

1. (8pts) Suppose a cab company charges \$3.50 per ride plus 45 cents for every mile traveled.
- Write the linear function that expresses the cost of a ride as a function of miles traveled.
 - What is the cost of a ride that took you 8.5 miles away from the start?
 - What is the farthest you can reach with \$10 in your pocket?

a) $C(x) = 3.50 + 0.45x$

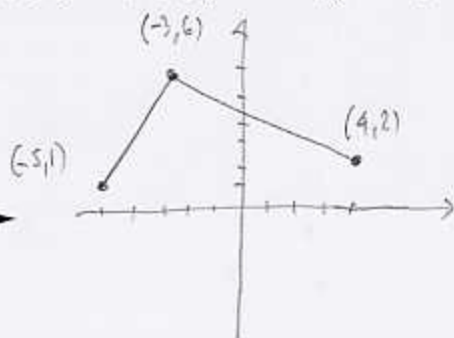
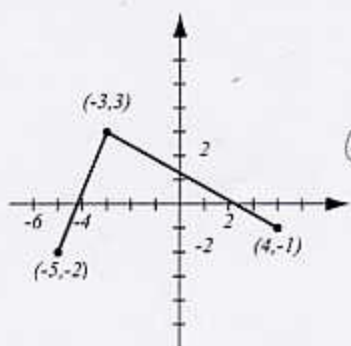
b) $C(8.5) = 3.50 + 0.45 \cdot 8.5 = \7.33

c) $3.50 + 0.45x = 10$

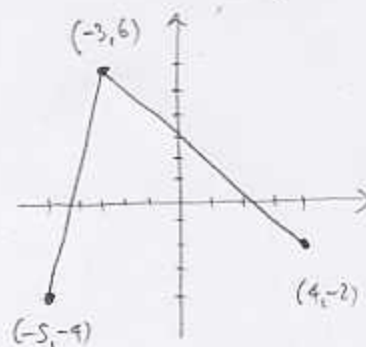
$$0.45x = 6.50$$

$$x = \frac{6.50}{0.45} = 14.44 \text{ miles}$$

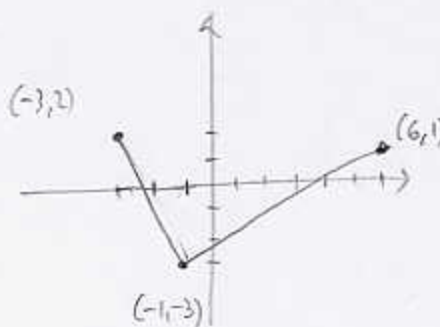
2. (7pts) The graph of the function f is given below. On three separate graphs, sketch the graphs of the functions $f(x) + 3$, $2f(x)$ and $-f(x-2)$. Label all the relevant points.



$f(x) + 3$ shift 3 up



$2f(x)$
stretch in
y-direction
by factor 2



$-f(x-2)$
shift 2 right,
reflect over
x-axis

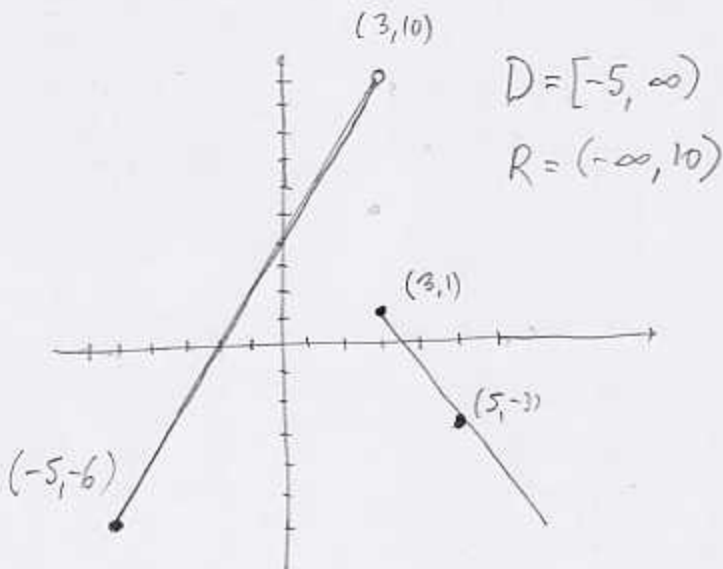
3. (6pts) The function f is given below.

- a) Sketch the graph of f .
 b) Find the domain and range of f .

$$f(x) = \begin{cases} 2x + 4, & \text{if } -5 \leq x < 3 \\ 7 - 2x, & \text{if } x \geq 3. \end{cases}$$

x	$2x+4$
-5	-6
3	10

x	$7-2x$
3	1
5	-3

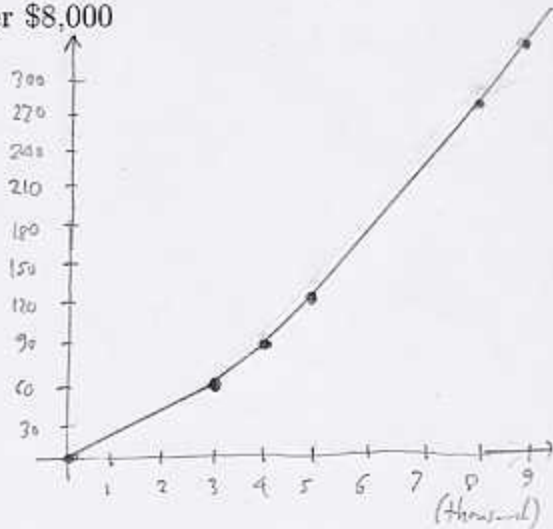


4. (9pts) The instructions for the 2004 Kentucky tax forms reveal how income tax is computed on a given taxable amount. The rules are outlined in the table below.

- a) Write the (piecewise defined) function that computes the income tax $T(x)$ as a function of taxable amount x .
 b) Graph the function T .
 c) What is the tax, if taxable amount is \$6,455?

If taxable amount is:	Tax is:
\$3,000 or less	2% of taxable amount
Over \$3,000 but not over \$4,000	\$60 plus 3% of amount over \$3,000
Over \$4,000 but not over \$5,000	\$90 plus 4% of amount over \$4,000
Over \$5,000 but not over \$8,000	\$130 plus 5% of amount over \$5,000
Over \$8,000	\$280 plus 6% of amount over \$8,000

$$c) \quad T(x) = \begin{cases} 0.02x, & \text{if } x \leq 3000 \\ 60 + 0.03(x-3000) & \text{if } 3000 < x \leq 4000 \\ 90 + 0.04(x-4000) & \text{if } 4000 < x \leq 5000 \\ 130 + 0.05(x-5000) & \text{if } 5000 < x \leq 8000 \\ 280 + 0.06(x-8000) & \text{if } 8000 < x \end{cases}$$



c) $T(6,455) = 130 + 0.05(6455 - 5000) =$
 btw, 5000 and 8000 $= 130 + 0.05 \cdot 1455$
 $= 130 + 72.75$
 $= 202.75$

x	$T(x)$
0	0
3000	60
4000	90
5000	130
8000	280
9000	340