

Bellwork: Check HW with someone around you.

Discuss Average Rate of Change (from summer assignment)

MMM: (02) Slopes of Secant & Tangent Lines Read & Take Notes, try problems

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$$360^\circ = 2\pi \text{ radians}$$

$$1 \text{ mole} = 6.02 \times 10^{23} \text{ atoms}$$

$$12 \text{ m} = 1 \text{ ft}$$

$$2.54 \text{ cm} = 1 \text{ in}$$

$$\frac{60 \text{ min}}{1 \text{ hr}} = \frac{1 \text{ h}}{1 \text{ hr}}$$

$$\frac{60 \text{ min}}{1 \text{ hr}} = 1$$

$$? \frac{\text{miles}}{\text{hr}} = \frac{72 \text{ km}}{\text{min}} \cdot \frac{60 \text{ min}}{1 \text{ hr}}$$

$$\frac{12 \text{ in}}{1 \text{ ft}} = 1$$

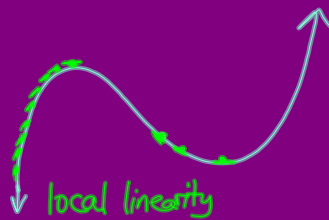
$$360^\circ = 2\pi \text{ rad}$$

$$\frac{360^\circ}{2\pi \text{ rad}} = 1$$

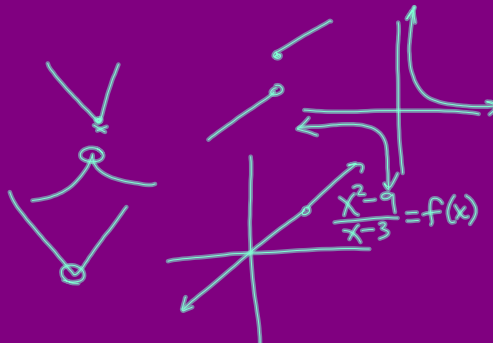
$$1 = \frac{2\pi \text{ rad}}{360^\circ}$$

$$? \text{ rad} = \frac{135^\circ}{1} \cdot \frac{2\pi \text{ rad}}{360^\circ}$$

$$? \text{ deg} = \frac{5\pi \text{ rad}}{3} \cdot \frac{180^\circ}{\pi \text{ rad}}$$

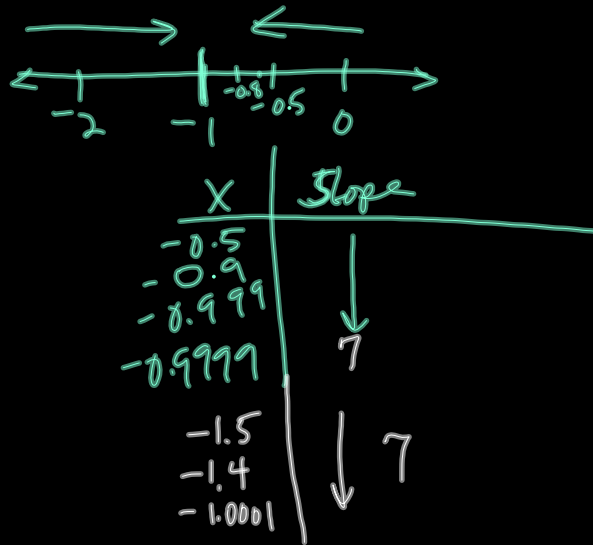
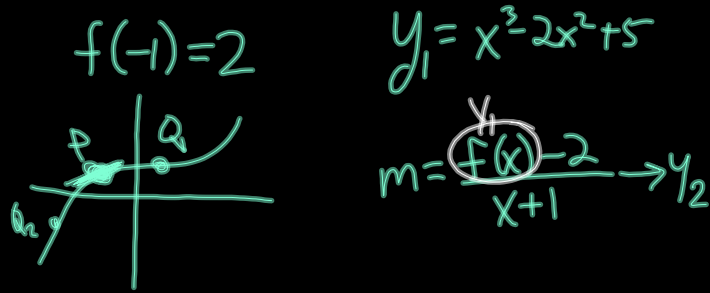


Does local linearity apply to EVERY function at EVERY point?



Tangent to a Curve Homework

Using the method shown in class, find the tangent line to $f(x) = x^3 - 2x^2 + 5$ at $x = -1$. Be sure to check both sides of $x = -1$. A complete solution will include calculations, a graph, a table, and sentence explanations. A graph of the function is shown below.



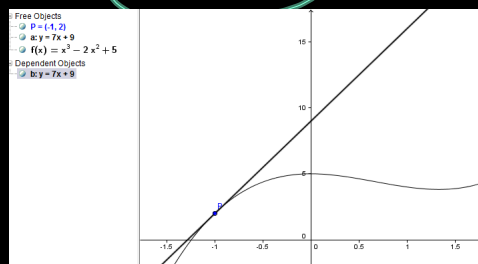
As we approach $x = -1$ from the left & from the right, the slope of the secant line approaches 7.

As point Q gets "really close" to point P, we have a tangent line, so we can say that the slope of the tangent line at the point $(-1, 2)$ is 7.

$$y - 2 = 7(x + 1)$$

$$y - 2 = 7x + 7$$

$$y = 7x + 9$$



You leave for a trip at 9:00am and travel 120 miles in 2.5 hours. What is your average speed?

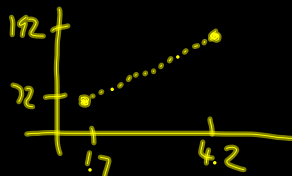
$$\frac{120 \text{ mi}}{2.5 \text{ hrs}}$$

At 11:30am you are 120 miles from where you started. What was avg. speed?

At time $t=3$, you leave on a trip.
At time $t=5.5$ hrs you have traveled 120 miles. Avg speed?

At time $t=1.7$ you are at mile marker 72. At time $t=4.2$, you are at mile marker 192. Avg speed?

$$\frac{192 - 72}{4.2 - 1.7}$$



Average rate of change is slope.

$$\textcircled{1} f(x) = x^3 - 2x$$
$$[0, 4] \quad \frac{f(4) - f(0)}{4 - 0} = 14$$

