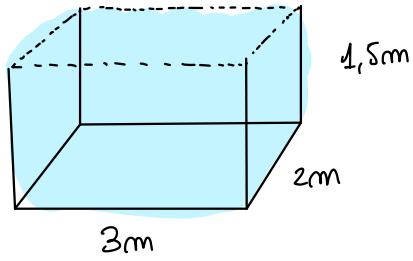
CORREZIONE ESERCITAZIONE

ESn 1:



$V = 1{,}5\,m \cdot 2\,m \cdot 3\,m = 9\,m^3$

$1\,m^3 = 1000\,L$

$V = 9\,m^3 = 9 \cdot 1000\,L = 9 \cdot 10^3\,L$

RISPOSTA: (A)

ESn 2:

$\Delta s = (42 \pm 1)\ km \rightarrow \varepsilon_{\Delta s} = \frac{1}{42} = 0{,}024$

$\Delta t = (2{,}5 \pm 0{,}1)\ h \rightarrow \varepsilon_{\Delta t} = \frac{0{,}1}{2{,}5} = 0{,}04$

$v = \frac{\Delta s}{\Delta t}$

Valore: $\bar{v} = \frac{42\ km}{2{,}5\ h} = 16{,}8\ km/h$

Errore: $\Delta v = \bar{v}\,(\varepsilon_{\Delta s} + \varepsilon_{\Delta t}) = 16{,}8\ km/h\,(0{,}024 + 0{,}04) = 1{,}08\ km/h$

$v = (16{,}8 \pm 1{,}08)\ km/h = (16{,}8 \pm 1{,}1)\ km/h$

RISPOSTA: (D)

ESn 3:

$\frac{503}{0{,}1} = \frac{503}{10^{-1}} = 503 \cdot 10 = 5030 = 5{,}030 \cdot 10^3 = 5{,}0 \cdot 10^3$

3 2 1

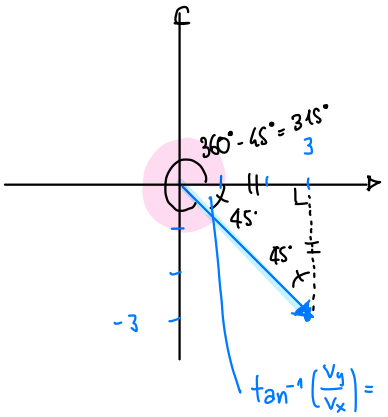
n° SENZA LA VIRGOLA: 50

ORDINE DI GRANDEZZA: $10^{3+1} = 10^4$

Aggiungiamo 1 se il numero è ≥ 5

RISPOSTA: (A)

ES n°4 : $\vec{v} = (3; -3)$ $\quad \rho_{\vec{v}} = ?$ $\quad \vartheta_{\vec{v}} = ?$



$$\rho_{\vec{v}} = \sqrt{v_x^2 + v_y^2} = \sqrt{3^2 + (-3)^2} = \sqrt{9+9} = \sqrt{18} = \sqrt{2 \cdot 3^2} = 3\sqrt{2}$$

$$\vartheta_{\vec{v}} = 315°$$

$\tan^{-1}\left(\frac{v_y}{v_x}\right) = \tan^{-1}\left(\frac{-3}{3}\right) = -45° + 360° = 315°$

in RADIANTI : $315° : x = 180° : \pi$

RISPOSTA: (D)

ES n°5 : $\dfrac{(1-x^2)(x+3)}{x^2+4x+3} \geq 0$ $\quad N_1 \quad N_2 \quad D$

Vogliamo usare il grafico dei segni

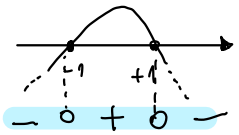
N_1 : $1-x^2$ è di 2° grado → EQUAZIONE + PARABOLA

$1-x^2 = 0$

$-x^2 = -1$

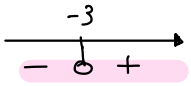
$x^2 = 1 \longrightarrow x = \pm 1$

$a = -1 < 0$



N_2 $x+3$ è di 1° grado → STUDIO MAGGIORE (o UGUALE)

$x+3 \geq 0 \rightarrow x \geq -3$



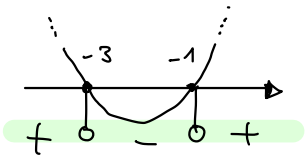
D x^2+4x+3 è di 2° grado

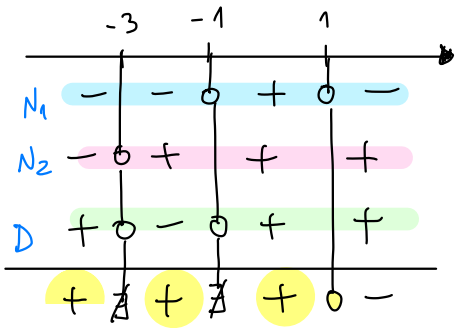
$a = 1 > 0$

$x^2+4x+3 = 0$

$\Delta = b^2 - 4ac = 16 - 4(1)(3) = 4$

$x_{1,2} = \dfrac{-b \pm \sqrt{\Delta}}{2a} = \dfrac{-4 \pm 2}{2}$ $\quad x_1 = -1$ $\quad x_2 = -3$



