1. $D_x\left[\, e^x + x^e + e^3 - x^3 + \ln(2) \,\right] =$

2. $D_x\left[\, x\sqrt{x^5 - x} \,\right] =$

3. $D_x\left[\, \left(\sin^{-1}(5x)\right)^3 \,\right] =$
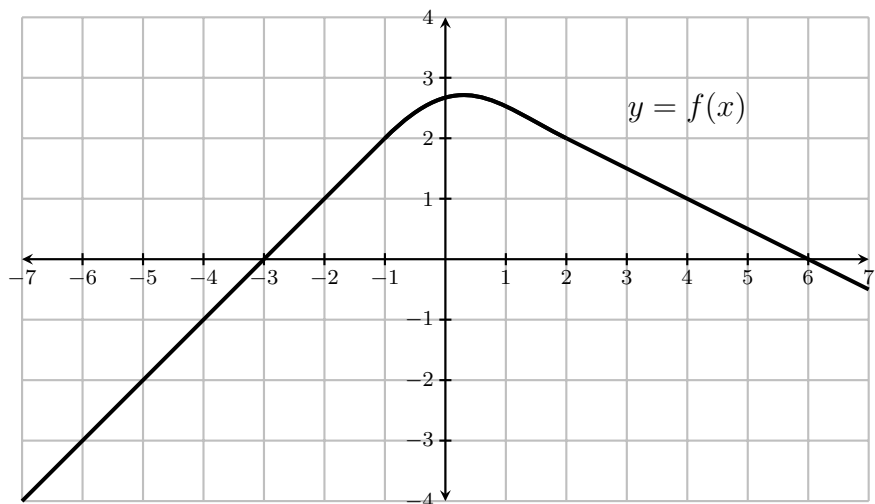
4. $D_x\left[\, \sec(x^2 + e^x) \,\right] =$

5. $D_x\left[\, e^{x/(x^2+1)} \,\right] =$

6. $D_w\left[\, \ln\left(w^3 - 4w^2 - 2w + 3\right) \,\right] =$

7. The graph of a function $f(x)$ is shown below.

Using the same coordinate axis, sketch the graph of its derivative $f'(x)$

$y = f(x)$

8. Given the equation $x^2 + y^3 = 3x^2y$, find $\dfrac{dy}{dx}$.

9. Suppose it costs $C(x)$ dollars to drill a well to a depth of x meters.

Suppose it happens that $C'(50) = 800$. Explain in simple terms what this means.

10. A spherical balloon is inflated at a rate of 64π cubic feet per minute.

How fast is the radius increasing at the instant the radius is 2 feet?

(A sphere of radius r has volume $V = \frac{4}{3}\pi r^3$ cubic units, and surface area $S = 4\pi r^2$ square units.)