

Esercizio 1.11.1 Semplificare le seguenti espressioni:

a) $\sqrt[6]{x^3}, x \geq 0$; $\sqrt[3]{x^6}, x \in \mathbb{R}$; $\sqrt[4]{x^6}, x \in \mathbb{R}$; $\sqrt[3]{x^9}, x \in \mathbb{R}$;

b) $\sqrt[3]{x^{6a}}, x > 0, a \in \mathbb{R}$; $\sqrt[6]{x^{3a}}, x > 0, a \in \mathbb{R}$.

Esercizio 1.11.2 Risolvere le seguenti disequazioni:

a) $1 < x^{1/2} \leq 32$;

e) $\sqrt{2 - |x|} \leq x$;

i) $\sqrt{x - 1} \geq \frac{|x|}{2}$;

l) $3 - x \geq \sqrt{x^2 - 12}$;

b) $1 < x^5 \leq 32$;

f) $\sqrt{3 - |x|} \geq 1 - x$;

j) $\sqrt[6]{x + 3} + \sqrt[3]{x + 3} \leq 2$;

m) $\sqrt{x^2 + 2x} > 1 + x$;

c) $1 < x^{10} \leq 32$;

g) $\sqrt{|x| - 3} \leq x - 1$;

k) $x - 2 < \sqrt{x^2 + 1}$;

n) $\sqrt{-3x - x^2} < 4 + x$;

d) $\sqrt{2 - |x|} \geq x$;

h) $\sqrt{x - 1} \leq |x - 2|$;

o) $\sqrt{1 - 2x} + \sqrt{5 - x} > 6$.

1.11.1 (a) $\sqrt{x}, x^2, \sqrt{|x|^3}, x^3$ (b) $x^{2a}, \sqrt{x^a}$

1.11.2 (a) $x \in (1, 1024]$ (b) $x \in (1, 2]$ (c) $x \in [-\sqrt{2}, -1) \cup (1, \sqrt{2}]$ (d) $x \in [-2, 1]$ (e) $x \in [1, 2]$
(f) $x \in [\frac{3}{2} - \frac{1}{2}\sqrt{17}, 3]$ (g) $x \in [3, +\infty)$ (h) $x \in [1, \frac{5}{2} - \frac{1}{2}\sqrt{5}] \cup [\frac{5}{2} + \frac{1}{2}\sqrt{5}, +\infty)$ (i) $x = 2$ (j) $x \in [-3, -2]$
(k) $x \in \mathbb{R}$ (l) $x \in (-\infty, -2\sqrt{3}]$ (m) $x \in (-\infty, -2]$ (n) $x \in [-3, 0]$ (o) $x \in (-\infty, -4)$