

1. (8pts) A customer with Rushy-Rushy cab company found that on one occasion they paid \$5.75 to ride 2 miles, and on another they paid \$10.75 to ride a cab for 5 miles.

- a) Find the cost of riding a cab as a function of miles traveled, assuming it is linear.
b) How far can a customer get if they have \$20 in their pocket?

a) Need the equation of a line through

$$(2, 5.75), (5, 10.75)$$

$$m = \frac{10.75 - 5.75}{5 - 2} = \frac{5}{3}$$

$$y - 5.75 = \frac{5}{3}(x - 2)$$

$$y = \frac{5}{3}x - \frac{10}{3} + 5.75$$

$$y = \frac{5}{3}x + 2.42 = 1.67x + 2.42$$

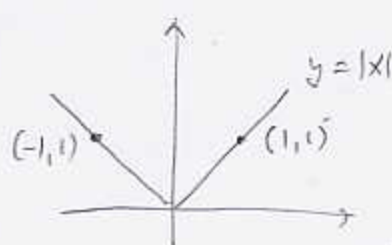
b) $20 = \frac{5}{3}x + 2.42$

$$17.58 = \frac{5}{3}x \cdot \frac{3}{5}$$

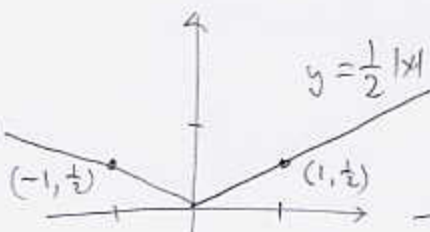
$$x = 17.58 \cdot \frac{3}{5} = 10.55$$

They can ride 10.55 miles

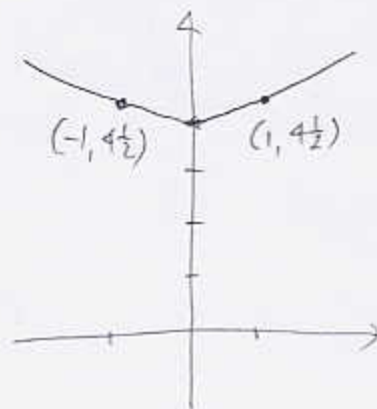
2. (5pts) Use the basic graph of $y = |x|$ and transformations to help you sketch the graph of $y = \frac{1}{2}|x| + 4$. Explain how you transform the original graph and what the axis of symmetry of the new graph is.



stretch
vertically
by factor $\frac{1}{2}$

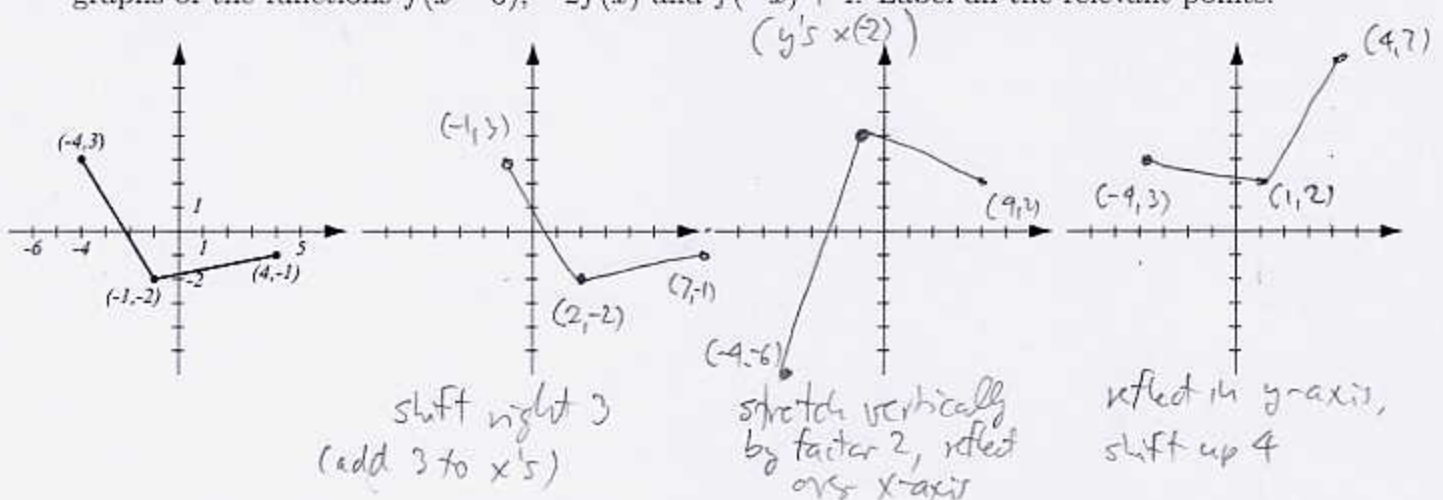


shift up
4 units



Axis of symmetry is the y-axis,
as for the original graph

3. (8pts) The graph of the function f is given below. On three separate graphs, sketch the graphs of the functions $f(x-3)$, $-2f(x)$ and $f(-x)+4$. Label all the relevant points.



4. (9pts) The Commonwealth of Norlandia, whose currency is Norlandisk Kroner (NK), assesses income tax based on the rules below.

- Compute tax on taxable amounts of NK 3,000, NK 4,700 and NK 16,500.
- Write the (piecewise defined) function that computes the income tax $T(x)$ as a function of taxable amount x .
- Graph the function T .

| If taxable amount is: | Tax is: |
|--------------------------------------|---|
| NK 4,000 or less | 10% of taxable amount |
| Over NK 4,000 but not over NK 10,000 | NK 400 plus 15% of amount over NK 4,000 |
| Over NK 10,000 | NK 1300 plus 25% of amount over NK 10,000 |

a) tax on NK 3,000 is
 $0.1 \cdot 3000 = \text{NK } 300$

tax on NK 4,700 is
 $400 + 0.15 \cdot 700 = \text{NK } 505$

tax on NK 16,500 is
 $1300 + 0.25 \cdot 6,500 = \text{NK } 2925$

$$T(x) = \begin{cases} 0.1x, & \text{if } x \leq 4000 \\ 400 + 0.15(x - 4000), & \text{if } 4000 < x \leq 10,000 \\ 1300 + 0.25(x - 10,000), & \text{if } 10,000 < x \end{cases}$$

