Problems with 2 Variables – $y = mx + b$

1) A new downtown garage posts its prices on a digital board that drivers see as they pull in. There is an initial fee of $10 the moment a ticket is printed. After that, the machine adds $2 per hour.
   a) What is the total cost for someone who stays 5 hours?
   b) A driver pays $19 when leaving the garage. How many hours was their vehicle parked?

2) During her evening jog, Sara's smartwatch already shows 60 calories burned before she starts running because of normal metabolism. The watch adds calories at a constant rate of 75 calories per kilometre.
   a) How many calories will the watch show after she runs 6 km?
   b) Sara finishes a run and her watch displays 510 calories. How far did she run?

3) Jordan opens a savings account with an initial deposit of $500. The account earns simple interest—$20 is added every month.
   a) What will Jordan's balance be after 9 months?
   b) Jordan's statement shows a balance of $660. How many months has the account been open?

4) In the morning before class, the fish-tank thermometer reads 18 °C after a cool night. When the automatic heater turns on, the water warms at a steady rate of 2 °C per hour.
   a) What is the tank's temperature after 5 hours of heating?
   b) How many hours does it take the tank to reach 26 °C?

5) An e-bike kiosk charges a $2 activation fee when a ride begins, plus $0.25 for every minute of use.
   a) What is the cost of a 12-minute ride?
   b) A rider pays $4.50 for a trip. How many minutes did they ride?

6) Every summer, residents around Lily Lake track how much the water level changes on a wooden ruler fixed to the dock. On July 1, the ruler shows 2.40 m of water depth. The town records show this steady drop has continued for years at roughly 0.15 m per week.
   a) After 6 weeks of hot weather, how deep should the lake be?
   b) Residents later measure the lake at 1.05 m. How many weeks after July 1 does this occur?

7) In a physics experiment, a mug of coffee starts at 95 °C immediately after it's poured. Each minute of sitting lowers the temperature by 2.5 °C.
   a) What is the coffee's temperature after 12 minutes?
   b) At what time will the coffee cool to 60 °C?

8) At the start of a dinner party, a tall decorative candle measures 25 cm high. Melted wax collects evenly around the base, confirming that burning occurs at a constant rate of 1.6 cm per hour.
   a) How tall is the candle after 4 hours?
   b) After how many hours will the candle reach 18 cm?

9) Biology students climb a hillside to study temperature change with elevation. At the base, sensors show 22 °C. The team determines that for every metre climbed, the temperature falls by 0.006 °C.
   a) What is the temperature 800 m up the hillside?
   b) At what elevation will the temperature reach 18 °C?

10) A delivery truck leaves the warehouse with a full 200 L tank. The fuel level drops at a constant rate of 0.15 L per kilometre.
   a) How much fuel remains after travelling 180 km?
   b) The truck's fuel gauge shows 110 L. How far has the truck travelled?