Linear function – real life problem applications

Celsius to Farenheit: $F = 1.8C + 32$

Farenheit to Celsius: $C = \frac{F-32}{1.8}$

1. (a) If a person has a slight fever of 38°C, what is that temperature in Fahrenheit?

   (b) A recipe from the USA tells you to preheat the oven to 350°F. What temperature should you set on your Celsius oven?

   (c)Find the temrpeture when Farenheit and Celsius has the same value.

2. Solar Panel Payback (Energy Investment): A homeowner installs solar panels for $18,000. Before the panels, the monthly electricity bill was $220. After installation, the bill dropped to $30, but there is a yearly maintenance fee of $180. Write a linear function for the total savings over time and calculate how many years it will take for the investment to "break even" (pay for itself).

3. You are offered two summer sales jobs:
   Company A: A base salary of $400 per week plus 5% commission on total sales.
   Company B: No base salary, but a 12% commission on all sales. At what specific dollar amount of sales does Company B become the better financial choice?

4. An EV starts a trip with an 85% battery charge. After driving 120 miles at a constant speed, the battery is at 45%. Create a linear model for the battery percentage based on miles driven. If your destination is 260 miles from the start, will you make it without recharging?

5. A startup makes custom mechanical keyboards. The total cost to produce 10 units is $1,500. The cost to produce 40 units is $3,600. The relationship between cost and units is linear. Determine the fixed costs (rent, tools, etc.) that the company pays even if they produce 0 units, and the variable cost per keyboard.

6. You buy a flagship phone for $1,200. Market data shows that its value drops linearly. After 18 months, the resale value is $750. Write a function for the phone's value over time. If you want to sell the phone while it is still worth at least $500, what is the maximum number of months you can keep it?

7. A cloud provider charges a flat monthly fee of $5 plus $0.02 per GB for the first 100GB. However, for a "Pro" plan, they charge $15 flat with unlimited data. At how many Gigabytes (GB) does the "Pro" plan become cheaper than the basic plan?

Solutions:

2. 8.6 years

3. You must sell more than $\$5{,}714.29$ worth of goods for Company B to pay more.

4. No, you will run out of battery about 5 miles before the destination.

5. Fixed costs are \$800, variable cost is \$70 per unit.

6. You must sell it within 28 months.

7. The pro plan is cheaper if you use 500 GB. (Note: the task mentions a 100GB limit for the first rate, implying a piecewise function, but in a simple linear comparison, the threshold is 500GB).