$$\frac{e^{3x}-e^{-3x}}{e^{3x}+e^{-3x}} \qquad x = \ln\sqrt{3}$$

$$\Rightarrow z = e^{3x} \qquad e^{-3x} = \left(e^{3x}\right)^{-1} = \frac{1}{z}$$

$$\frac{z - 1/z}{z + 1/z} = \frac{\frac{z^2-1}{\cancel{z}}}{\frac{z^2+1}{\cancel{z}}} = \frac{z^2-1}{z^2+1}$$

$$\Rightarrow e^{3x} = e^{3\ln\sqrt{3}} = \cancel{e}^{\cancel{\ln}\sqrt{3^3}} = \sqrt{3^3}$$

$$\frac{\left(\sqrt{3^3}\right)^2-1}{\left(\sqrt{3^3}\right)^2+1} = \frac{3^3-1}{3^3+1} = \frac{27-1}{27+1} = \frac{26}{28} = \boxed{\frac{13}{14}}$$

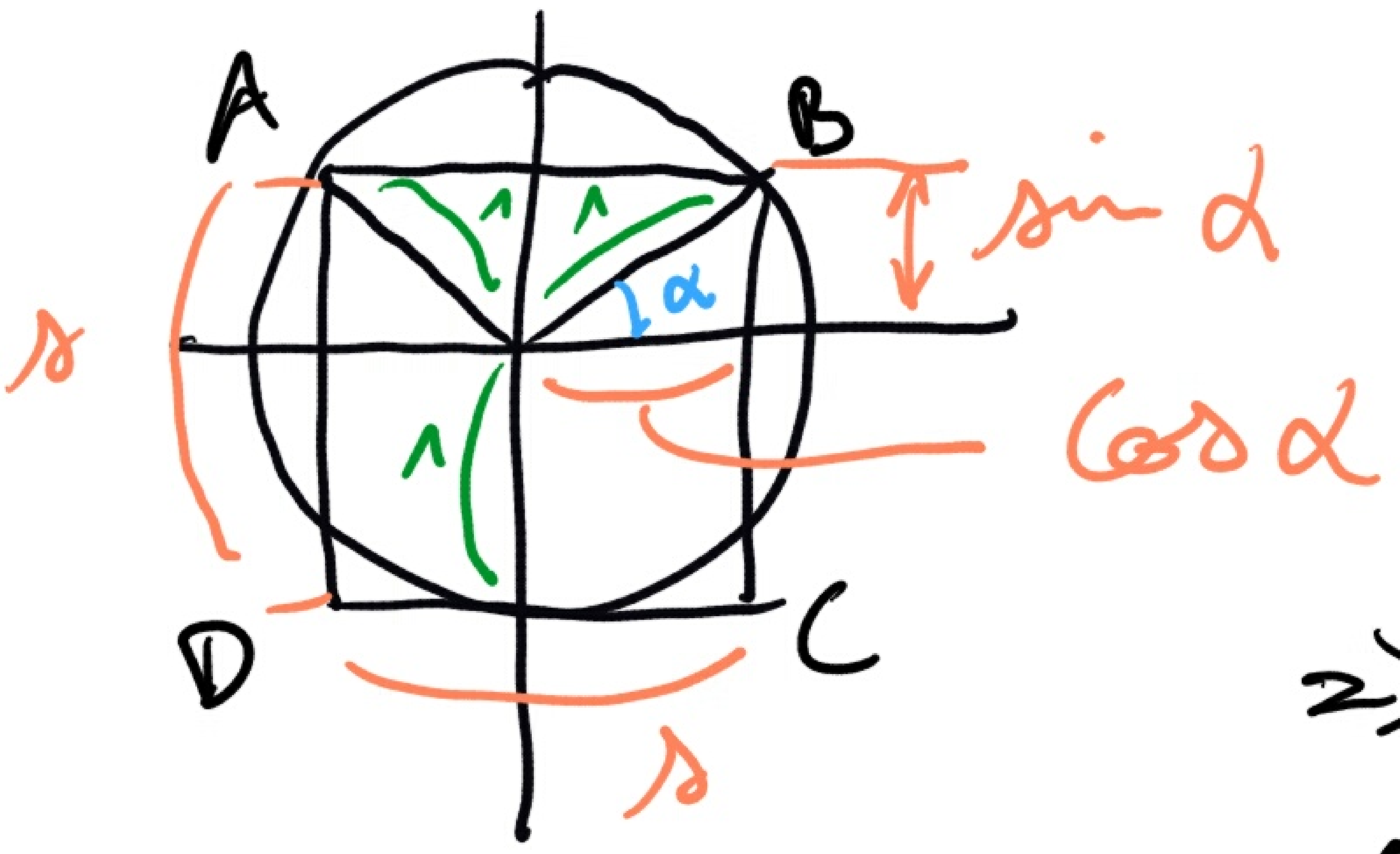
$$\begin{cases} x-1 = y-2 = z-3 \\ x+2y+3z+4=0 \end{cases}$$

