Extra prep for the term test on Tue (AaL) FRI 25 JAN 2019

where do I start?

<u>Exercise</u>: Given $f(x) = x^2$, write the expression for

a) $g(x) = f(x-3) = (x-3)^2$ Vertex form

b) $h(x) = f(2x+1) = (2x+1)^2$ Not in Vertex form

$= \left[2\cdot(x+a)\right]^2 = \left[2\left(x+\frac{1}{2}\right)\right]^2 = 2^2\cdot\left(x+\frac{1}{2}\right)^2 = \boxed{4\left(x+\frac{1}{2}\right)^2}$

It must be

$2a = 1$

$\frac{2a}{2} = \frac{1}{2} \rightarrow a = \frac{1}{2}$

③ $r(x) = 3f(x) = 3(x)^2 = \boxed{3x^2}$

$\left(f(x) = x^2\right)$

④ $s(x) = 2\boxed{f(x)} - 1 = 2\boxed{x^2} - 1 = \boxed{2x^2 - 1}$

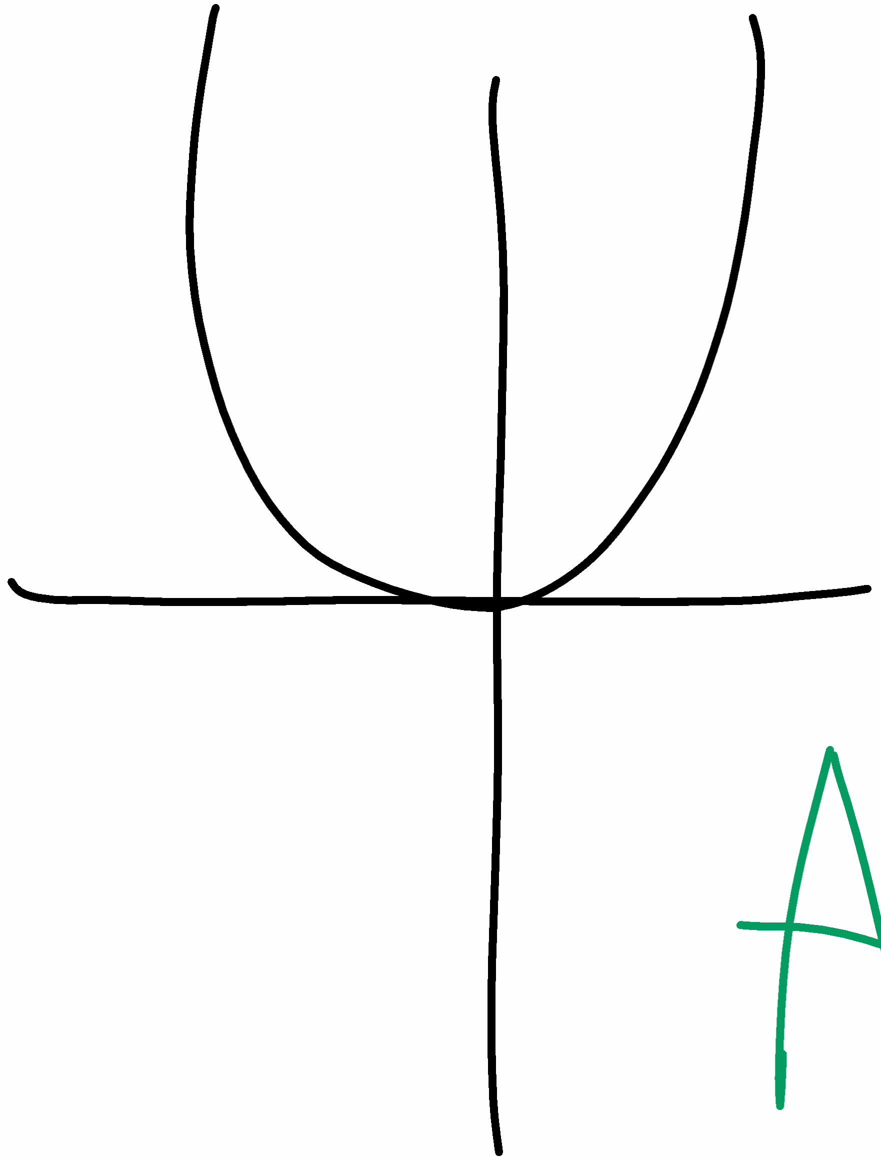
② Given $f(x) = (x-1)^2$, determine

a) $g(x) = 3\boxed{f(x-1)} + 1 = 3\boxed{(x-1-1)^2} + 1$

$= \boxed{3(x-2)^2 + 1}$

b) $h(s) = \frac{1}{2}\boxed{f(s+2)} = \frac{1}{2}\boxed{(s+2-1)^2} = \boxed{\frac{1}{2}(s+1)^2}$

③ State the transformations of $y = 3(x+2)^2 - 3$ relative to the base function $y = x^2$.



- Horiz. translation of 2 units left
- Vert. " " " 3 " down
- Vertically stretched by factor of 3

AaL

Have we improved?

AfL: Why/where you did mistakes? How to improve?

