① $p(t) = 2t^2 - 20t$

$p = 2(t^2 - 10t)$

$p = 2[(t^2 - 10t + 25) - 25]$

$p = 2(t-5)^2 - 50 \rightarrow (5, -50)$

Le requin peut plonger jusqu'à 50 m de profondeur en 5 secondes.

② $f(t) = \frac{-5}{12}t^2 + \frac{10}{3}t$

$\left(5 = \frac{-5}{12}t^2 + \frac{10}{3}t\right) \times 12$

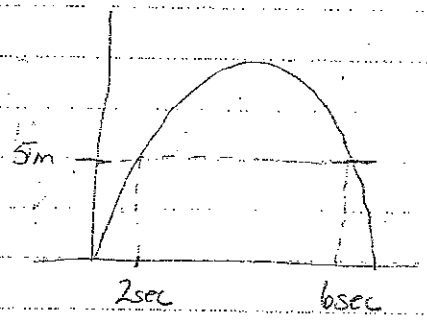
$60 = -5t^2 + 40t$

$5t^2 - 40t + 60 = 0$

$5(t^2 - 8t + 12) = 0$

$5(t-6)(t-2) = 0$

$t = 6$ ou $t = 2$



Sa trajectoire dure 6 seconde

③ $y = a(x-p)^2 + q$ Sommet $(4,0)$ pt $(3,4)$ pt $(6,?)$

$y = a(x-4)^2$

$4 = a(3-4)^2$

$4 = a(-1)^2$

$a = 4$

$y = 4(x-4)^2$

$y = 4(6-4)^2$

$y = 4(2)^2$

$y = 4 \times 4$

$y = 16$

La grandeur du grand poteau est 16m.

④ A(0,10) $y = a(x-p)^2 + q$
B(60,10) $y = a(x-30)^2 + q$
pt(20,8)
Sommet(30,q)

$10 = a(0-30)^2 + q$ $10 = a(60-30)^2 + q$ $8 = a(20-30)^2 + q$
$10 = 900a + q$ ① $10 = 900a + q$ ② $8 = 100a + q$ ③

① $10 = 900a + q$
③ x-1 $-8 = -100a - q$
$2 = 800a$
$\boxed{a = \frac{1}{400}}$

$10 = 900a + q$
$10 = 900\left(\frac{1}{400}\right) + q$
$10 = \frac{9}{4} + q$
$q = \frac{40}{4} - \frac{9}{4}$
$\boxed{q = \frac{31}{4}}$

L'équation du câble est $y = \frac{1}{400}(x-30)^2 + \frac{31}{4}$

⑤ $C(t) = (-1200t^2 + 1200t) + 1800$
$C(t) = -1200(t^2 - t) + 1800$
$C(t) = -1200\left[(t^2 - t + \frac{1}{4}) - \frac{1}{4}\right] + 1800$
$C(t) = -1200\left(t - \frac{1}{2}\right)^2 + 300 + 1800$
$C(t) = -1200\left(t - \frac{1}{2}\right)^2 + 2100$ → $\left(\frac{1}{2}, 2100\right)$

La température du brasier va augmenter à sa chaleur maximale de 2100°C dans $\frac{1}{2}$ heure.