

EQUATIONS, INEQUALITIES AND SYSTEMS TEST - 4^o ESO

Exercise 1: Solve the following equations:

a) (0.75 points) $x^4 - 14x^2 + 45 = 0 \rightarrow x = \pm 3, x = \pm\sqrt{5}$

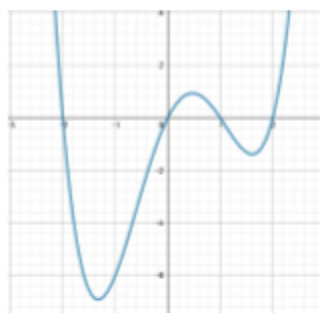
b) (0.75 points) $\sqrt{2-x} - x = 10 \rightarrow x = -7$

c) (1 point) $\sqrt{3x+1} + \sqrt{x+3} = 4 \rightarrow x = 1$

Exercise 2: (1.5 points) Solve these inequalities:

a) (1 point) $x^3 - x^2 - 12x \leq 0 \rightarrow x \in (-\infty, -3] \cup [0, 4]$

b) (0.5 points) $x^4 - x^3 - 4x^2 + 4x > 0$ if its graph is given by



$$x \in (-\infty, -3] \cup [0, 4]$$

Exercise 3: (2 points) Let's face now some non-linear simultaneous equations with two variables:

a)
$$\left. \begin{array}{l} x^2 - y^2 = 45 \\ 3x^2 + 2y^2 = 155 \end{array} \right\} \rightarrow \begin{array}{ll} \boxed{x=7 \quad y=2} & \boxed{x=7 \quad y=-2} \\ \boxed{x=-7 \quad y=2} & \boxed{x=-7 \quad y=-2} \end{array}$$

b)
$$\left. \begin{array}{l} xy = 30 \\ 4x^2 - y^2 = 64 \end{array} \right\} \rightarrow \begin{array}{ll} \boxed{x=5 \rightarrow y=6} & \boxed{x=-5 \rightarrow y=-6} \end{array}$$

Exercise 4: (3 points) And a few simultaneous inequalities:

a)
$$\left. \begin{array}{l} 3x - y < 7 \\ x - 2y \geq 4 \end{array} \right\}$$



b)
$$\left. \begin{array}{l} x^2 + 7x > 0 \\ 9 - x^2 \geq 0 \end{array} \right\} \rightarrow x \in (0, 3]$$



I'm gonna pass,
gimme candy

$$c) \left. \begin{array}{l} x^2 - 10x + 25 > 0 \\ x^2 - 3x + 2 \leq 2x + 8 \end{array} \right\} \rightarrow x \in [-1, 5) \cup (5, 6]$$

Exercise 5: (1 point) Find the dimensions of a rectangle if its perimeter has a length of 60 m and its area measures 221 m²

The dimensions are 17 m wide and 13 m long or the other way round



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