(Compare slides of Thu Jan 10th)

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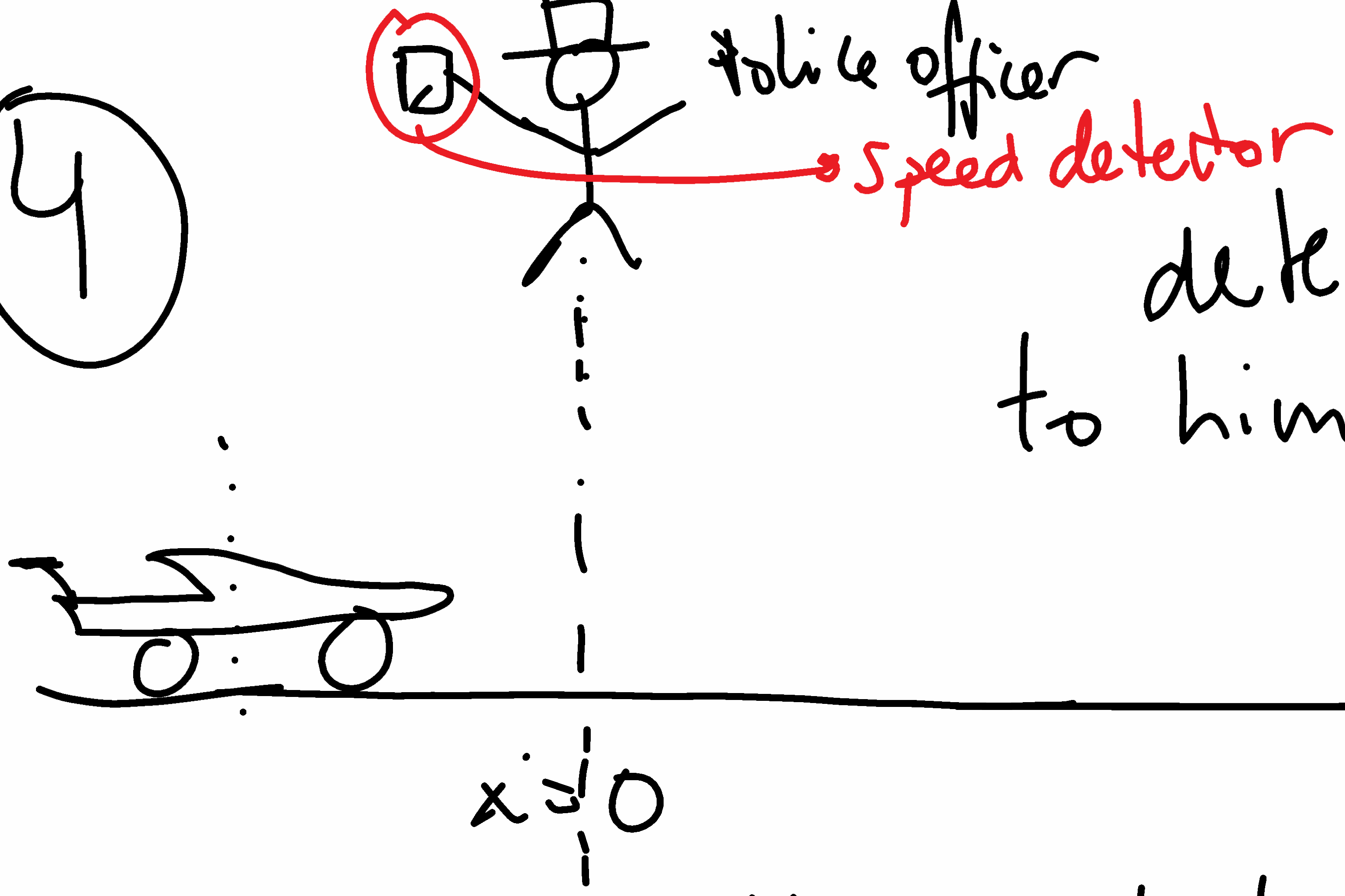

A car rushes by a police officer who determines that the car's distance (in meters) relative to himself is given by the function

$$x(t) = -85.5 + 27 \cdot t + \frac{1}{2} t^2$$

a) What's the initial distance of the car to the officer?

Ans: Initial value means at $t=0$. Hence $\underline{x(0) = -85.5\,m}$
That is, 85.5 meters to the left of the officer

b) At what time does the car pass in front of the officer?

Ans: That's the time when the car is at $x=0$. Hence, we seek a value t such that $x(t)=0$

$$-85.5 + 27t + \frac{1}{2}t^2 = 0$$ ← Quadratic equation

$$t = \frac{-27 \pm \sqrt{27^2 - 4\cdot\left(\frac{1}{2}\right)\cdot(-85.5)}}{2\cdot\left(\frac{1}{2}\right)}$$ ← Quadratic Equation

$$t = \frac{-27 \pm \sqrt{729 + 171}}{1} = -27 \pm \sqrt{900} = -27 \pm 30$$

$-27 + 30 = 3 \text{ sec}$

$-27 - 30 = \cancel{-57}$

No physical meaning for negative time

Therefore, the car passes in front of the officer at $\boxed{t = 3 \text{ sec}}$