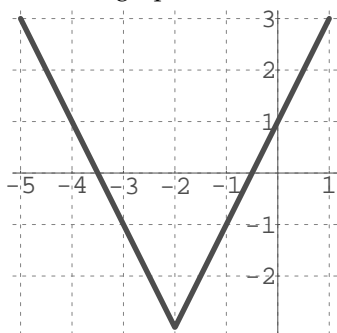
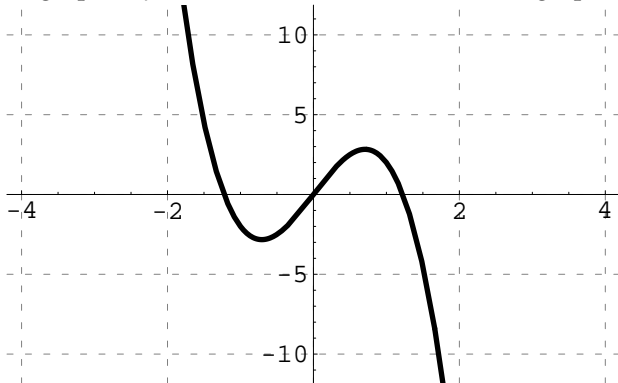


1. Use the definition of the derivative to find the derivative of $y = x^2 - 3x$.
2. Find the equation of the tangent line to $y = x^5 - 3x - 1$ at $x = 1$.
3. The position of a particle at any time t is given by $s(t) = -16t^2 + 240t$. Find the velocity of the particle when $t = 2$ seconds.
4. A baseball with mass 0.15 kg and speed 45 m/s is struck by a baseball bat of mass m and speed 40 m/s (in the opposite direction of the ball's motion). After the collision, the ball has initial speed $u(m) = \frac{82.5m - 6.75}{m + 0.15}$ m/s. Show that $u'(m) > 0$ and interpret this in baseball terms.
5. Suppose that the price of an object is \$20 and 20,000 units are sold. If the price increases at a rate of \$1.25 per year and the quantity sold increases at a rate of 2000 per year, at what rate will revenue increase?
6. Sketch the graph of the derivative of the following function.



7. The graph of $f'(x)$ is shown below. Sketch the graph of $f(x)$.



8. Find the derivatives of the following. Simplify the results.

(a) $y = \ln \sqrt{8x}$

(b) $y = x^{\ln x}$

(c) $y = \ln(\sec 2x + \tan 2x)$

(d) $y = e^{\ln(x^2 e^x)}$

(e) $y = \frac{3x^2 - 2x}{(2x + 1)^2}$