Linear Equations Word Problems

Write a linear equation for each situation. Use your equation to answer the questions.
Use $y = mx + b$ where m is the rate of change and b is the starting value.
You may choose your own variables but define what they mean.

1. A movie theater charges \$12 per ticket and a one-time online fee of \$4 per order.

   a. Write an equation for the total cost.

   b. What is the total cost for 5 tickets?

   c. How many tickets can you buy for \$64?

2. A gym charges a \$25 sign-up fee and \$9 per month.

   a. Write an equation for total cost after m months.

   b. What is the total cost after 6 months?

   c. After how many months will the total cost be \$106?

3. A phone battery starts at 100% and drops 7% each hour.

   a. Write an equation for battery percent after t hours.

   b. What percent remains after 6 hours?

   c. After how many hours will the battery be at 44%?

4. A candle is 22 cm tall and burns down 0.5 cm each hour.

   a. Write an equation for candle height after h hours.

   b. What is the height after 12 hours?

   c. After how many hours will the candle be 15 cm tall?

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1.   A movie theater charges $12 per ticket and a one–time online fee of $4 per order.

    a.   Write an equation for the total cost.

       Let x= number of tickets, y= total cost
       $y = 12x + 4$

    b.   What is the total cost for 5 tickets?

       $y = 12(5) + 4 = 60 + 4 = 64 \rightarrow$ **$64**

    c.   How many tickets can you buy for $64?

       64=12x+4⇒60=12x⇒x=5 → **5 tickets**

2.   A gym charges a $25 sign–up fee and $9 per month.

    a.   Write an equation for total cost after m months.

       Let m= months, C= total cost
       $C = 9m + 25$

    b.   What is the total cost after 6 months?

       $C = 9(6) + 25 = 54 + 25 = 79 \rightarrow$ **$79**

    c.   After how many months will the total cost be $106?

       $106 = 9m + 25 \Rightarrow 81 = 9m \Rightarrow m = 9 \rightarrow$ **9 months**

3.   A phone battery starts at 100% and drops 7% each hour.

    a.   Write an equation for battery percent after t hours.

       Let t = hours, B= percent
       $B = -7t + 100$

    b.   What percent remains after 6 hours?

       $B = -7(6) + 100 = -42 + 100 = 58 \rightarrow$ **58%**

    c.   After how many hours will the battery be at 44%?

       44=−7t+100⇒−56=−7t⇒t=8 → **8 hours**

4.   A candle is 22 cm tall and burns down 0.5 cm each hour.

    a.   Write an equation for candle height after h hours.

       Let h= hours, H= height
       $H = -0.5h + 22$

    b.   What is the height after 12 hours?

       H=−0.5(12)+22=−6+22=16 → **16 cm**

    c.   After how many hours will the candle be 15 cm tall?

       15=−0.5h+22⇒−7=−0.5h⇒h=14 → **14 hours**