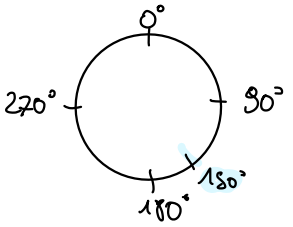


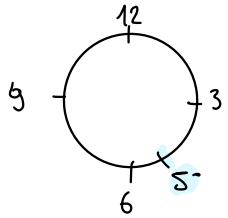
$S = x \leq 1$ con $x \neq -3$ e $x \neq -1$

RISPOSTA: (C)

ES n°6: $\frac{5}{6}\pi$ → Gradi?

$\frac{5}{6}\pi : x = \pi : 180°$ ⇝ $x = \frac{\frac{5}{6}\pi \cdot 180}{\pi} = 150°$

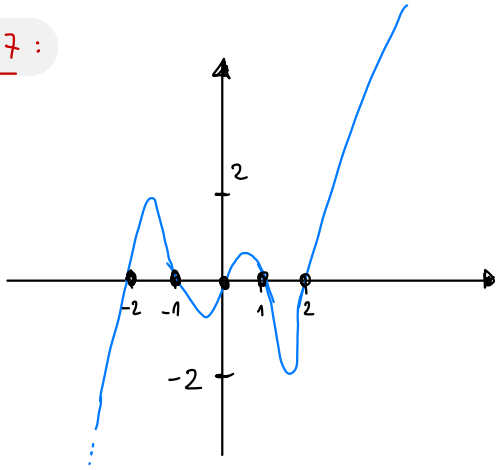




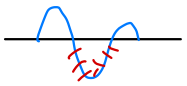
Sono le 05:00

RISPOSTA : (A)

ES n°7:



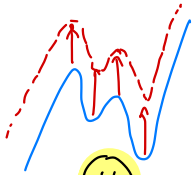
(A) Positiva per $-2 < x < 1$ → (F)



(B) $f(x)=0$ per $x=\pm1$ e $x=\pm2$ → (F)

manca 0!

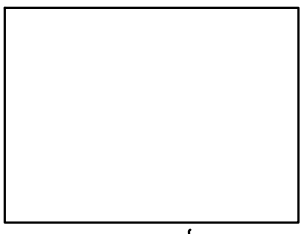
(C) $y = f(x) + 2$ è sempre positiva → (F)



(D) $y = f(x) + 2$ è positiva per $x > 0$ → (V)

RISPOSTA : (D)

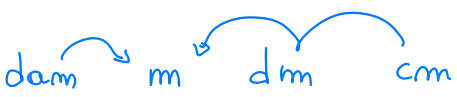
ES n°8:



200 cm

0,3 dam

$1\,m^2$ costa 2€



$S = 0{,}3\,dam \cdot 200\,cm = 3m \cdot 2m = 6\,m^2$ ⟶ 12€

RISPOSTA: (B)

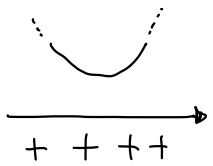
ES n°9 $y = \log(2-x) + \log(x) - \log(x^2+4)$

Condizioni di esistenza

$$\begin{cases} 2-x>0 \rightarrow -x>-2 \rightarrow x<2 \\ x>0 \\ x^2+4>0 \quad \text{è di 2° grado} \rightarrow \text{EQ + PARABOLA} \end{cases}$$

$x^2+4=0$

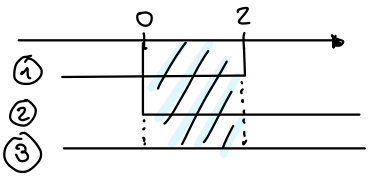
$x^2=-4$ ~ è negativo!



Sempre positiva!

L'EQ. è IMPOSSIBILE

INTERSECO:



S: $0<x<2$

RISPOSTA: (C)

ES n°10

C.E. $x \neq 0$

$$x \cdot \frac{2^{x-1}-4}{x} = 0 \cdot x \rightarrow 2^{x-1}-4=0 \rightarrow 2^{x-1}=4$$

$$\log_2(2^{x-1}) = \log_2(2^2) \rightarrow x-1=2 \rightarrow x=3 \text{ Accettabile}$$

RISPOSTA: (B)

ES n°11:

$\bar{l} = 25\,cm$ (VALOR MEDIO) $\quad E_{\%} = 1\%$ $\quad$ ERRORE ASSOLUTO = ?

