October 30, 2026

National Candy Corn Day

Today in History:

"War of the Worlds" opens (1938)

Aaron Copland's Appalachian Spring premieres (1944)

Number of the Day: 777

777 = 3 x 7 x 37

777 is 3333 in base 6.

Fun Fact:

In Delaware it is illegal to get married on a dare.

Quote of the Day:

"If you want to read about love and marriage, you have to buy two separate books."

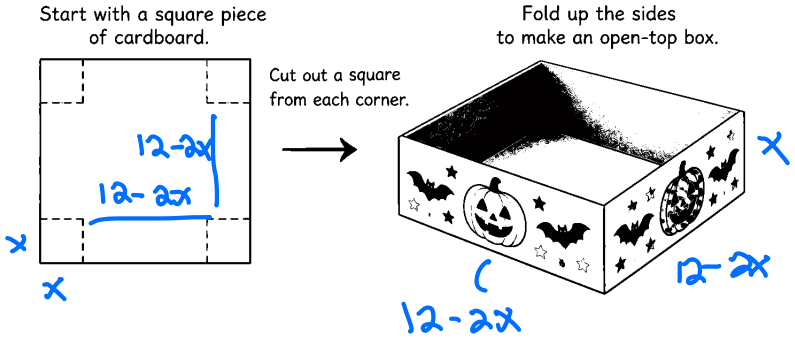
- Alan King

Today's Weather:

Sun and clouds mixed, high near 56^{o}.

Math 121 - Quiz #32

You want to make an open-top box for your Halloween candy from a 12 inch square piece of cardboard by cutting a square out of each corner and turning up the sides. How large should you make the corner cuts to maximize the volume of the box (to hold the most candy)?



$$V = x(12-2x)^2$$

$$\frac{dV}{dx} = x(2)(12-2x)(-2) + (12-2x)^2$$

$$= (12-2x)(-4x + 12 - 2x)$$

$$= (12-2x)(12-6x) = 0$$

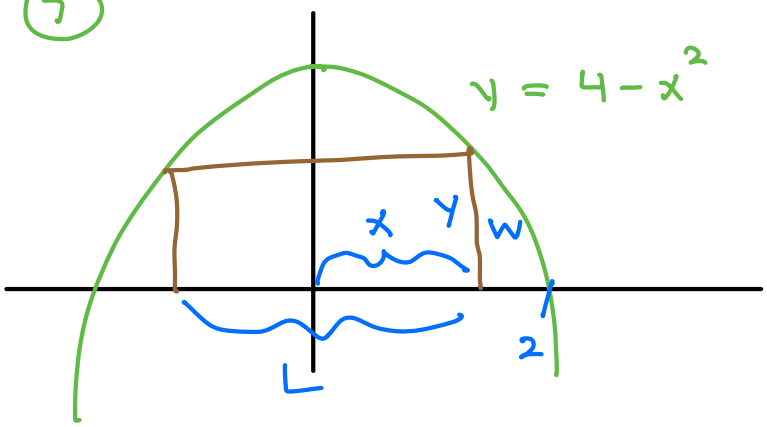
$12-2x=0$ $\quad$ $12-6x=0$

C.P. $\quad x=6$ $\quad \boxed{x=2}$

E.P. $\quad x=0, x=6$

x	V
0	0
2	128 IN^3
6	0

7



$L = 2x$

$y = 4 - x^2$

$A = L \cdot W$

$= 2x(4 - x^2)$

$A = 8x - 2x^3$

$\frac{dA}{dx} = 8 - 6x^2 = 0$

$6x^2 = 8$

$3x^2 = 4$

$x^2 = \frac{4}{3}$

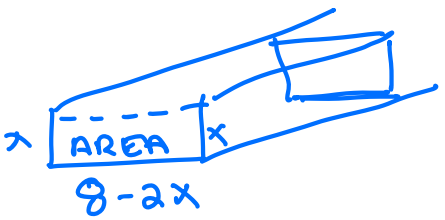
CP $\quad x = \pm\sqrt{\frac{4}{3}} = \frac{2}{\sqrt{3}}$

