

Practice Exercises for Test #3 MATH 160

1. Write out the definition for “the derivative of $f(x)$.” Use the definition stated in the shaded box at the top of page 157 in your text.
2. Show how to use the definition of the derivative to find the derivative of $f(x)$ where $f(x) = 5x^2 + 7x + 15$.
3. Suppose a ball is tossed vertically upward so that its distance in feet above the ground t seconds after being tossed is given by $s(t) = -16t^2 + 64t + 8$. Show how to use calculus to find the instantaneous velocity of the ball 1.5 seconds after being tossed. Use calculus to determine when the ball’s velocity will be zero ft/sec.
4. Show how to use calculus to help you find the equation of the line tangent to the graph of $y = 3x^2$ at the point $(3, 27)$.
5. Specify the derivatives of the following functions:
 - a. $f(x) = 4x^3 - 11x^2 - 9x + 23$
 - b. $g(x) = 100e^x$
 - c. $h(x) = 5/x$
6. Exercise #77 in exercise Set 3.1.
7. Exercise #31 in Exercise Set 3.5.
8. Given the graph of a function, identify:
 - a. Where the function is increasing (decreasing)
 - b. Where the function’s derivative is positive (negative)
 - c. Where the function’s derivative is increasing (decreasing)
 - c. The maximum and minimum values of the function
9. Given a quadratic or cubic polynomial, show how to use calculus to help you sketch the graph of the function and then identify:
 - a. Where the function is increasing (decreasing)
 - b. Where the function’s derivative is positive (negative)
 - c. Where the function’s derivative is increasing (decreasing)
 - c. The maximum and minimum values of the function