① $f(x) = \frac{1}{2}\tan(2x+\pi)$

? vico vaakteljn in $P\left(-\frac{\pi}{2}, f\left(-\frac{\pi}{2}\right)\right)$

$f\left(-\frac{\pi}{2}\right) = \frac{1}{2}\tan\left(-\frac{2\pi}{2}+\pi\right) = 0$

$\frac{dy}{dx} = \frac{dy}{du}\,\frac{du}{dx}$

$u = 2x+\pi \rightarrow \frac{du}{dx} = 2$

$\frac{dy}{du} = \left(\frac{1}{2}\tan(u)\right)' = \frac{1}{2}\,\frac{1}{\cos^2 u}$

$\Rightarrow \frac{dy}{dx} = \frac{1}{2}\cdot 2\cdot\frac{1}{\cos^2(2x+\pi)} = f'(x)$

$f'\left(-\frac{\pi}{2}\right) = \frac{1}{\cos^2\left(-\frac{2\pi}{2}+\pi\right)} = \frac{1}{\cos^2(0)} = 1$

② $C: x^2 - 4x + y^2 - 2y + 4 = 0$

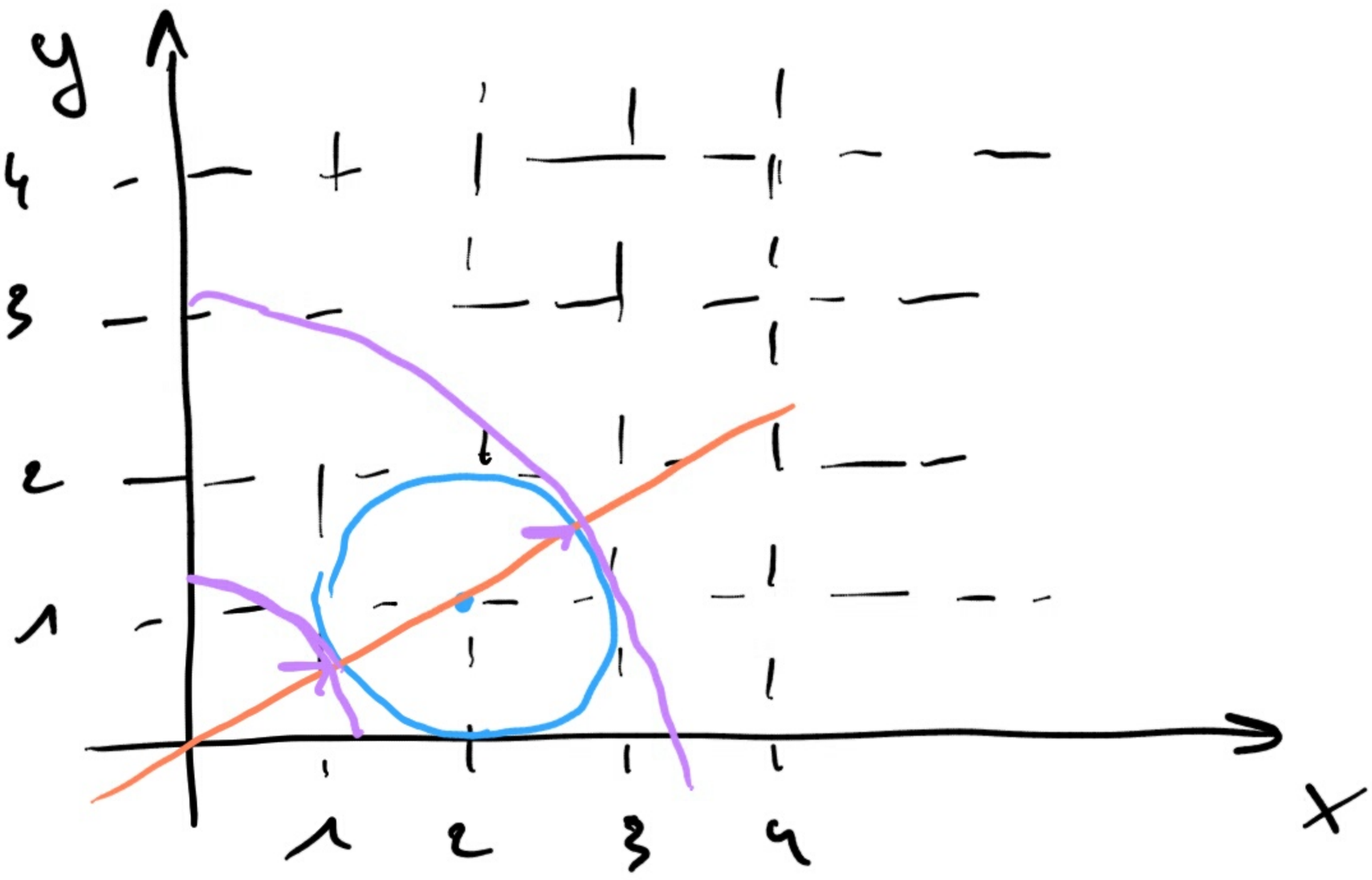
$x^2 - 4x + 4 = (x-2)^2$

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

$x^2 - 4x + y^2 - 2y + 4 + 1 - 1$

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

