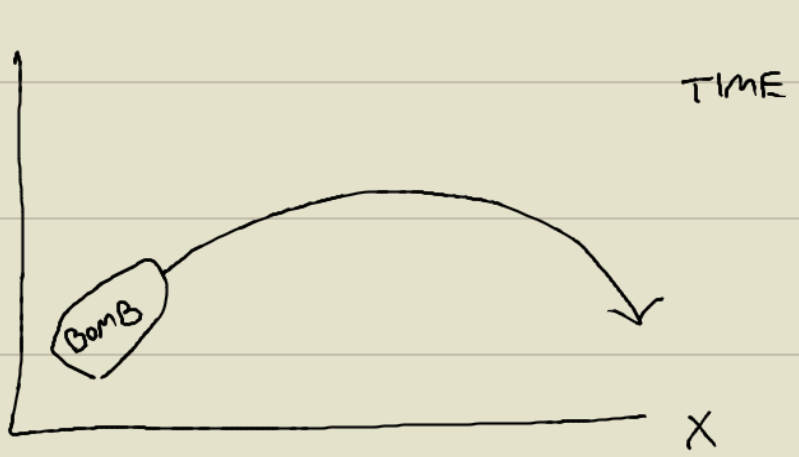

1. $y = 10(x^2 - 5x + 2)$

$\frac{d}{dt}(y) = \frac{d}{dt}[10(x^2-5x+2)]$

$1 \cdot \frac{dy}{dt} = 10(2x-5)\frac{dx}{dt}$ ←

a) $x=5$, $\frac{dx}{dt} = 4$

$\frac{dy}{dt} = 10(2\cdot 5 - 5)\cdot 4$

$= 10(5)\cdot 4$

$= \boxed{200}$

b) $x=2$, $\frac{dy}{dt} = 7$

$7 = 10(2\cdot 2 - 5)\frac{dx}{dt}$

$7 = 10(-1)\frac{dx}{dt}$

$7 = -10\frac{dx}{dt}$

$\boxed{\frac{-7}{10}} = \frac{dx}{dt}$

2. $x^3 + y^3 = 9$

$\frac{d}{dt}(x^3) + \frac{d}{dt}(y^3) = \frac{d}{dt}(9)$

$3x^2 \cdot \frac{dx}{dt} + 3y^2 \cdot \frac{dy}{dt} = 0$

a) $x=1$, $y=2$, $\frac{dx}{dt} = 5$

$3(1)^2 \cdot 5 + 3(2)^2 \cdot \frac{dy}{dt} = 0$

$15 + 12\frac{dy}{dt} = 0$

$12\frac{dy}{dt} = -15$

$\frac{dy}{dt} = \frac{-15}{12}$

$= \boxed{\frac{-5}{4}}$

b) $x=2$, $y=1$, $\frac{dy}{dt} = 3$

$3\cdot 2^2 \cdot \frac{dx}{dt} + 3(1)^2 \cdot 3 = 0$

$12\frac{dx}{dt} + 9 = 0$

$12\frac{dx}{dt} = -9$

$\frac{dx}{dt} = \frac{-9}{12}$

$\frac{dx}{dt} = \boxed{\frac{-3}{4}}$