IB questions worksheet-class work: this wks is due the day of the test: Thursday, January 9th.

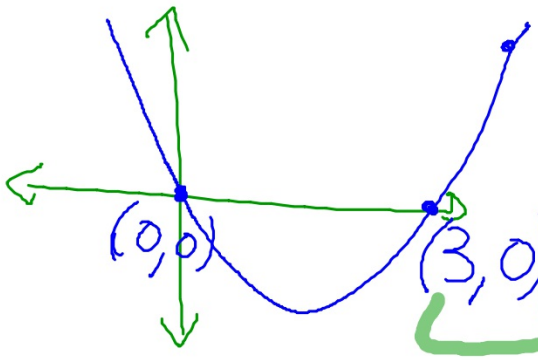
1 a) $x(x-k)$

b) $x^2 - kx = 0$ $\quad a \cdot b = 0$

$x(x-k) = 0$

$x = 0$ $\quad x - k = 0$, $x = k$

c)



$k = 3$

$y = a(x-0)(x-3)$

$y = x(x-3)$

$y = x^2 - 3x$

$y = x^2 - 3x$ or $y = x(x-3)$

$x = \frac{-b}{2a}$ $\quad x = \frac{0+3}{2}$

$x = \frac{3}{2}$ $\quad x = \frac{3}{2}$

$y = \left(\frac{3}{2}\right)^2 - 3\left(\frac{3}{2}\right)$ $\quad y = \frac{3}{2}\left(\frac{3}{2} - 3\right)$

$y = \frac{9}{4} - \frac{9}{2}$

$= \frac{9 - 18}{4}$

$= -\frac{9}{4}$

(2) (a) $Q(t) = 0.003t^2 - 0.625t + 25$

$Q(0) = 0 - 0 + 25$

$\boxed{Q(0) = 25}$

(b) $Q(20)$?

$Q(20) = 0.003(20)^2 - 0.625(20) + 25$

$= 13.7$

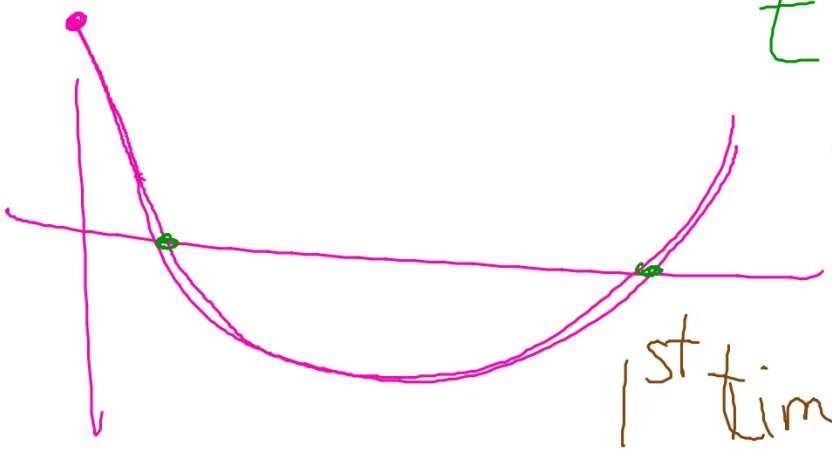
(c) $\text{avg} = \frac{Q(10) + Q(20)}{2} = \frac{19.05 + 13.7}{2} = 16.375$

(d) $Q = 0$ what is t?

