LINEAR FUNCTIONS, TANGENT LINES AND PRACTICE PROBLEMS

MA 131-006

We're interested in know: As you vary the x-values that you plug into a function, how do the y-values change? What is the rate of this change? If you vary x a little, with y change by just a little or by a lot?

- Review the solution to number 3
- Derivatives
  - Reminder the ***derivative*** of the function $y = f(x)$ at the point x_0 is the slope of the tangent line at x_0.
  - Activity–measuring speed at an instant.
  - Example: The slope of the tangent line for $y = x^2$ is given by the following rule: $x \mapsto 2x$. For example, the slope of the tangent line at $x = 1$ is 2×1; the slope of the tangent line at $x = 2$ is 4.
  - For each of the following points, sketch the tangent line to $y = x^2$ and write down its equation.
    - $x = 0$
    - $x = 1$
    - $x = -2$
    - $x = 2$.
  - A rule like this that determines the derivative at each point is called the ***derivative*** of $y = f(x)$, and it is a function in its own right. We denote this function by $f'(x)$ or simply f' or y'.
  - Power rule!
    - Compute the derivative of the following functions, and then write the equation for the tangent line at the point $x = 1$.
      - $f(x) = x^8$
      - $f(x) = \sqrt{x}$
      - $f(x) = x^{-3}$
      - $y = \sqrt[7]{x}$
  - We calculate the derivative using secant lines and a limit.
    - Difference quotient: $y = x$ and $y = x^2$.

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