Spring '06/MAT 140/Worksheet 7   Name: Solution   *Show all your work.*

1. (6pts) Suppose a cab company charges \$2.50 per ride plus 55 cents for every mile traveled.
a) Write the linear function that expresses the cost of a ride as a function of miles traveled.
b) What is the cost of a ride that takes you 13 miles?
c) What is the farthest you can reach with \$20 in your pocket?

a) $C(x) = 2.50 + 0.55x$, $x =$ miles traveled

b) $C(13) = 2.50 + 0.55 \cdot 13 = \$9.65$

c) $2.50 + 0.55x = 20$

$0.55x = 17.50$

$x = \dfrac{17.50}{0.55} = 31.82$ miles

2. (6pts) In an effort to relate a child's height H to their head circumference C, a pediatrician has measured nine children.
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) What does the equation from b) predict about the head circumference of a child whose height is 26in?

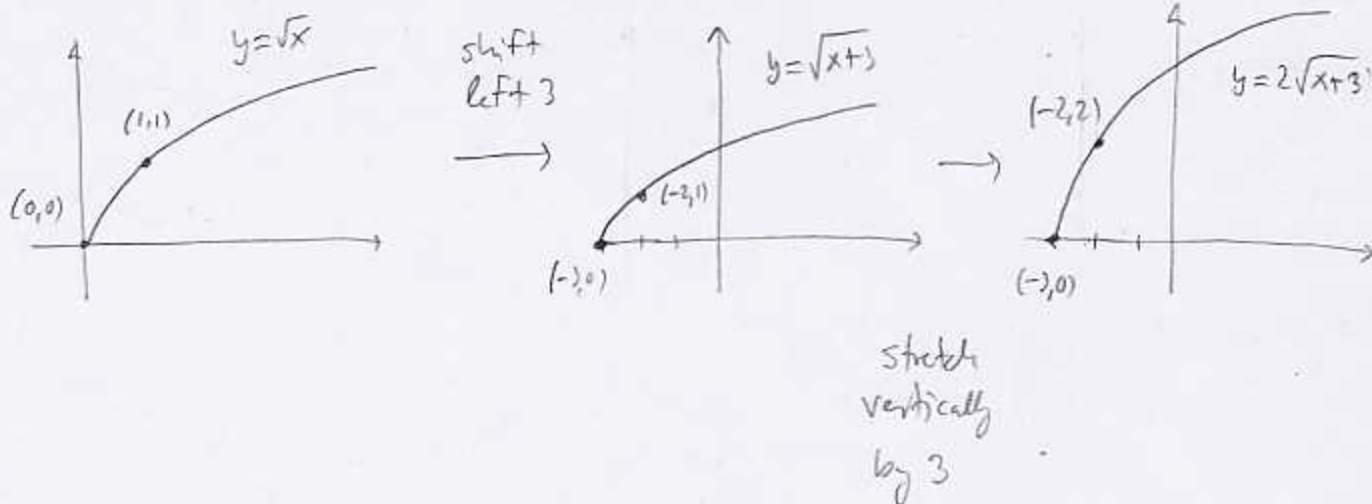| H	C
25.25	16.4
25.75	16.9
25	16.9
27.75	17.6
26.5	17.3
27	17.5
26.75	17.3
26.75	17.5
27.5	17.5

a)
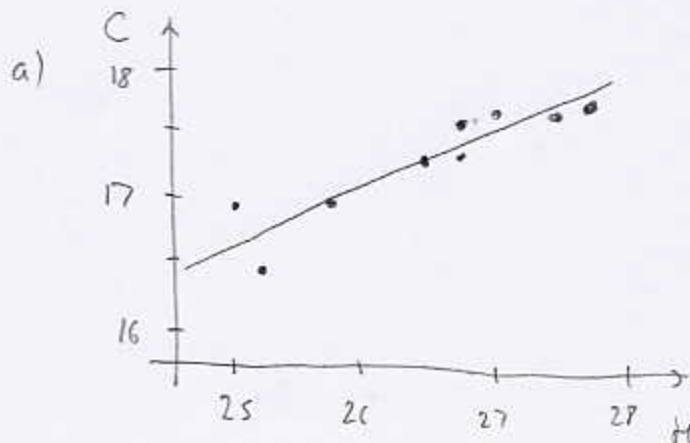
It looks roughly linear

b) Line of best fit is $y = 0.3734x + 7.3268$

c) $y(26) = 0.3734 \cdot 26 + 7.3268 = 17.0352$ in

3. (4pts) Use the basic graph of $y = \sqrt{x}$ and transformations to help you sketch the graph of $y = 2\sqrt{x+3}$. Explain how you transform the original graph.

$y = \sqrt{x}$

$(1,1)$

$(0,0)$

shift
left 3

$\longrightarrow$

$y = \sqrt{x+3}$

$(-2,1)$

$(-3,0)$

$\longrightarrow$

$(-2,2)$

$y = 2\sqrt{x+3}$

$(-3,0)$

stretch
vertically
by 3

4. (8pts) The graph of the function f is given below. On three separate graphs, sketch the graphs of the functions $f(x-1)$, $\frac{1}{2}f(x)$ and $f(-x)+3$. Label all the relevant points.

$(-4,2)$

$(-1,-2)$

$(4,0)$

$(-3,2)$

$(0,-2)$

$(5,0)$

$(-4,1)$

$(-1,-1)$

$(4,0)$

$(-4,3)$

$(4,5)$

$(1,1)$
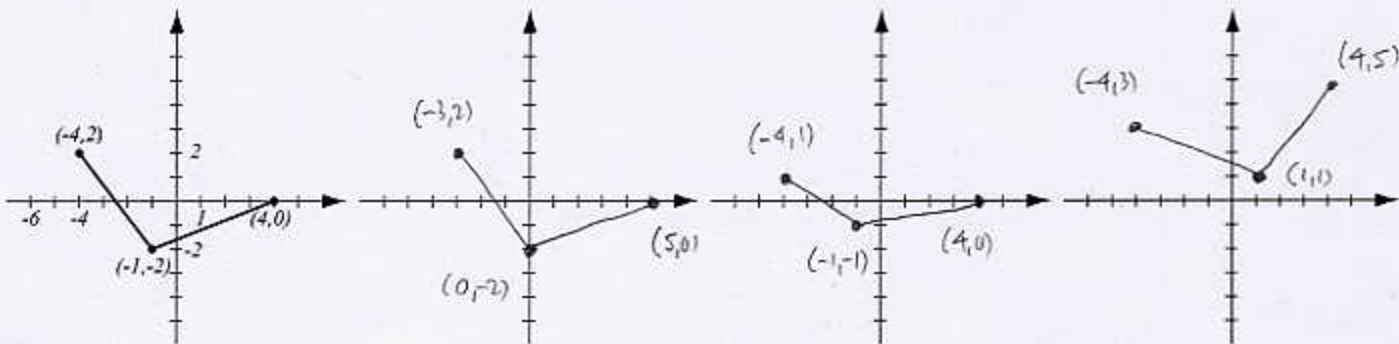
5. (6pts) The function f is given below.
a) Sketch the graph of f.
b) Find the domain and range of f.

$$f(x) = \begin{cases} -3x+2, & \text{if } -5 \le x < 2 \\ -x+7, & \text{if } 2 \le x < 6. \end{cases}$$

$(-5,17)$

$(2,5)$

$(6,1)$

$(2,-4)$

x	$-3x+2$
2	-4
-5	17

x	$-x+7$
2	5
6	1

Domain $= [-5,6)$ Range $= (-4,17]$