

Model test clasa a 10 – a

**1. Simplify each expression.**

a)  $5^3 : (5^2)^3 \cdot \left(\frac{5}{2}\right)^2 + 25^0$

b)  $\sqrt{\frac{121}{625}} : \left(\frac{5}{11}\right)^{-2} - 144 : (-12) + (-3)^2$

c)  $\sqrt[4]{256x^{12}y^4} \cdot (x^3y)^{-1}$

d)  $\sqrt[3]{x} \cdot \sqrt[7]{x^5} : x$

**2. Simplify the following expression.**

$$E(x) = \left( \frac{2x}{x+1} + \frac{3x}{x-1} - \frac{5x^2-2}{x^2-1} \right) \cdot \left( x + \frac{1}{x+2} \right)$$

**3. Solve each (in)equation.**

a)  $\frac{5}{3} - \frac{3}{4}x = \frac{12}{9}x + 10$

b)  $6x^2 - (x-3)(x+3) \leq (x-1)(x+2) + 4(x-5)^2$

c)  $3x^2 + x + 10 = 12$

4. Tom wants to analyze his monthly expenses to better manage his budget. He kept track of his expenses for the last six months and recorded the following amounts (in dollars):

Month 1: \$800

Month 2: \$950

Month 3: \$700

Month 4: \$850

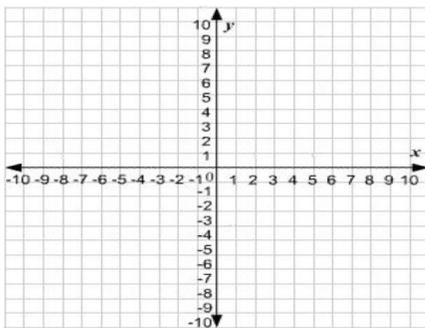
Month 5: \$900

Month 6: \$750

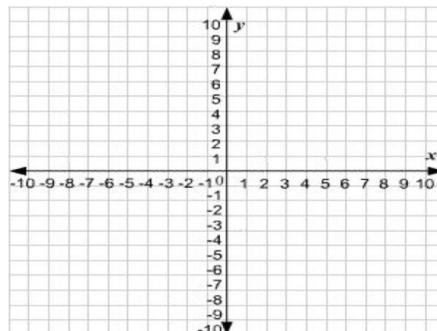
a) Calculate the average monthly expense for Tom.

b) Determine which months had expenses above the average and which months had expenses below the average.

5. A) Graph the function  $f(x) = -5x - 1$



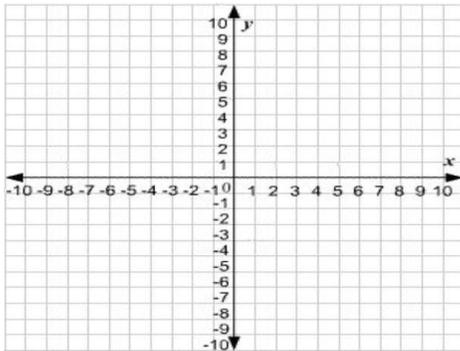
B) Graph  $f(x) - 3$



6. Sarah is tracking the growth of a plant in her garden over time. She measured the height of the plant (in centimeters) on three different days and recorded the following data:

Day 1: Height = 10 cm  
Day 2: Height = 15 cm  
Day 3: Height = 20 cm  
Day 4: Height = 25 cm  
Day 5: Height = 30 cm

- a) Calculate the slope of the line representing the plant's height over time.
- b) Interpret the meaning of the slope in the context of the plant's growth.
- c) Write the equation that represents the growth of the plant over time, based on the given data, and create a graphical representation of the plant's growth.

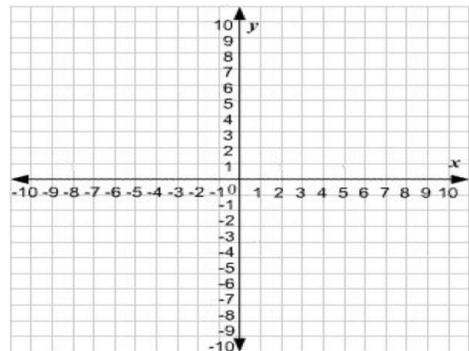


7. It is given the function  $f(x) = x^2 - 2x - 3$

- a) Find the point where  $f(x)$  reaches its minimum value.

- b) Find the x intercepts of the function.

- c) Graph the function.



**8. Consider a box containing colored balls. The box contains 8 red balls, 6 blue balls, and 4 green balls.**

- a) What is the probability of randomly drawing a red ball from the box?
  
  
  
  
  
  
  
  
  
  
- b) If two balls are drawn consecutively, what is the probability of getting a red ball followed by a blue ball?
  
  
  
  
  
  
  
  
  
  
- c) What is the probability of drawing a green ball from the box?
  
  
  
  
  
  
  
  
  
  
- d) If two balls are drawn consecutively (without replacement), what is the probability of getting two blue balls in a row?

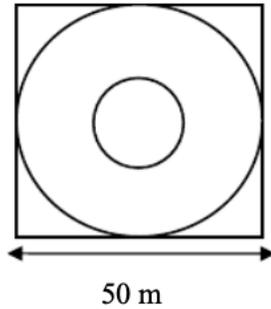
**9. An electronics store is offering a special discount on laptops. The original price of a laptop is \$800. The store is offering two discount options:**

Option A: A straight 20% discount on the original price

Option B: A 10% discount on the first \$500 and then a 5% discount on the remaining amount

- a) What is the discounted price of the laptop under Option A?
  
  
  
  
  
  
  
  
  
  
- b) What is the discounted price of the laptop under Option B?
  
  
  
  
  
  
  
  
  
  
- c) Which option offers a higher discount in dollars?
  
  
  
  
  
  
  
  
  
  
- d) If you have a budget of \$700, which option would allow you to purchase the laptop?

10. To create an ornament, a square sheet with a side length of 50 cm is used, from which a disc with the maximum diameter is cut out. Concentric with the first disc, a second disc with a radius of 10 cm is drawn.



- a) What is the radius of the big circle?
- b) What area of the sheet is lost after cutting the big circle?
- c) What is the area of the small circle?
- d) Calculate how many meters of bead strings are used to be glued of the circumferences of the 2 circles. ( $\pi = 3.14$ )