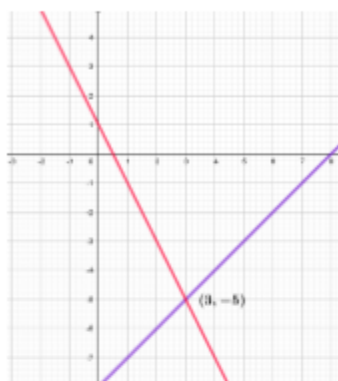# EQUATIONS TEST – 3º ESO

Exercise 1: (2.5 ptos) Solve and classify the following systems of equations using the indicated method:

a) $\left.\begin{array}{l} 3x - y = 7 \\ 6x - 2y = 15 \end{array}\right\}$ Substitution $\qquad$ $\not\exists$ solution $\rightarrow$ Inconsistent

b) $\left.\begin{array}{l} 2x - 6y = 4 \\ 3x - 9y = 6 \end{array}\right\}$ Elimination $\qquad$ ∞ solutions $\rightarrow$ Consistent dependent

c) $\left.\begin{array}{l} x - y = 8 \\ 2x + y = 1 \end{array}\right\}$ Graphical $\qquad$ Consistent independent

(3, −5)

d) $\left.\begin{array}{l} 3x + y = 4 \\ 5x - 3y = 7 \end{array}\right\}$ Nasıl istersen $\qquad$ $x = \dfrac{19}{14} \qquad y = \dfrac{-1}{14} \rightarrow$ Consistent independent

Exercise 2: (0.75 ptos) Find the value of k so that when we divide the polynomial $P(x) = kx^3 - 3x^2 + 5x - 4$ by $(x+1)$ the remainder is eleven $\qquad$ $k = -23$

Exercise 3: (1.5 ptos) Divide the following polynomials and indicate the quotient and the remainder:

a) $(x^4 - 5x^3 - 3x + 4) : (x^2 - 2x) = \begin{cases} \text{Quotient: } x^2 - 3x - 6 \\ \text{Remainder: } -15x + 4 \end{cases}$

b) $(3x^4 - x^2 - 3) : (x - 2) = \begin{cases} \text{Quotient: } 3x^3 + 6x^2 + 11x + 22 \\ \text{Remainder: } 41 \end{cases}$

Exercise 4: (3 ptos) Find the roots of these polynomials and factorize them:

a) $P(x) = x^5 - 2x^4 - 13x^3 + 26x^2 + 36x - 72 \rightarrow \begin{cases} \text{Roots: } x = 2 \text{ double, } x = -2, \ x = \pm 3 \\ \text{Fact: } (x-2)^2(x+2)(x+3)(x-3) \end{cases}$

b) $Q(x) = x^6 + 9x^5 + 23x^4 + 15x^3 \rightarrow \begin{cases} \text{Roots: } x = 0 \text{ triple, } x = -1, \ x = -3, \ x = -5 \\ \text{Fact: } x^3(x+1)(x+3)(x+5) \end{cases}$

c) $R(x) = 6x^4 - 5x^3 - 20x^2 + 25x - 6 \rightarrow \begin{cases} \text{Roots: } x = 1, \ x = -2, \ x = 3/2, \ x = 1/3 \\ \text{Fact: } 6(x-1)(x+2)\left(x - \dfrac{3}{2}\right)\left(x - \dfrac{1}{3}\right) = \\ \qquad = (x-1)(x+2)(2x-3)(3x-1) \end{cases}$

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a) $(2x-1)^2 - 24 = (x+3)^2 \rightarrow \begin{cases} x = 16/3 \\ x = -2 \end{cases}$

b) $\dfrac{x-5}{x-1} = \dfrac{x-3}{x+5} \rightarrow x = 7$

Exercise 6: (0.75 ptos) I am thinking that I didn't study enough for my Math text, because the teacher asked me to factorize the polynomial $R(x) = 5x^5 + 4x^4 + 3x^3 + 2x^2 + 8x$, and when I answered $R(x) = (x-2)(x+3)(x+1)^2$, she looked at me as if she wanted to strangle me... Is it that bad? Really? Please, tell me what's wrong !!!!

-) The degrees of both polynomials don't coincide

-) You forgot to take out the x as a common factor

-) Since all the signs in the polynomial are positive, you can't have a positive root, $x = 2$

-) You also forgot to place the leading coefficient 5 in front of the factorization

-) 3 is not a divisor of 8

Come on, my girl, try learning Turkish or something, because, definitely, this is not your thing ;)