EP $\quad x = 0$

$x = 2$

3





$A = x(8 - 2x)$

$A = 8x - 2x^2$

$$\frac{dA}{dx} = 8 - 4x = 0 \qquad x = 2$$

OFFICE HOURS 10|30

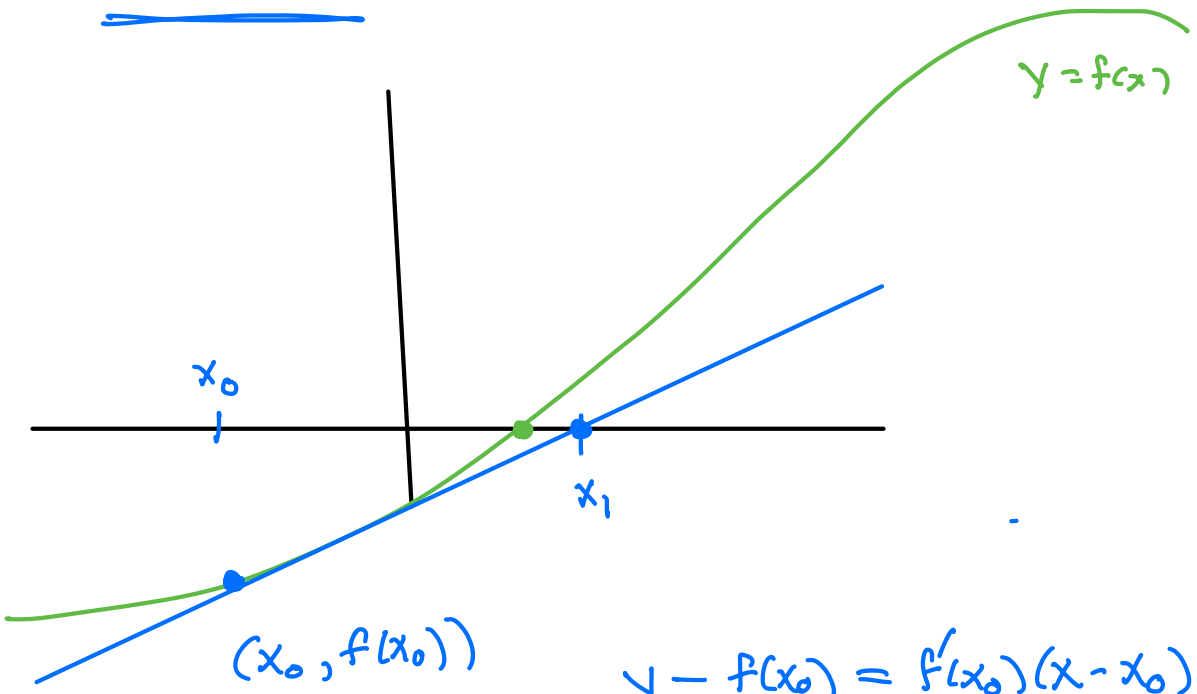
10:30 - 12:30

2-3

NEWTON'S METHOD

ROOTS

$f(x) = 0$



$(x_0, f(x_0))$

$f'(x_0)$

$y - f(x_0) = f'(x_0)(x - x_0)$

$y = 0$ $\qquad 0 - f(x_0) = f'(x_0)(x - x_0)$

$= f'(x_0)x - f'(x_0)x_0$

$f'(x_0)x_0 - f(x_0) = f'(x_0)x$

$x\, f'(x_0) = f'(x_0)x_0 - f(x_0)$

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

$$x_2 = x_1 - \frac{f(x_1)}{f'(x_1)}$$

$$x_3 = x_2 - \frac{f(x_2)}{f'(x_2)}$$

$$\boxed{x_{N+1} = x_N - \frac{f(x_N)}{f'(x_N)}}$$

NEWTON'S FORMULA

Q1: WHERE TO START?

Q2: WHEN SHOULD I STOP?

