Math 6c, homework 22

1. The graph of a linear function ($general\ form\ is\ y = ax + b$) pass through the points A (5, 1) and B (2, -1). Find the function and plot it in your notebook.

2. Points $A(x_1, y_1)$ and $B(x_2, y_2)$ lie on the graph of the function $y = x$. Is it true that**:**

   a) if $x_1 > x_2$, then $y_1 > y$;

   b) if $x_1 < x_2$, then $y_1 < y$;

3. Points $A(x_1, y_1)$ and $B(x_2, y_2)$ lie on the graph of the function $y = x^2$. Is it true that**:**

   c) if $x_1 > x_2$, then $y_1 > y$;

   d) if $x_1 < x_2$, then $y_1 < y$;

4. Using the graph of the function $y = x^2$, determine (roughly)**:**

   a. the values of y when $x = \frac{1}{4};\ 0.3;\ 1.3;\ -2.2;$
   b. the values of x when $y = 1;\ 1.2;\ 3.5;$
   c. $y(0),\ y(5),\ y(1.6),\ y(4.7);$
   d. the values of x when $y(x) = 3,\ y(x) = 6;$
   e. the values of y when $x > 0,\ x > 3,\ x < -2;$
   f. the values of y when $-1 < x < 1,\ -2 < x < 5,\ -12 < x < 7;$

5. For the function $y = \frac{1}{x}$ answer:

   a. the values of y when $x > 0,\ x < 0;$
   b. find $y(1),\ y(3),\ y(5),\ y(10);$
   c. find $y(-1),\ y(-2),\ y(-8),\ y(-9);$
   d. find $y(\frac{1}{2}),\ y(\frac{1}{3}),\ y(\frac{1}{10});$

6. Plot functions: $y = 2x + 3;$ $y = 2x - 3;$ $y = -2x + 3;$ $y = -2x - 3;$
7. Plot functions: $y = x^2;$ $y = x^2 + 1;$ $y = (x + 1)^2 + 1;$ $y = -x^2 - 1;$

8. Prove that for any x the expressions are positive or 0:

Example:
$x^2 + 2x + 1 = x^2 + 2 \cdot 1 \cdot x + 1^2 = (x+1)^2$
$(x+1)^2$ is a square of a number $x+1$. The square of any number is a positive number, or 0, if 0 is squared. For $x = -1$, $(x+1)^2 = 0$. For any other x, $(x+1)^2 > 0$

$a.\ x^2 + 2x + 1 \geq 0;$ $b.\ x^2 - 8x + 16 \geq 0$

9. Represent as a square:

Example:

$4x^2y^6 = (2xy^3)^2$

$121,$ $25m^2n^6;$ $x^4;$ $\frac{1}{4}p^2,$ $a^6;$ $0.25x^4;$ $2\frac{1}{4}x^4q^2$