of $(x-2)^2 + (y-1)^2 = 1$



2 cirkels met middelpunt O

en 1 raakpunt aan de cirkel.

Straal op de cirkel door O

en middelpunt cirkel.

C

(3) 1 vierkant met zijde 1
4 halve cirkels met straal 1/2
= 2 hele cirkels

$$O_V = z^2 = 1^2 = 1$$

$$O_C = 2 \cdot \pi r^2 = 2 \cdot \pi \left(\frac{1}{2}\right)^2 = \frac{\pi}{2}$$

$$\approx 1{,}57$$

Totaal $= 1 + 1{,}57 = 2{,}57$ (C)

④ $2x^3 + x^2 - 13x + 6$ MP: $x = 2$

	2	1	-13	6
2		1	4	10	-6
	2	5	-3	0

$(2x^2 + 5x - 3)(x - 2)$

↳ $x = \frac{-5 \pm \sqrt{5^2 - 4 \cdot 2 \cdot (-3)}}{2 \cdot 2}$

$x = \frac{-5 \pm \sqrt{49}}{4} = \frac{-5 \pm 7}{4}$

$x < \begin{matrix} 2/4 = 1/2 \\ -12/4 = -3 = -\frac{6}{2} \end{matrix}$

verschil in absolute waarde

$\left| \frac{1}{2} - \frac{-6}{2} \right| = \frac{7}{2}$ (A)

(5)

