Notes for "Normal Lines"

Get out notecard 22. Normal lines are just like tangent lines, except they are perpendicular to the tangent line at the point of tangency.

Recall from algebra 1 and geometry that perpendicular lines have negative reciprocals for slopes. If one line has a slope of 2/3 for a slope, the normal line will have s lope of -3/2. Likewise, if one line has a slope of -2, the perpendicular or normal like will have a slope of 1/2.

Read through the top of notecard 22.

Look at #1. If $h(x) = \frac{3}{x^2}$, then find the derivative like usual (like we practiced on Monday).

- Find $h(-4)$ to get the *y*-value.
  - $h(-4) = \frac{3}{(-4)^2} = \frac{3}{16}$
  - Therefore our point is $\left(-4, \frac{3}{16}\right)$
- Rewrite it as $h(x) = 3x^{-2}$
- Take the derivative: $h'(x) = -6x^{-3}$
- Find the slope of the tangent line by plugging in $x = -4$
  - $h'(-4) = -6(-4)^{-3} = \frac{-6}{(-4)^3} = \frac{-6}{-64} = \frac{3}{32}$
  - The slope of the **tangent line** is $m = \frac{3}{32}$
- Therefore, to find the slope of the normal line, find the opposite reciprocal or negative reciprocal: $m_{\perp} = \frac{32}{3}$.
- To find the equation of the tangent line, we would use point-slope formula. The normal line uses the same method, but just the new slope instead.
  - $y - \frac{3}{16} = \frac{3}{32}(x + 4)$
- Finish filling out the normal line notes. Use www.whsmath.com to double-check that your notes are correct.

If you want a link that takes you directly to the normal notes key: