrt{100 - 4y^2}} \, dy = \]

(10 points) 19. \[ \int_{0}^{5} \frac{1}{4 + z^2} \, dz = \]

(10 points) 20. \[ \int_{-\pi/2}^{\pi/2} \frac{\cos \theta}{3 + \sin \theta} \, d\theta = \]