$$g(x) = 2\sqrt{x}$$

$$f(x) = 2\sqrt{\underbrace{x+3}_{x}} + \underbrace{2}_{y}$$ verschuiving

$$\frac{dy}{dx} = \frac{dy}{du} \cdot \frac{du}{dx}$$

$$u = x+3 \rightarrow \frac{du}{dx} = 1$$

$$\frac{dy}{du} = \left(2u^{1/2} + 2\right)' = 2\frac{1}{2} \cdot u^{-1/2} + 0$$

$$\frac{dy}{dx} = f'(x) = \frac{1}{\sqrt{x+3}}$$

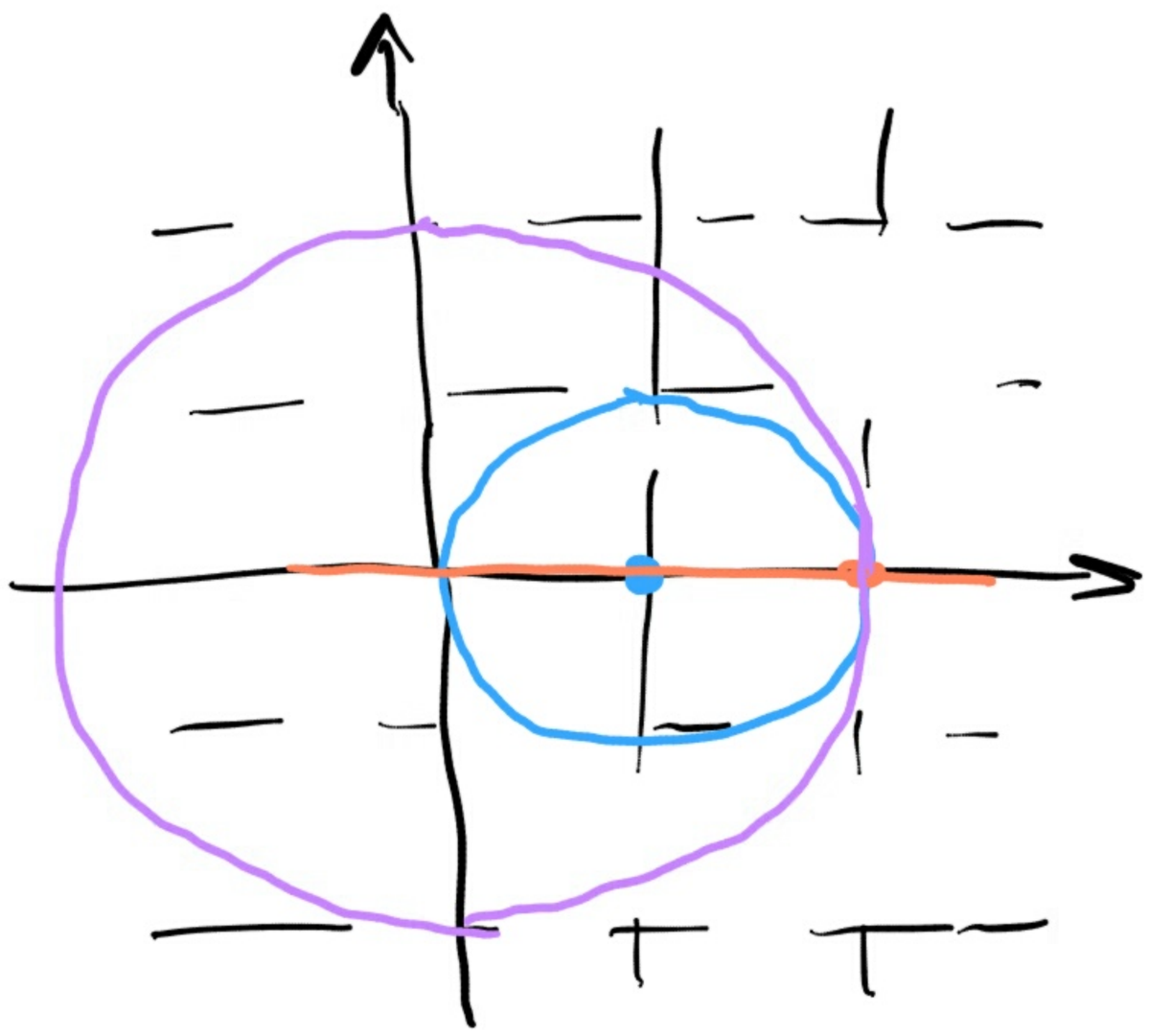
C

⑥ $C: x^2 + y^2 - 2x = 0$

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

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

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



Sledits 1 cirkel die raakt!

(B)

(7) $f(x) = \frac{x^2}{x-3}$

$$\left(\frac{f(x)}{g(x)}\right)' = \frac{f'(x)g(x) - f(x)g'(x)}{(g(x))^2}$$

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

$$\rightsquigarrow 2x(x-3) - x^2 = 0$$

$$2x^2 - 6x - x^2 = 0$$

$$x^2 - 6x = 0$$

$$x(x-6) = 0 \rightarrow \begin{cases} x = 0 \\ x = 6 \end{cases}$$

$$f(0) = 0$$

$$f(6) = \frac{36}{6-3} = \frac{36}{3} = 12$$

recte door $(0,0)$ en $(6,12)$

$$\downarrow$$

$$y = 2x$$

(A)

