HW Due Mon 10/24:
handout packets:
- graphs
- multiple choice AP calculus problems
- final exam practice problems
- sudoku, etc. worksheets

30 pts

Review Session: 3:30pm Tues 10/28

Exam: 9:00am Wed 10/29
- All A's on all 4 tests (after bonus pts) --> exempt from final (unless you want to take it because HW and quizzes are keeping you from an A in the class)
- Lowest of 4 regular test grades will be dropped (if it helps you)
- Final Exam can replace 2nd lowest test grade (if it helps you)

If $f(x) = \begin{cases} ax^2 + b &, \ x \geq -2 \\ -4x &, \ x < -2 \end{cases}$

f is cts. & diff. @ $x = -2$
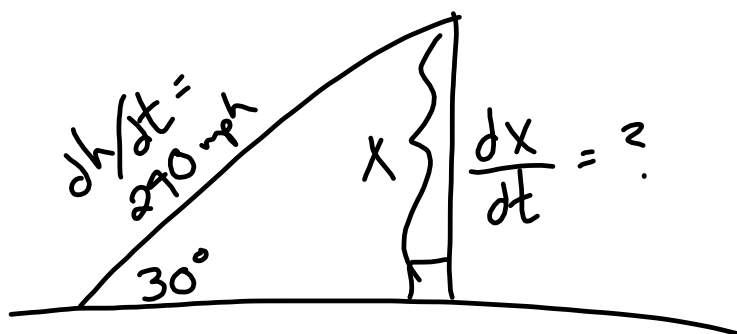what is $a + b$?

$a(-2)^2 + b = -4(-2)$ & $2a(-2) = -4$

$4 + b = 8$ $-4a = -4$

$\boxed{b = 4}$ $\boxed{a = 1}$

$\boxed{5}$

$$\sin 30° = \frac{x}{h}$$

$$\frac{1}{2} = \frac{x}{h}$$

$$x = \frac{h}{2}$$

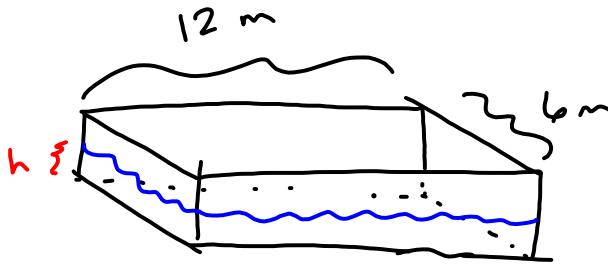$$\frac{dx}{dt} = \frac{1}{2} \cdot \frac{dh}{dt} = \boxed{120 \text{ mph}}$$

$$3x^2 + 2xy + y^2 = 2 \qquad ; \quad \frac{dy}{dx} = ? \text{ when } x = 1$$

$$y' = f(x,y)$$

$$3 + 2y + y^2 = 2$$

$$y^2 + 2y + 1 = 0$$

$$(y+1)^2 = 0 \quad y = -1$$

12 m

6 m

h

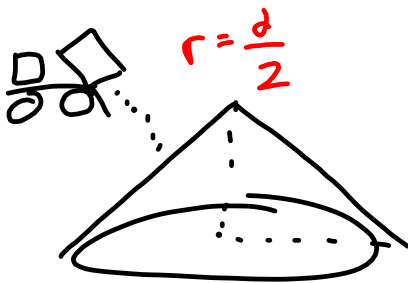when there is 1 m of water remaining (height) how fast is height of water changing?

a rectangular swimming pool is being drained @ 1 cubic meter/s

$$V(h) = 12 \cdot 6 \cdot h$$

$$\frac{dV}{dt} = 72 \cdot \frac{dh}{dt}$$

$$-1 = 72 \cdot \frac{dh}{dt}$$

$$\boxed{\frac{dh}{dt} = -\frac{1}{72} \quad \text{m/s}}$$

D

$$r = \frac{d}{2}$$

$$V = \frac{1}{3}\pi r^2 h$$

diameter of pile is 5 x height

$$d = 5h$$

height is growing @ 1 ft/s.

how fast is volume growing when pile is 10 ft across?

$$V = \frac{1}{3}\pi \left(\frac{d}{2}\right)^2 h$$

$$V = \frac{1}{3}\pi \cdot \left(\frac{5h}{2}\right)^2 \cdot h$$

$$V = \frac{25\pi}{12} h^3$$

$$\frac{dV}{dt} = \frac{25\pi}{4} h^2 \cdot \frac{dh}{dt}$$

$$\frac{dV}{dt} = \frac{25\pi}{4} \cdot (2)^2 \cdot 1$$

$$= \boxed{25\pi \ \text{ft}^3/s}$$