1/10/2021

31 Una funzione $y = f(x)$ associa al numero reale x la differenza tra il cubo del numero e il cubo della somma tra il numero e 2. Scrivi $f(x)$ e trova il suo insieme immagine $Im(f)$ se il dominio è $D = \{-2, -1, 0, 1\}$.

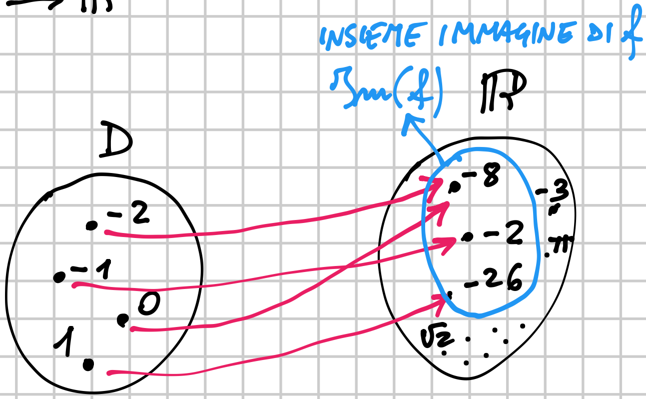
$[y = -6x^2 - 12x - 8;\ Im(f) = \{-26, -8, -2\}]$

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

$$f: D \to \mathbb{R}$$

$$= x^3 - (x^3 + 6x^2 + 12x + 8) =$$

$$= \cancel{x^3} - \cancel{x^3} - 6x^2 - 12x - 8$$



$$f(x) = -6x^2 - 12x - 8$$

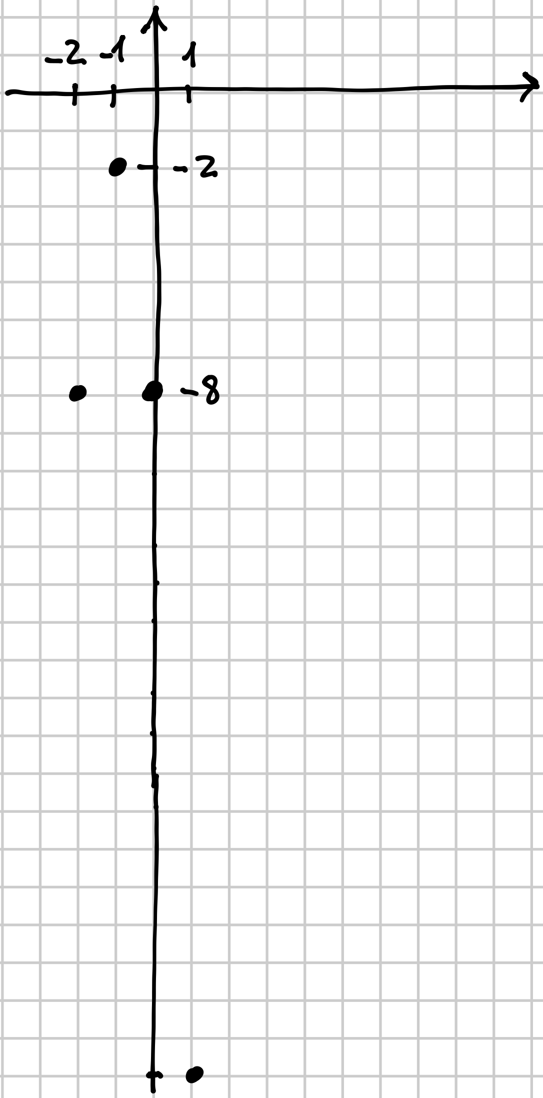
$$f(-2) = -6(-2)^2 - 12(-2) - 8 = -24 + 24 = -8$$

$$f(-1) = -6(-1)^2 - 12(-1) - 8 = -6 + 12 - 8 = -2$$

$$f(0) = -6 \cdot 0^2 - 12 \cdot 0 - 8 = -8$$

$$f(1) = -6 \cdot 1^2 - 12 \cdot 1 - 8 = -26$$

$$Im(f) = \{-8, -2, -26\}$$



32 Data la funzione $f(x) = x^2 - 4$, calcola $f(2x)$, $2f(x)$, $f(x^2)$, $[f(x)]^2$. $[4x^2 - 4;\ 2x^2 - 8;\ x^4 - 4;\ x^4 - 8x^2 + 16]$