(8) $A = \begin{bmatrix} 1 & 3 \\ 3 & 2 \end{bmatrix}$ $B = \begin{bmatrix} x & 1 \\ 1 & y \end{bmatrix}$

$$A.B = \begin{bmatrix} 1 & 3 \\ 3 & 2 \end{bmatrix}\begin{bmatrix} x & 1 \\ 1 & y \end{bmatrix} = \begin{bmatrix} x+3 & 1+3y \\ 3x+2 & 3+2y \end{bmatrix}$$

$$B.A = \begin{bmatrix} x & 1 \\ 1 & y \end{bmatrix}\begin{bmatrix} 1 & 3 \\ 3 & 2 \end{bmatrix} = \begin{bmatrix} x+3 & 3x+2 \\ 1+3y & 3+2y \end{bmatrix}$$

$$\left.\begin{aligned} 1+3y &= 3x+2 \\ 3x+2 &= 1+3y \end{aligned}\right\} \rightarrow 3x = 3y-1$$

$$x = y - \frac{1}{3}$$

(A)

⑨ $p(x) = 3x^3 - 2x^2 - 12x + 8$

Voor welke waarde van a wel deelbaar door $ax+2$?

Algemeen: deelbaar door $(x-a)$ als $x=a$ een nulpunt is!

A: $a=-3 \rightarrow -3x+2 = -3(x-\frac{2}{3})$

is $x=\frac{2}{3}$ een nulpunt?

$3\left(\frac{2}{3}\right)^3 - 2\left(\frac{2}{3}\right)^2 - 12\left(\frac{2}{3}\right) + 8 = \frac{8}{9} - \frac{8}{9} - 8 + 8 = 0$ ✓

B: $a=-1 \rightarrow -x+2 = -1(x-2)$

is $x=2$ een nulpunt?

$3(2)^3 - 2(2)^2 - 12 \cdot 2 + 8 = 24 - 8 - 24 + 8 = 0$ ✓

C: $a=1 \rightarrow x+2$

is $x=-2$ een nulpunt?

$3(-2)^3 - 2(-2)^2 - 12(-2) + 8 = -24 - 8 + 24 + 8 = 0$ ✓

D: $a=3 \rightarrow 3x+2 = 3(x+\frac{2}{3})$

is $x=-\frac{2}{3}$ een nulpunt?

$3\left(-\frac{2}{3}\right)^3 - 2\left(-\frac{2}{3}\right)^2 - 12\left(-\frac{2}{3}\right) + 8 = -\frac{8}{9} - \frac{8}{9} + 8 + 8$

$\neq 0$

D

10) $\frac{x-2}{x+2} < \frac{x+2}{x-2}$

$\frac{x+2-4}{x+2} < \frac{x-2+4}{x-2} \Rightarrow 1 - \frac{4}{x+2} < 1 + \frac{4}{x-2}$

$-\frac{1}{x+2} < \frac{1}{x-2}$

A $]-2,-1[$ liers $x = -3/2$

$-\frac{1}{-\frac{3}{2}+\frac{4}{2}} < \frac{1}{-\frac{3}{2}-\frac{4}{2}} \Rightarrow -\frac{2}{1} < -\frac{2}{7}$ ok

B $]-1,0[$ liers $x = -1/2$

$-\frac{1}{-\frac{1}{2}+\frac{4}{2}} < \frac{1}{-\frac{1}{2}-\frac{4}{2}} \Rightarrow -\frac{2}{3} < -\frac{2}{5}$ ok

C $]1,2[$ liers $x = 3/2$

$-\frac{1}{\frac{3}{2}+\frac{4}{2}} < \frac{1}{\frac{3}{2}-\frac{4}{2}} \Rightarrow -\frac{2}{7} < -\frac{2}{1}$ NOK

D $]2,3[$ liers $x = 5/2$

$-\frac{1}{\frac{5}{2}+\frac{4}{2}} < \frac{1}{\frac{5}{2}-\frac{4}{2}} \Rightarrow -\frac{2}{9} < \frac{2}{1}$ ok

C