$$\left.\begin{aligned} x &= y-1 \\ z &= y+1 \end{aligned}\right\}$$

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

$$6y+6=0 \Rightarrow y=-1$$

$$x = y-1 = \boxed{-2}$$



$$s = 2 \cdot \cos\alpha$$

$$s = 1 + \sin\alpha$$

$$\Rightarrow \boxed{2\cos\alpha = 1 + \sin\alpha} \Leftarrow$$

$$\sin\alpha = \frac{2t}{1+t^2}$$

$$\cos\alpha = \frac{1-t^2}{1+t^2}$$

$$\frac{2-2t^2}{\cancel{1+t^2}} = 1 + \frac{2t}{1+t^2} = \frac{1+t^2+2t}{\cancel{1+t^2}}$$

$$2-2t^2 = 1+t^2+2t$$

$$\Rightarrow 3t^2+2t-1=0$$

$$\Rightarrow t = \frac{-2 \pm \sqrt{4-4\cdot 3\cdot(-1)}}{2\cdot 3}$$

$$t = -\frac{2}{6} \pm \frac{\sqrt{16}}{6} = -\frac{1}{3} \pm \frac{2}{3} \quad \begin{cases} 1/3 \\ \cancel{-1} \end{cases}$$

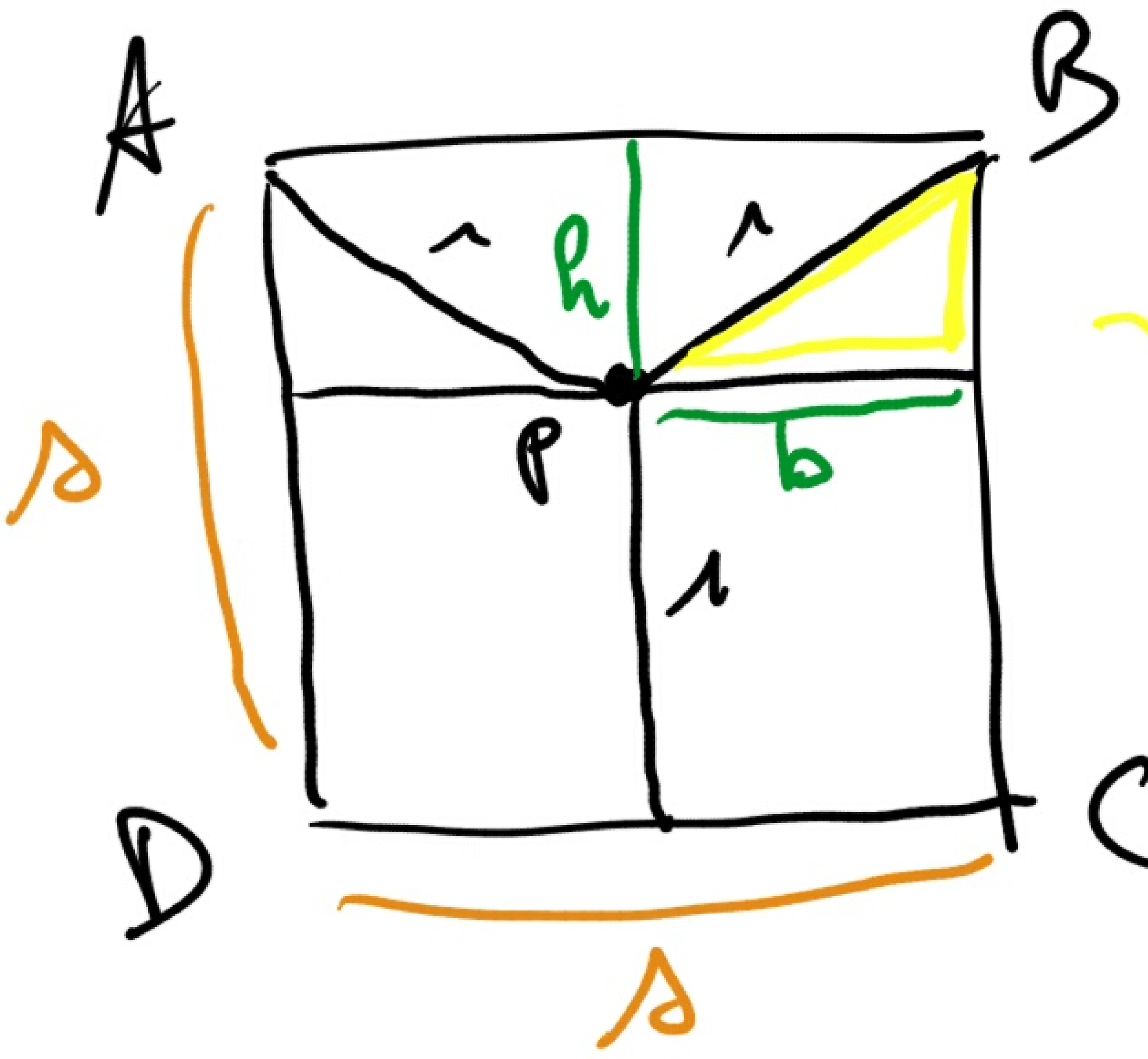
$$\sin\alpha = \frac{2t}{1+t^2} = \frac{2\ 1/3}{1+(1/3)^2} = \frac{2}{3}\cdot\frac{1}{1+\frac{1}{9}}$$