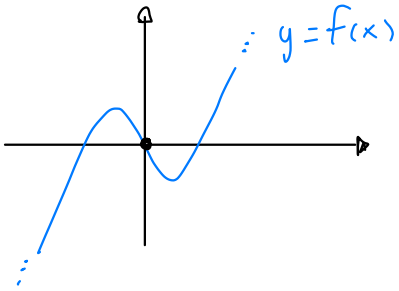
$$E_{\%} = \varepsilon_l \cdot 100\% \rightsquigarrow \varepsilon_l = \frac{E_{\%}}{100\%} \rightarrow \varepsilon_l = \frac{1\%}{100\%} = 0{,}01$$

$$\varepsilon_l = \frac{\Delta l}{\bar{l}} \rightsquigarrow \Delta l = \varepsilon_l \cdot \bar{l} \rightsquigarrow \Delta l = 0{,}01 \cdot 25\,cm = 0{,}25\,cm$$

RISPOSTA: (D)

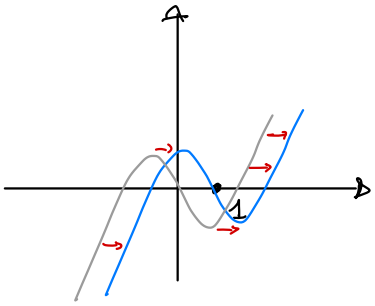
ES n° 12:

$y = -f(x-1)$



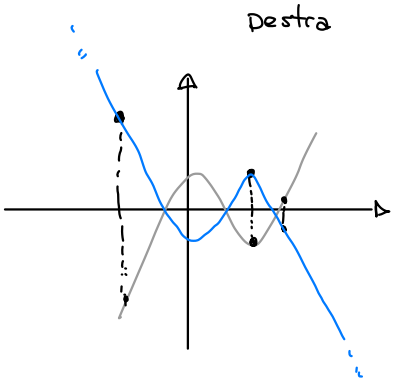
$x-1$ al posto di x

MI SPOSTO DI 1 VERSO... Destra



c'è un - davanti

RIBALTO RISPETTO ALL'ASSE x



RISPOSTA : (D)

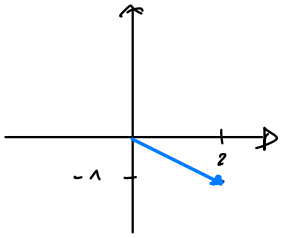
ES n° 13 :

$\vec{v} = (0;3)$

$\vec{w} = (-2;4)$

$\vec{v} - \vec{w} = \left(0-(-2) \;;\; 3-4\right)$

$= (2\;;-1)$



RISPOSTA: (C)

ES n° 14

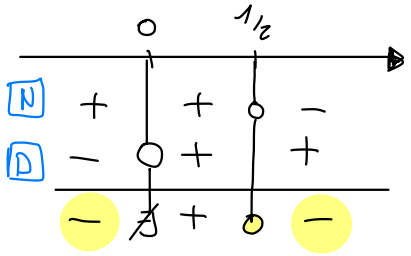
ci deve essere zero!

$$\frac{1-x}{x} \leq 1$$

$$\frac{1-x}{x} - 1 \leq 0 \quad \rightarrow \quad \frac{1-x-x}{x} \leq 0 \quad \rightarrow \quad \frac{1-2x}{x} \leq 0$$

N: $1-2x \geq 0 \rightarrow -2x \geq -1 \rightarrow x \leq 1/2$

D: $x > 0$



$\rightarrow$ $x < 0 \;\vee\; x \geq 1/2$

RISPOSTA : (A)

ES n° 15:

$$2^{\log_2\left(2^{\log_2(2^x)}\right)} = 1$$

$$2^{\log_2(2^x)} = 1$$

RICORDA: $2^{\log_2(A)} = A$

$$2^x = 1 \longrightarrow \log_2(2^x) = \log_2(1) \rightarrow x = 0$$

RISPOSTA : (A)

ES n° 16:

VALORE:	1	2	3	5
FREQUENZA:	2	5	7	1

La moda è il valore con la frequenza maggiore → 3

La media è: $\frac{1\cdot 2 + 2\cdot 5 + 3\cdot 7 + 5\cdot 1}{2+5+7+1} = \frac{38}{15} = 2{,}53$

RISPOSTA : (B)

