4. a) $t = 1$ ⇒ plug 1 in for t ⇒ $\frac{7(1)+15.5}{4(1)+1} = \frac{22.5}{5} =$ **4.5%**

b) *how many months implies solve for t.

percentage is 2.5, so $2.5 = \frac{7t+15.5}{4t+1}$ solve for t.

*multiply both sides by $4t+1$

$(4t+1)2.5 = 7t+15.5$

$10t + 2.5 = 7t + 15.5$

$3t + 2.5 = 15.5$

$3t = 13$

$t = \frac{13}{3} \approx 4.33$ months

c) as $t \to \infty$ means as time goes on their is a value or ASYMPTOTE the function approches. (Horizontal asymptote)

look at degree: • degree 1 on top, degree 1 on bottom ⇒ divide coefficients.

$\frac{7}{4} =$ **1.75% is H.A.**

the percentage of defective welds as time goes on.

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5. *Maximum ⇒ Vertex ⇒ (h, k)

h: max fertilizer; k: max profit.

a) find $h = \frac{-b}{2a} = \frac{-120}{(2(-.2))} = 300$

find $k = -.2(300)^2 + 120(300) - 5500 =$ **\$12,500**

(plug 300 in)

b) *Negative profit ⇒ negative y-values ⇒ has to cross x-axis to go into negative

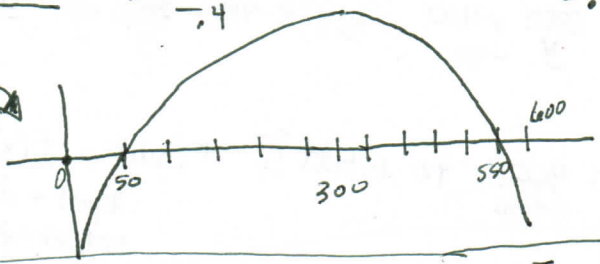
Find zeros. $0 = \underset{a}{-.2}x^2 + \underset{b}{120}x - \underset{c}{5500}$ can try factoring, or Quadratic formula.

$x = \frac{-120 \pm \sqrt{(120)^2 - 4(-.2)(-5500)}}{2(-.2)} = \frac{-120 \pm \sqrt{14400 - 4400}}{-.4} = \frac{-120 \pm \sqrt{10000}}{-.4} \Rightarrow \frac{-120 \pm 100}{-.4}$

$x = \frac{(-120+100)}{-.4} = +50$

$x = \frac{(-120-100)}{-.4} = 550$ ← two x-int

Visual:



from 0 → 600, negative profit is from [0, 50) and (550, 600]