Tasks 02-01 - Linear Equations & Inequalities

Section 02: Equations & Systems

Problem 1: Solving Linear Inequalities (x)

Solve the following inequalities and express the solution set using interval notation.

a) $5x + 3 \leq 18$

b) $21 - 2x > 9$

c) $3(x + 4) \geq 5x - 8$

d) $\frac{x-1}{4} < \frac{x+3}{2}$

Problem 2: Break-Even Analysis (xx)

A company is launching a new smartwatch with the following cost structure:

- Fixed monthly costs (rent, salaries, insurance): $12,000
- Variable cost per watch (materials, assembly): $85
- Planned selling price: $249

a) Write an equation for the total cost when x watches are produced in the first month.

b) How many watches must be sold in the first month to break even on monthly operations?

Problem 3: Motion and Meeting Problem (xxx)

Two delivery services are coordinating a package handoff.

- QuickShip leaves City A heading east toward City B at 65 km/h.
- At the same time, FastTrack leaves City B heading west toward City A at 85 km/h.
- The cities are 375 km apart.

a) How long until the drivers meet?

b) How far from City A will they meet?

c) If QuickShip had left 30 minutes earlier, where would they meet?

Problem 4: Business Decision (xx)

A freelance designer has two pricing plans for a project:

- Plan A: A flat fee of €1,200.
- Plan B: An initial fee of €500 plus €35 per hour.

Let h be the number of hours the project takes.

a) Write an expression for the total cost of each plan (e.g., Cost A, Cost B).

b) For what number of hours are the two plans equal in cost?

c) If the designer estimates the project will take 25 hours, which plan is cheaper for the client?

Problem 5: Investment Threshold (xx)

An investor has €20,000 to invest. They decide to put some money into a safe bond that yields 3% annual interest and the rest into a riskier stock fund that is projected to yield 8% annual interest.

What is the minimum amount of money the investor must put into the stock fund to ensure a total annual return of at least €1,000?