$$f: \mathbb{R} \to \mathbb{R}$$

$$f(t) = t^2 - 4$$

$$f(\text{Pinco Pallino}) = (\text{Pinco Pallino})^2 - 4$$

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

$$2f(x) = 2(x^2 - 4) = 2x^2 - 8$$

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

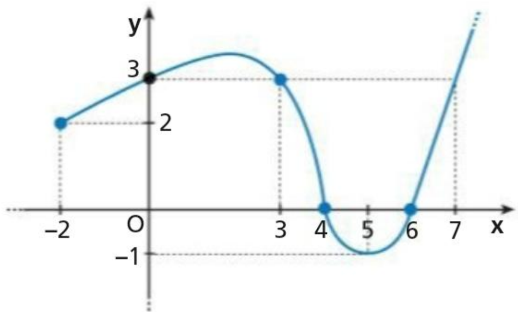
$$[f(x)]^2 = f^2(x) = (x^2 - 4)^2 = x^4 - 8x^2 + 16$$

36 **LEGGI IL GRAFICO** Completa utilizzando il grafico della figura, che rappresenta una funzione f.

Insieme immagine $Im(f) = \boxed{}$; $f(4) = \boxed{0}$, $f(0) = \boxed{3}$;

$f(\boxed{6}) = 0$, $f(\boxed{5}) = -1$, $f(\boxed{7}) = 3$;

$f(-2) = \boxed{2}$; $2 \cdot \underbrace{f(3)}_{3} = \boxed{6}$.



DOMINIO

$$D = \{x \in \mathbb{R} \mid x \geq -2\} = [-2, +\infty) = [-2, +\infty[$$

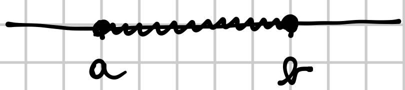
CODOMINIO $\mathbb{R}$

$$Im(f) = \{y \in \mathbb{R} \mid y \geq -1\} = [-1, +\infty) = [-1, +\infty[$$

<u>INTERVALLI</u>

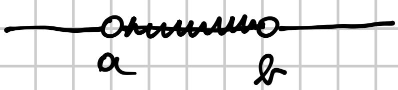
Siano $a, b \in \mathbb{R}$ con $a \leq b$

$$[a, b] = \{x \in \mathbb{R} \mid a \leq x \leq b\}$$

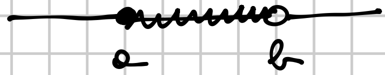


INTERVALLO CHIUSO E LIMITATO

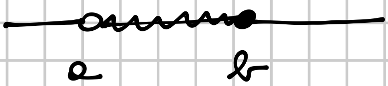
$$(a, b) =]a, b[= \{x \in \mathbb{R} \mid a < x < b\}$$



INTERVALLO APERTO E LIMITATO

$[a, b) = [a, b[= \{x \in \mathbb{R} \mid a \leq x < b\}$ 

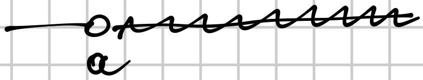
INTERVALLO SEMIAPERTO (LIMITATO)

$(a, b] =]a, b] = \{x \in \mathbb{R} \mid a < x \leq b\}$ 

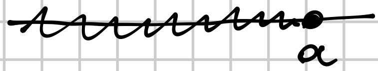
INT. SEMIAPERTO (LIMITATO)

$[a, +\infty) = [a, +\infty[= \{x \in \mathbb{R} \mid x \geq a\}$ 

INTERVALLO CHIUSO ILLIMITATO (SUPERIORMENTE)

$(a, +\infty) =]a, +\infty[= \{x \in \mathbb{R} \mid x > a\}$ 

INT. APERTO ILLIMITATO (SUPERIORMENTE)

CHIUSO $(-\infty, a] =]-\infty, a] = \{x \in \mathbb{R} \mid x \leq a\}$ 

APERTO $(-\infty, a) =]-\infty, a[= \{x \in \mathbb{R} \mid x < a\}$ 

INTERVALLI ILLIMITATI INFERIORMENTE

$[2, 3) = \{x \in \mathbb{R} \mid 2 \leq x < 3\}$

$(-\infty, -5) = \{x \in \mathbb{R} \mid x < -5\}$

$[4, 4] = \{x \in \mathbb{R} \mid 4 \leq x \leq 4\} = \{4\}$

$(4, 4) = \{x \in \mathbb{R} \mid 4 < x < 4\} = \emptyset$

$(-\infty, +\infty) = \mathbb{R}$ $\qquad$ $\mathbb{R}^+ = (0, +\infty) = \{x \in \mathbb{R} \mid x > 0\}$

$\mathbb{R}^-$ e $\mathbb{R}_0^-$ analogamente.... $\qquad$ $\mathbb{R}_0^+ = [0, +\infty) = \{x \in \mathbb{R} \mid x \geq 0\}$