$$= \frac{2}{3}\ \frac{9}{9+1} = \frac{3}{5}$$

$$\cos\alpha = \frac{1+\sin\alpha}{2} = \frac{1+3/5}{2}$$

$$= \frac{1}{2}\cdot\frac{5+3}{5} = \frac{1}{2}\frac{8}{5} = \frac{4}{5}$$

$$\text{opp } ABP = \frac{b.h}{2} = \frac{1}{\cancel{2}}\ \cancel{2}\cdot\frac{4}{5}\cdot\frac{3}{5} = \boxed{\frac{12}{25}}$$



$s = 1 + h$

$1^2 = h^2 + b^2$

$s = 2 \cdot b$

$1 + h = 2 \cdot b$

$h = 2b - 1$

$$1^2 = (2b-1)^2 + b^2$$

$$1 = 4b^2 - 4b + 1 + b^2$$

$$\Rightarrow 0 = 5b^2 - 4b = b(5b-4)$$

$$\Rightarrow 5b - 4 = 0 \Rightarrow \boxed{b = \frac{4}{5}}$$

$$h = 2b - 1 = \frac{2 \cdot 4}{5} - \frac{5}{5} = \frac{8-5}{5} = \frac{3}{5}$$

$$\text{Opp } \triangle ABP = \frac{1}{2} b \cdot h = \frac{1}{\cancel{2}} \cdot \left(\cancel{2} \cdot \frac{4}{5}\right) \cdot \frac{3}{5}$$

$$= \boxed{\frac{12}{25}}$$

$$y^2 - x^2 - x - y = 0 \quad \Big| \; (a+b)^2 = \underbrace{a^2}_{} + \underbrace{2ab}_{} + b^2$$