EXAMPLE

$f(x) = x^2 - 2$ $\qquad x^2 - 2 = 0$

$f'(x) = 2x$

$$x_{N+1} = x_N - \frac{f(x_N)}{f'(x_N)}$$

$$x_{N+1} = x_N - \frac{x_N^2 - 2}{2x_N}$$

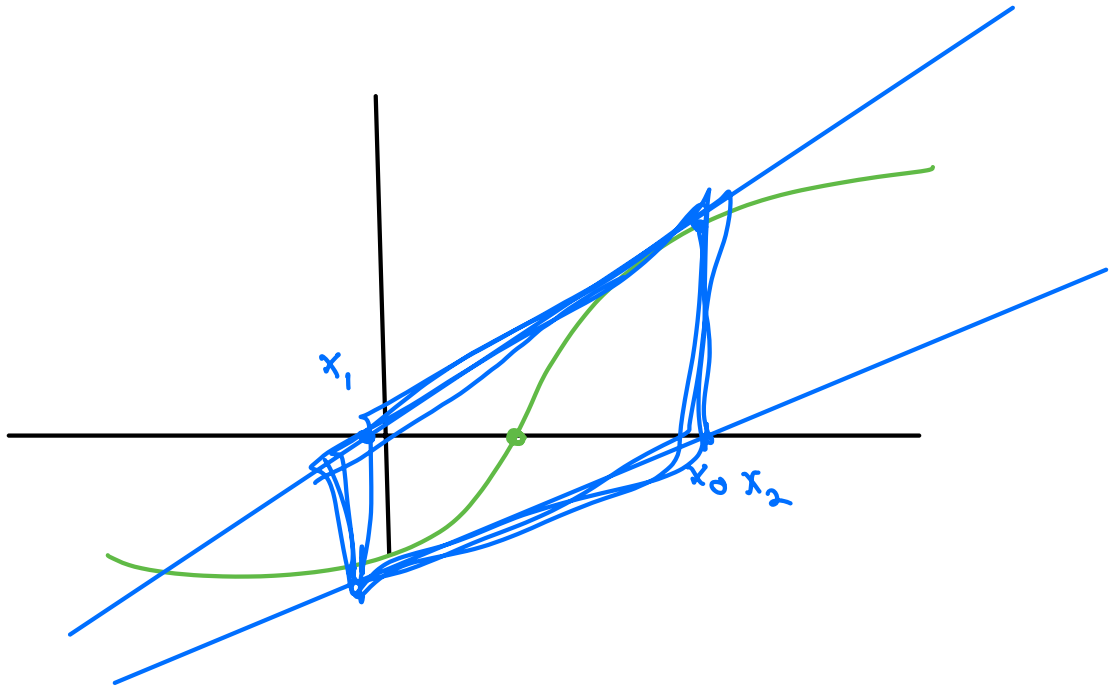
	x_N	x_{N+1}
N=0	1	1.5
N=1	1.5	1.41666
N=2	1.41666	1.414216

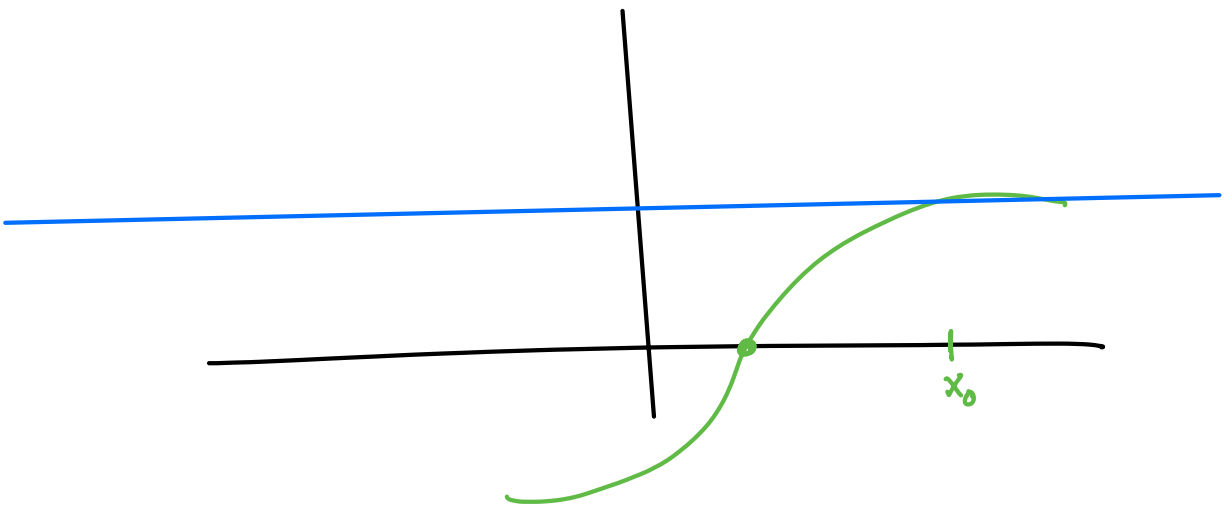
$$x_1 = 1 - \frac{1-2}{2} = 1.5$$

$$x_2 = 1.5 - \frac{(1.5)^2 - 2}{2(1.5)} = 1.41666$$

$$x_3 = 1.41666 - \frac{(1.41666)^2 - 2}{2(1.41666)} =$$

START?





STAY AWAY FROM $f'(x) = 0$

$$f(x) = 2x^3 + x^2 - x + 1 = 0$$

$$x_{N+1} = x_N - \frac{f(x_N)}{f'(x_N)}$$

$$= x_N - \frac{2x_N^3 + x_N^2 - x_N + 1}{6x_N^2 + 2x_N - 1}$$

	x_N	x_{N+1}
N=0	−1.2	−1.23511
N=1	−1.23511	−1.23375 ↓
	−1.23375	−1.23375