Exercise 1: (0.75 ptos) Find the value of k so that the polynomial $P(x) = x^4 + kx^3 + 10x^2 + 17x - 18$ is divisible by $(x - 2)$ $\boxed{k = -9}$

Exercise 2: (1.5 ptos) Divide the following polynomials:

a) $\left(3x^4 - 5x^2 + 3x - 9\right) : \left(x^2 - 2x\right) =$ Quotient: $3x^2 + 6x + 7$ Remainder: $17x - 9$

b) $\left(x^4 + 9x^2 - 4x - 7\right) : \left(x + 3\right) =$ Quotient: $x^3 - 3x^2 + 18x - 58$ Remainder: 167

Exercise 3: (3 pto) Factorize the following polynomials and indicate their roots:

a) $P(x) = x^5 + 9x^4 + 23x^3 + 15x^2$

$\boxed{\begin{array}{l} \text{Roots: } x = 0 \text{ double, } x = -1, \ x = -3, \ x = -5 \\ \text{Factorization: } x^2 (x+1)(x+3)(x+5) \end{array}}$

b) $Q(x) = x^5 - x^4 - 13x^3 + 13x^2 + 36x - 36$

$\boxed{\begin{array}{l} \text{Roots: } x = 1, \ x = -2, \ x = 2, \ x = -3, x = 3 \\ \text{Factorization: } (x-1)(x+2)(x-2)(x+3)(x-3) \end{array}}$

c) $R(x) = 5x^3 + 3x^2 - 32x + 12$

$\boxed{\begin{array}{l} \text{Roots: } x = 2, \ x = -3, \ x = 2/5 \\ \text{Factorization: } 5(x-2)(x+3)(x-2/5) = (x-2)(x-3)(5x-2) \end{array}}$

Exercise 4: (0.75 ptos) I've factorized the polynomial $P(x) = 2x^5 + 12x^4 + 4x^3 + 5x + 8$ and I got

$$P(x) = 2x^5 + 12x^4 + 4x^3 + 5x + 8 = x(x-3)(x+1)(x+2)$$

Find at least five mistakes

1. The degree of the polynomial is five, but you only have four factors
2. You can't take x as a common factor
3. Three is not a divisor of eight
4. There's a two missing at the beginning of the factorization
5. All the roots must be negative

Exercise 5: **(3.25 ptos)** Solve and classify the following systems of equations using the indicated method:

a) $\left.\begin{array}{l} 2x - y = 11 \\ 3x - 5y = 6 \end{array}\right\}$ Substitution

$\boxed{x = 7}$ $\boxed{y = 3}$

Consistent independent

b) $\left.\begin{array}{l} 6x - 3y = 9 \\ 10x - 5y = 5 \end{array}\right\}$ Elimination

It has no solution, Inconsistent

c) $\left.\begin{array}{l} 5x + 2y = 1 \\ 3x + 7y = 2 \end{array}\right\}$

$\boxed{x = 3/29}$ $\boxed{y = 7/29}$

Consistent independent

d) $\left.\begin{array}{l} x + y = 3 \\ 2x - y = 12 \end{array}\right\}$ Graphical

Consistent independent

(5, −2)

Exercise 6: **(0.75 pto)** In a restaurant they have tables for three people and tables for four people. If they have a total of nineteen tables and they can sit a total of sixty-nine people, how many tables of each type are there?

PS: Due to the coronavirus pandemic, all the four-people tables are outside.

There are seven tables for three people and twelve tables for four people