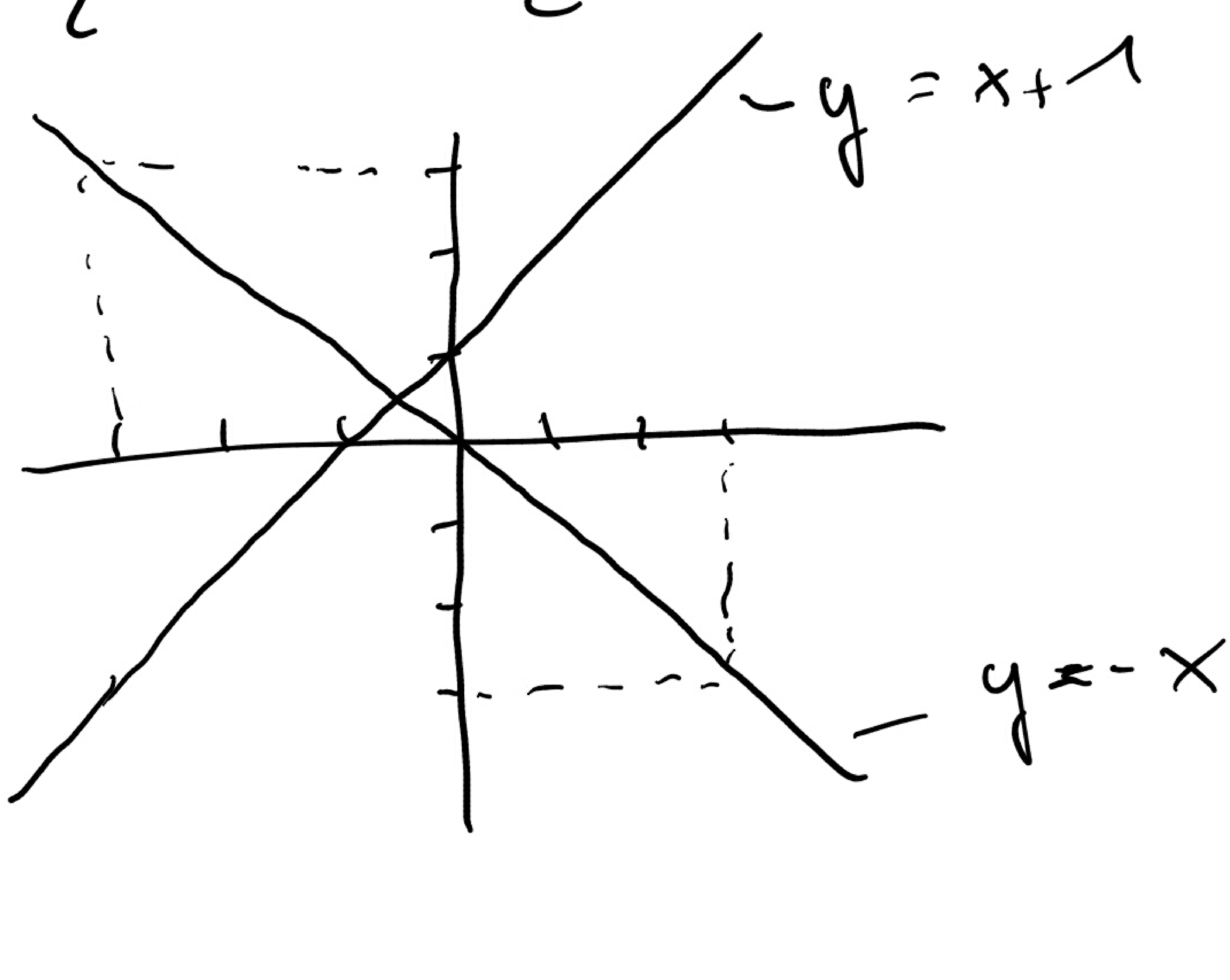
$$\Rightarrow y^2 - y - x^2 - x = 0$$

$$\begin{cases} y^2 - y = \left(y - \frac{1}{2}\right)^2 - \frac{1}{4} \\ -x^2 - x = -\left[\left(x + \frac{1}{2}\right)^2 - \frac{1}{4}\right] \end{cases}$$

$$\Rightarrow \left(y - \frac{1}{2}\right)^2 - \cancel{\frac{1}{4}} - \left(x + \frac{1}{2}\right)^2 + \cancel{\frac{1}{4}} = 0$$

$$\Rightarrow \underbrace{\left(y - \frac{1}{2}\right)}_{v}{}^2 = \underbrace{\left(x + \frac{1}{2}\right)}_{w}{}^2 \quad \Rightarrow \quad v^2 = w^2 \;\Leftrightarrow\; \cancel{\pm} v = \pm w$$

$$\begin{cases} y - \frac{1}{2} = x + \frac{1}{2} \Rightarrow y = x + 1 \\ y - \frac{1}{2} = -x - \frac{1}{2} \Rightarrow y = -x \end{cases}$$



$$y^2 - y - x^2 - x = 0$$

$$? \quad (x+y)(ax+by+c) = 0$$

$$ax^2 + bxy + cx + axy + by^2 + cy$$

$$\Rightarrow \left.\begin{array}{l} x^2 \to -1 = a \\ y^2 \to 1 = b \\ x, y \to -1 = c \end{array}\right\}$$

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

$$\Rightarrow \begin{cases} x+y = 0 & \Rightarrow \quad y = -x \\ -x+y-1 = 0 & \Rightarrow \quad y = x+1 \end{cases}$$

