Test topics – calc Mon
non-calc Tue

Extreme values: EVT, 1st deriv. test for min/max, increasing & decreasing intervals, global vs local maxima, 2nd deriv test for extremum.

Mean Value Theorem (MVT)
- conditions
- conclusion
- be able to find promised spot on fcn.

From graph of f: where is $f' > 0$, < 0, $= 0$

From graph of f': where is f increasing, decreasing, max, min, inflection pt

Linearization & differentials – estimation of dy, error of linearization.

Related rates.

#27 p. 256

linearization $L(x)$ for $\tan x$ "centered on" $x = -\frac{\pi}{4}$

$$L(x) = \tan\left(-\frac{\pi}{4}\right) + \sec^2\left(-\frac{\pi}{4}\right)\left(x+\frac{\pi}{4}\right)$$

$$L(x) = -1 + 2\left(x+\frac{\pi}{4}\right)$$

$$L(x) = -1 + 2x + \frac{\pi}{2}$$

What is the error of this linearization at $x = -0.9$?

$$\left| L\left(\frac{-\pi}{4}\right) - \tan\left(-\frac{\pi}{4}\right) \right|$$

answers to 3 decimal places

#39 $f'(x) = \sin(x^2)$

$f(0) = -1$

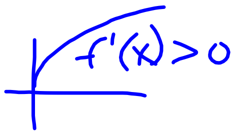
(a) $L(x) = -1 + 0(x-0)$

$L(x) = -1$

(b) $dy \approx f'(0) \cdot dx$

$dy \approx 0 \cdot 0.1$

≈ 0

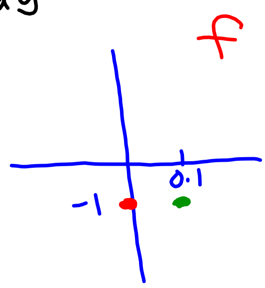


estimate of $f(0.1)$

$= f(0) + dy$

$= -1 + dy$

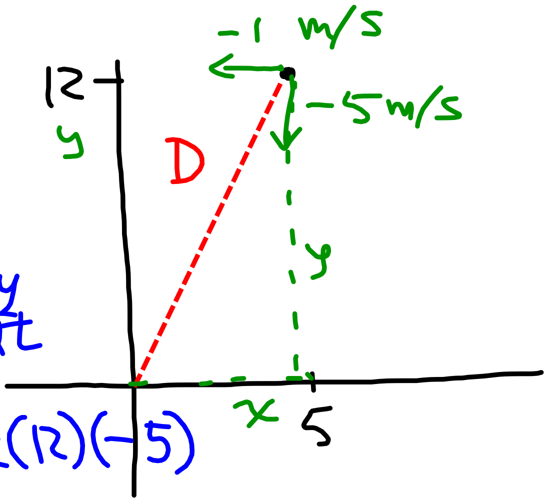
$= -1$



(c) if f is increasing, our estimate will be low, & vice versa.

#59 $\frac{dx}{dt} = -1$ m/sec

$\frac{dy}{dt} = -5$ m/sec



$D^2 = x^2 + y^2$

find $\left|\frac{dD}{dt}\right|$

$2D\frac{dD}{dt} = 2x\frac{dx}{dt} + 2y\frac{dy}{dt}$

$2(13)\frac{dD}{dt} = 2(5)(-1) + 2(12)(-5)$

$\cancel{26}\frac{dD}{dt} = \frac{-130}{26} = -5$ $\left|\frac{dD}{dt}\right| = 5$ m/sec