$0 = 0.003t^2 - 0.625t + 25$

$t = 53.99$ or 54.0 min

$t = 154.34$ min



1st time energy reaches zero @ $t = 54.0$ min

3 (a) $y = c + kx - x^2$ $\quad a = -1$

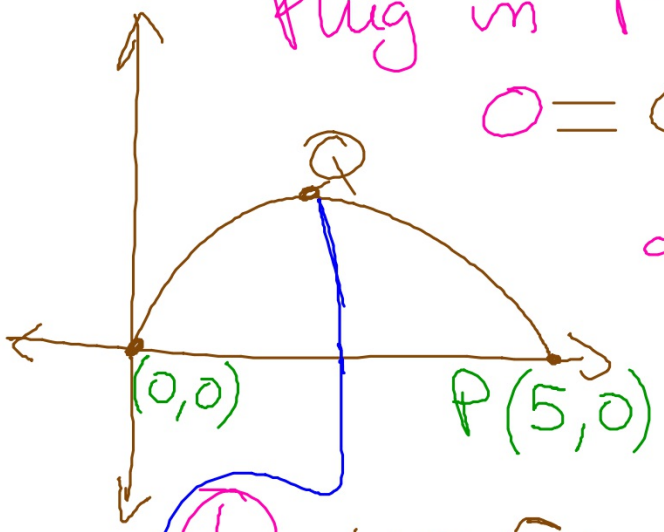
$c = 0$ ↑ y-int is (0,0)

Plug in P:

$0 = 0 + k(5) - (5)^2$

$25 = 5k$

$\boxed{k = 5}$



(b) $y = 5x - x^2$

$x = \frac{-b}{2a} = \frac{-5}{-2}$

$x = 2.5$

$y = 5(2.5) - (2.5)^2$

$y = 6.25$

$Q(2.5, 6.25)$

4 (a) from equation

$C(0, -2)$

$y = (0)^2 - (0) - 2$

$y = -2$

Hence $C(0, -2)$

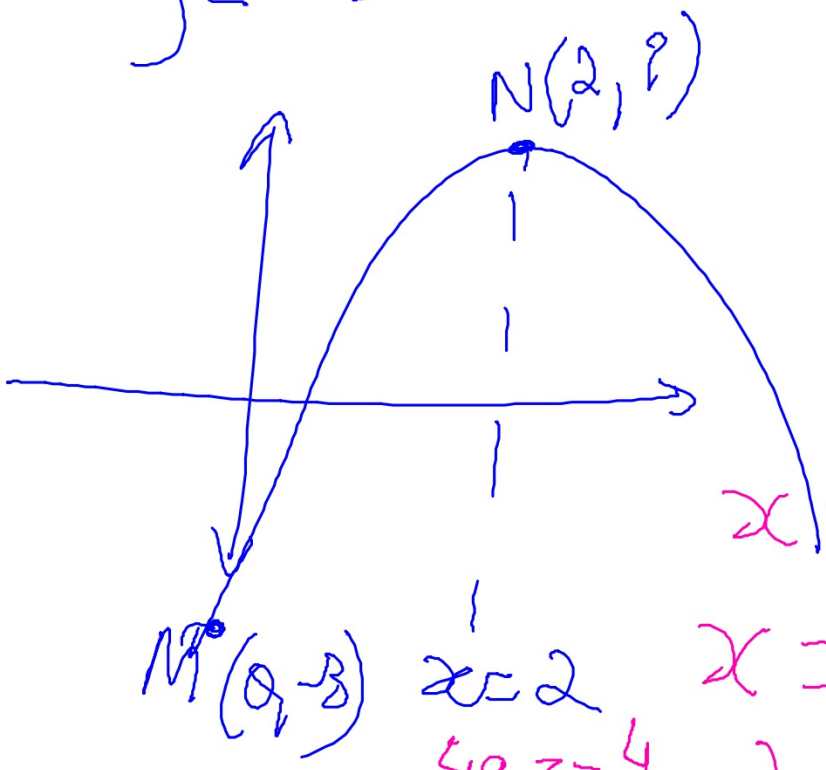
(b) $0 = x^2 - x - 2$

$0 = (x-2)(x+1)$

$x = 2 \quad x = -1$

$A(-1, 0) \quad B(2, 0)$

(5) $y = ax^2 + 4x - 3$



$x = 2$

$x = \frac{-b}{2a}$

$M(0, -3)$ $x = 2$

$2 = \frac{-4}{2a}$

$4a = -4$

$a = -1$

$y = -1(x^2) + 4x - 3$

$y = -1(0^2) + 4(0) - 3$

$y = 0 \to 0 - 3$

$y = -3$

$M(0, -3)$

$N(2, ?)$ $y = -(2)^2 + 4(2) - 3$

$y = 1$

$N(2, 1)$