ES n° 17:

$$\frac{\log_2\left((-4)^{20}\right) + \log_{1/2}(64) - \log_2(2)}{2^{\log_2(1)+\log_2(3)}}$$

$$\frac{\log_2\left((2^2)^{20}\right) + \log_{1/2}(2^6) - \log_2(2^1)}{2^{\log_2(3)}}$$

$(2^A)^B = 2^{A\cdot B}$ $\qquad A^{-1} = \frac{1}{A}$

$$\frac{\log_2(2^{40}) + \log_{1/2}((1/2)^{-6}) - \log_2(2^1)}{2^{\log_2(3)}}$$

$$\frac{40 - 6 - 1}{3} = \frac{33}{3} = 11$$

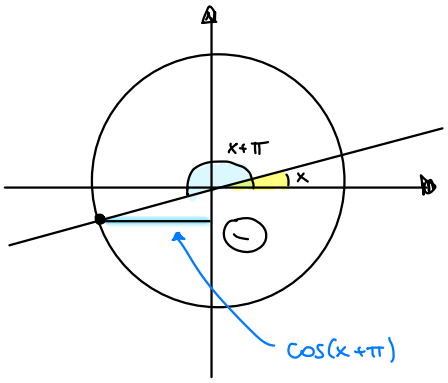
$\log_2 2^A = A$

$2^{\log_2 A} = A$

$\log_2 A + \log_2 B = \log_2 AB$

RISPOSTA : (C)

ES n° 18 : $\sin(x+a) = \cos(x+\pi)$ per quali a è vera $\forall x \in \mathbb{R}$



$a = \frac{1}{2}\pi$

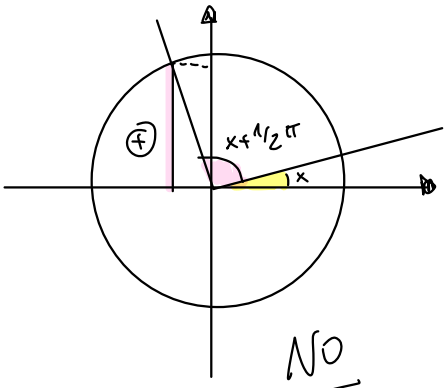
$a = \pi$

$a = -\frac{3}{2}\pi$

$a = \frac{3}{2}\pi$

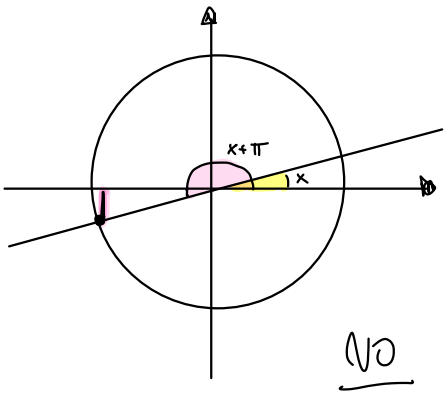
Valutiamo tutte le opzioni:

$\sin(x+\frac{1}{2}\pi)$



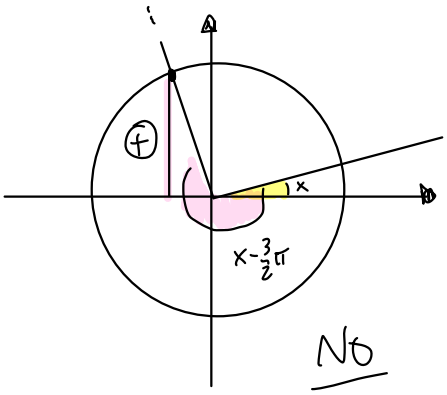
NO

$\sin(x+\pi)$



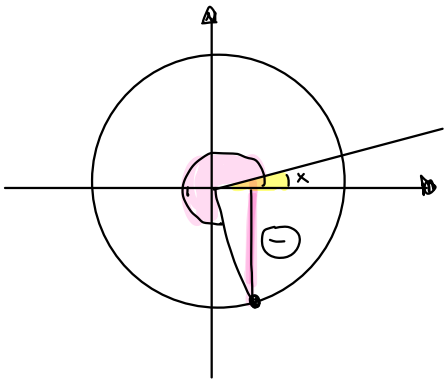
NO

$\sin(x-\frac{3}{2}\pi)$



NO

$\sin(x+\frac{3}{2}\pi)$



✓

In alternativa, poiché deve valere $\forall x \in \mathbb{R}$, deve essere vera per $x=0$

$\sin(x+a) = \cos(x+\pi)$ diventa $\sin(a) = \cos(\pi)$

Ma $\cos\pi = -1 \Rightarrow \sin(a) = -1$, da cui $a = \frac{3}{2}\pi$

RISPOSTA: (D)