

1. (6pts) A horse farm buys a pick-up truck for \$24,700. After two years the value of the truck is estimated to be \$18,300.

a) Assuming the truck is depreciated using a linear function, write the function that expresses the value of the truck as a function of its age.

b) When does the truck have value \$5,000?

a) Need equation of a line through $(0, 24700)$ and $(2, 18300)$

$$m = \frac{18300 - 24700}{2 - 0} = \frac{-6400}{2} = -3200$$

b) $5000 = -3200x + 24700$

$$3200x = 19700$$

$$x = \frac{19700}{3200} = \frac{197}{32} = 6.15625$$

$$y = -3200x + 24700$$

happens to be y-intercept

After 6.16 years

2. (6pts) The amount of money that a bank will allow you to borrow mainly depends on the interest rate and your annual income. The data in the table represent a sample of loans L that were given to people with income levels I at interest rate 7.5% for 30 years.

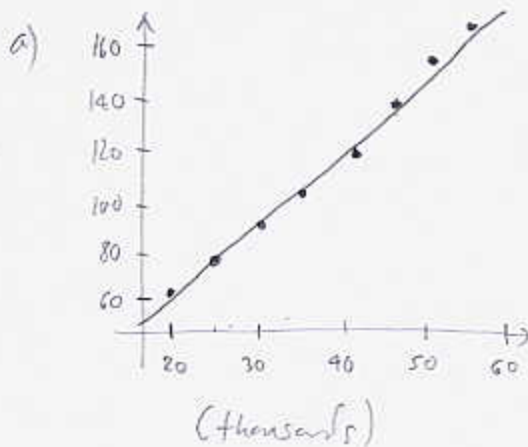
a) Draw the scatterplot of the data on paper. Does the relationship look linear?

b) Use the calculator to find the "line of best fit" to the data. Draw the line on paper.

c) Interpret the slope of the line of best fit.

d) What loan amount would an individual earning \$37,500 qualify for?

I	L
20,000	60,500
25,000	74,500
30,000	90,400
35,000	104,300
40,000	118,200
45,000	134,100
50,000	152,000
55,000	163,900



Data looks linear

b) $y = 2.991x + 0.067$
(when x 's, y 's are in thousands)



For every \$1 increase in income, loan amount increases by 2.991

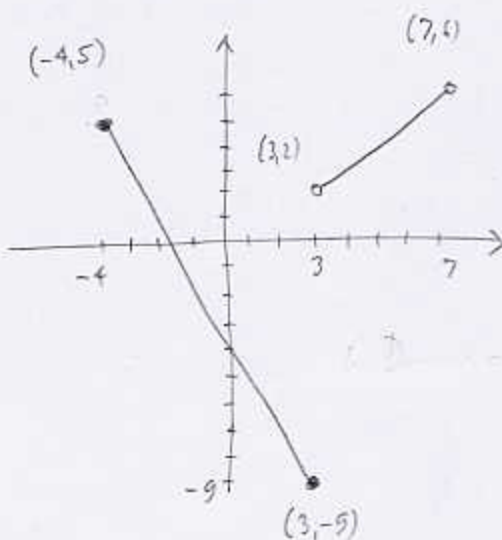
d) $2.991 \cdot 37.5 + 0.067$
 \rightarrow loan amt = 112,229.50 \rightarrow = 112.2295

3. (6pts) The function f is given below.

a) Sketch the graph of f on paper.

b) Find the domain and range of f .

$$f(x) = \begin{cases} -2x - 3, & \text{if } -4 \leq x \leq 3 \\ x - 1, & \text{if } 3 < x < 7. \end{cases}$$

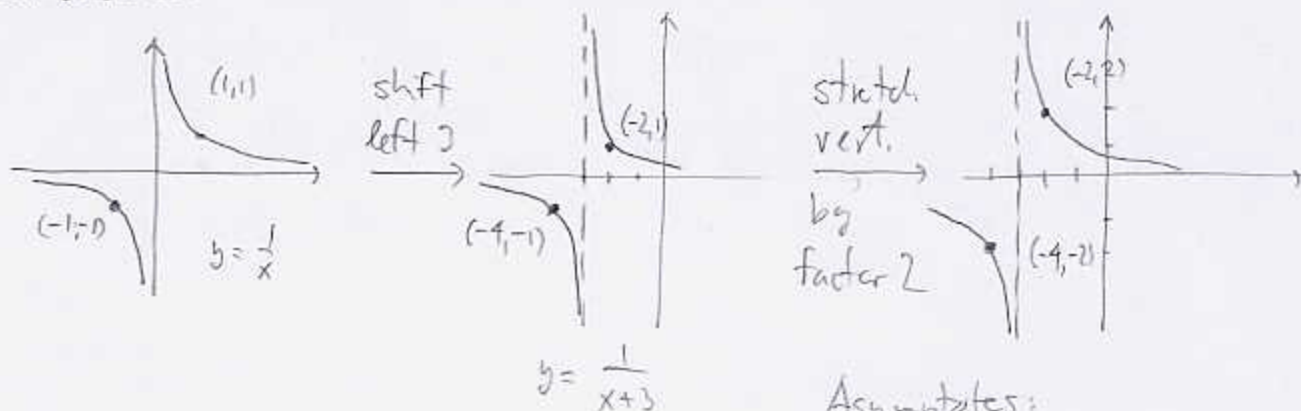


a)

x	$-2x-3$	x	$x-1$
-4	5	3	2
3	-9	7	6

b) domain = $[-4, 7)$, range = $[-9, 6)$

4. (5pts) Use the basic graph of $y = \frac{1}{x}$ and transformations to help you sketch the graph of $y = \frac{2}{x+3}$. Explain how you transform the original graph and what the asymptotes of the new graph are.



Asymptotes:

vertical: $x = -3$

horizontal: $y = 0$

5. (7pts) The graph of the function f is given below. On three separate graphs, sketch the graphs of the functions $f(x) + 2$, $f(2x)$ and $-f(x - 2)$. Label all the relevant points.

