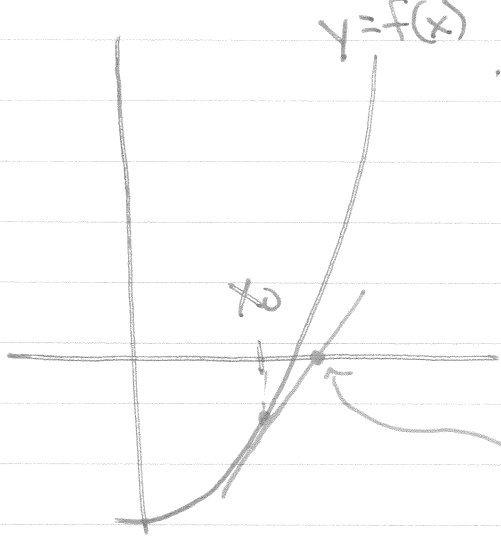


Course book: some solutions at the back

Quiz 2 this Friday: up through Newton's method

Recap: Newton's method: $\sqrt{105}$



$$\cdot f(x) = x^2 - 105 \quad f'(x) = 2x$$

$$\cdot x_0 = 10$$

$$\cdot y = \underbrace{f(x_0)} + \underbrace{f'(x_0)(x - x_0)}$$
$$= -5 + 20(x - 10)$$

$$\cdot 0 = f(x_0) + f'(x_0)(x - x_0)$$

$$\frac{-f(x_0)}{f'(x_0)} = x - x_0$$

$$\boxed{x_0 - \frac{f(x_0)}{f'(x_0)} = x_1}$$

One step of
Newton's method = Linear approximation

Position
 $f(x)$

Velocity
 $f'(x)$

Acceleration
 $f''(x)$ (Force)

Jerk
 $f'''(x)$

Increasing

Positive

Decreasing

Negative

Concave up
(cup)

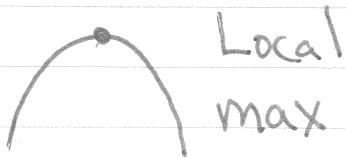
Increasing

Positive

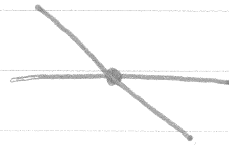
Concave down
(frown)

Decreasing

Negative

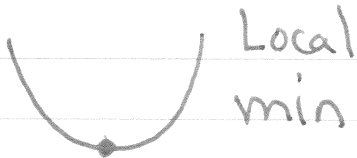


Local
max

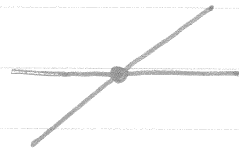


$x=0$

Critical
points

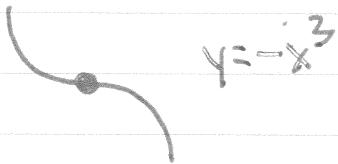


Local
min

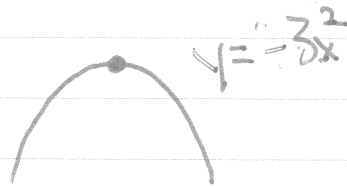


$x=0$

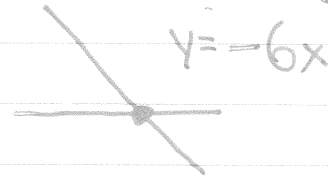
$f'(x)=0$



$y = -x^3$

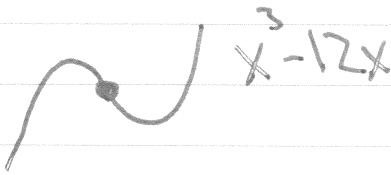


$y = -3x^2$

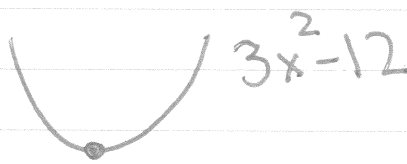


$y = -6x$

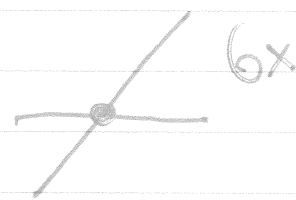
Inflection
point



$x^3 - 12x$



$3x^2 - 12$



$6x$

$f''(x)=0$

"Curves
the other
way"