D

$$f(x) = (x-1) \cdot tg(x^2)$$

$$f'(x) = (x-1)' \cdot tg(x^2) + (x-1) \cdot \underbrace{[tg(x^2)]'}$$

$$y = tg(x^2) \longrightarrow \quad u = x^2$$

$$du = 2x\,dx$$

$$\frac{dy}{du} = \frac{1}{\cos^2(u)}$$

$$\frac{dy}{dx} = \frac{2x}{\cos^2(x^2)}$$

$$f'(x) = tg(x^2) + (x-1) \cdot \frac{2x}{\cos^2(x^2)}$$

$$f'(\sqrt{\pi}) = tg(\pi) + (\sqrt{\pi} - 1) \cdot \frac{2\sqrt{\pi}}{\cos^2(\pi)}$$

$$= 0 + (\sqrt{\pi} - 1)\, \frac{2\sqrt{\pi}}{1}$$

$$= 2\sqrt{\pi}\,(\sqrt{\pi} - 1)$$

C

$$f(x) = \frac{4}{3}x^3 - 2x^2 + x + p$$

$$f'(x) = \frac{4}{\cancel{3}}\cancel{3}x^2 - 2.2x + 1$$

$$= 4x^2 - 4x + 1 \underbrace{=}\, 0$$

$$x = \frac{+4 \pm \sqrt{4^2 - 4.4.1}}{2.4}$$

$$= \frac{4}{8} \pm 0 = \frac{1}{2}$$

$$f\left(\frac{1}{2}\right) = \frac{4}{3}\frac{1}{8} - 2\frac{1}{4} + \frac{1}{2} + p = 0$$

$$\frac{1}{6} - \cancel{\frac{1}{2}} + \cancel{\frac{1}{2}} + p = 0$$

$$\Rightarrow \boxed{p = -\frac{1}{6}}$$

A

Aantal mogelijke rangschikkingen:
permutatie (geordend, geen herhaling)
$\Rightarrow n!$

Aantal gunstige $\rightarrow$ combinatie C_n^2

$$C_n^k = \frac{n!}{k!\,(n-k)!}$$ $\rightarrow$ volgorde niet van belang!

$$C_n^2 = \frac{n!}{2!\,(n-2)!}$$

Laplace: $\dfrac{\text{aantal gunstige}}{\text{aantal mogelijke}}$

$$\Rightarrow \frac{C_n^2}{n!} = \frac{1}{\cancel{n!}} \cdot \frac{\cancel{n!}}{2!\,(n-2)!} = \frac{1}{48}$$

$$48 = 2!\,(n-2)! \Rightarrow (n-2)! = \frac{48}{2} = 24$$

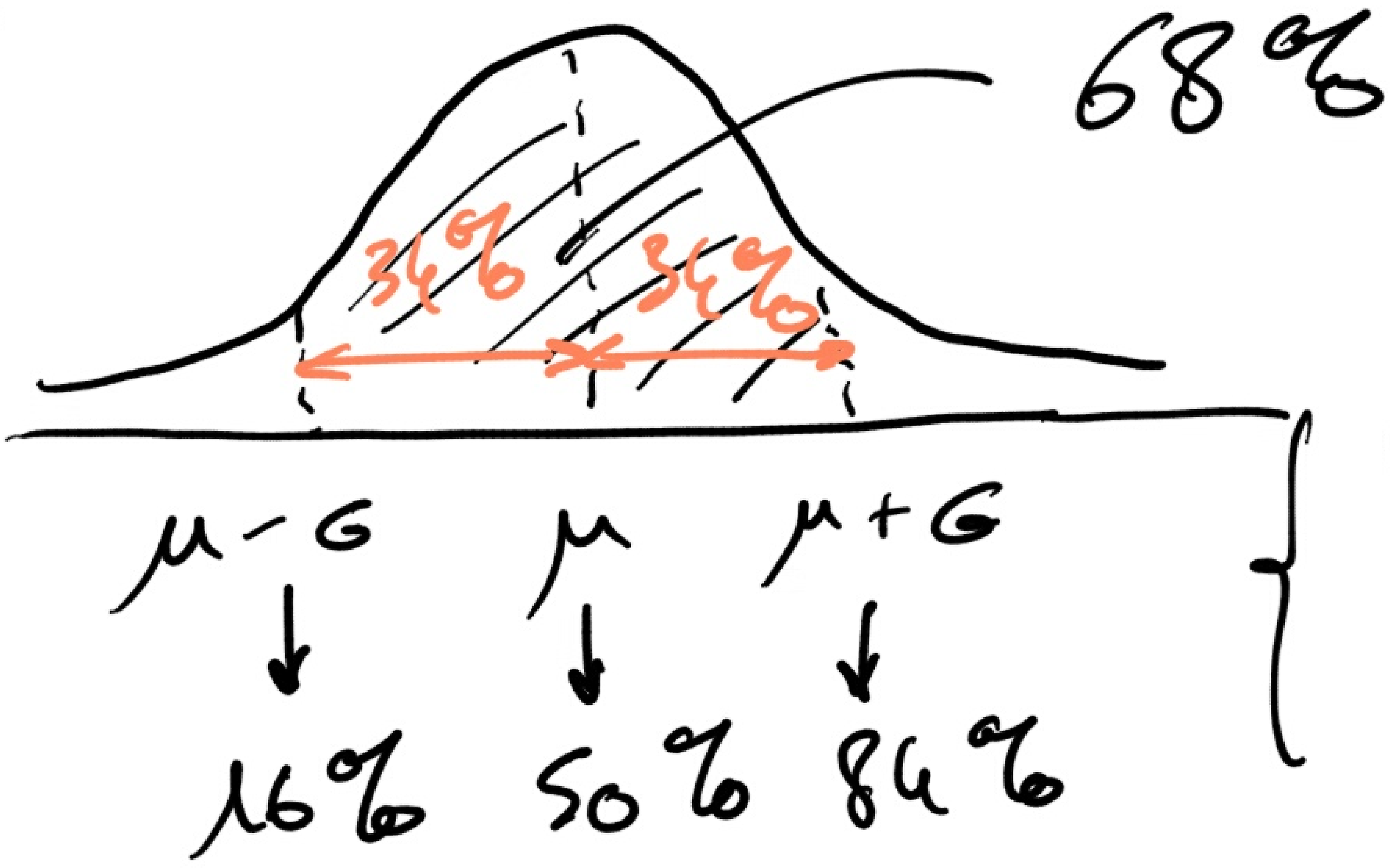
$4!$

$n-2 = 4$

$\Rightarrow \underline{n = 6}$

C

$P(-1 < z < 1) = 0{,}68 \Rightarrow$ 68 % van alle gevallen ligt tussen $\mu - \sigma$ en $\mu + \sigma$.



50 % M
50 % V

M: $\mu = 180$, $\sigma = 5$
V: $\mu = 170$, $\sigma = 10$

Kies 2 personen: 4 mogelijkheden:

$(MM + MV + VM + VV)\ \frac{1}{4}$

$P(M > 180) = 50\ \%\ (\mu = 180)$

$P(V > 180) = 16\ \%\ (\mu + \sigma = 180)$

$\frac{1}{4} \cdot \frac{1}{100} (50 \cdot 50 + 50 \cdot 16 + 16 \cdot 50 + 16 \cdot 16)$

$\frac{1}{400} (2500 + 800 + 800 + 256)$

$\frac{1}{400} (4356) = \boxed{10{,}89\ \%}$

B

Maak tabel:

	M	V	totaal
> 180cm	50	16	66
< 180cm	50	84	144
totaal	100	100	200

$P(1 \text{ persoon} > 180) = \frac{66}{200} = 0{,}33$

$P(2 \text{ personen} > 180) = 0{,}33 \cdot 0{,}33$

$= 0{,}1089$

$= \boxed{10{,}89\ \%}$

$p(x) = x^3 - x^2 + 2x - 3$

$\hookrightarrow$ coefficients : $\begin{cases} x^0 \to -3 \\ x^1 \to 2 \\ x^2 \to -1 \\ x^3 \to 1 \end{cases}$

$$p(x) = c_0 + \underline{c_1(x-1)} + \underline{c_2(x-1)(x-2)}$$
$$+ \underline{c_3(x-1)(x-2)(x-3)}$$

$c_1 x - c_1$ $\quad$ $c_2 x^2 - 3c_2 x + 2c_2$

$c_3 x^3 - 6c_3 x^2 + 11 c_3 x - 6c_3$

$x^0 \to c_0 - c_1 + 2c_2 - 6c_3 = -3$

$x^1 \to c_1 - 3c_2 + 11 c_3 = 2$

$x^2 \to c_2 - 6c_3 = -1$

$x^3 \to c_3 = \boxed{1}$

$c_2 - 6.1 = -1 \Rightarrow c_2 = \boxed{5}$

$c_1 - 3.5 + 11.1 = 2 \Rightarrow c_1 = \boxed{6}$

$c_0 - 6 + 10 - 6 = -3 \Rightarrow c_0 = \boxed{-1}$

$c_0 + c_1 + c_2 = -1 + 6 + 5 = \boxed{10}$

A