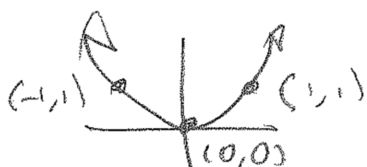
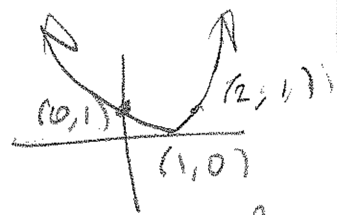
121 §2.3 π #s 45-75, 93-99

#s 45-60 Use transformations to graph each & state $\mathcal{D}$ & $\mathcal{R}$

45 $y=(x-1)^2+2$

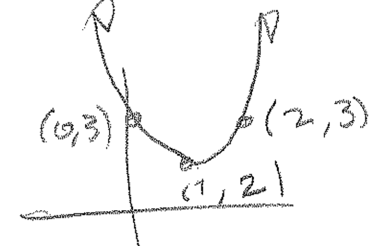


$f(x)=x^2$



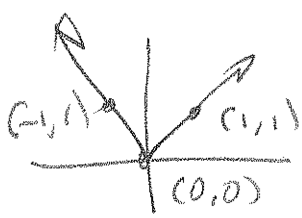
$f(x-1)=(x-1)^2$

$\mathcal{D}=\mathbb{R}$, $\mathcal{R}=[2,\infty)$

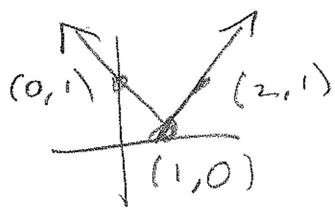


$f(x-1)+2=(x-1)^2+2=$

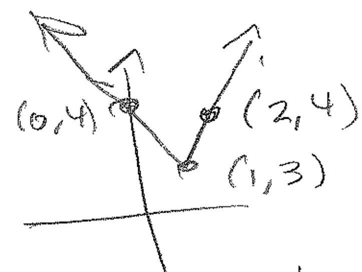
47 $y=|x-1|+3$



$f(x)=|x|$



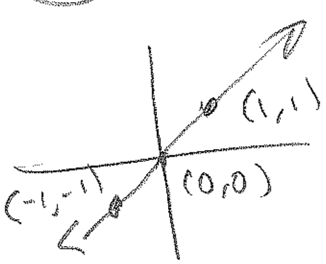
$f(x-1)=|x-1|$



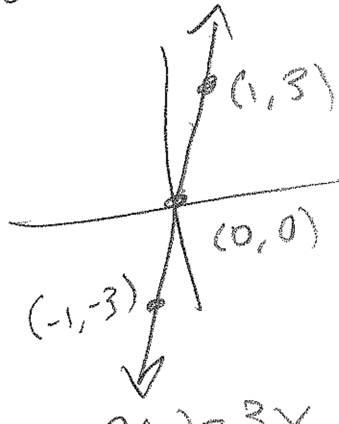
$\mathcal{D}=\mathbb{R}$
$\mathcal{R}=[3,\infty)$

$f(x-1)+3=|x-1|+3$

49 $y=3x-40$

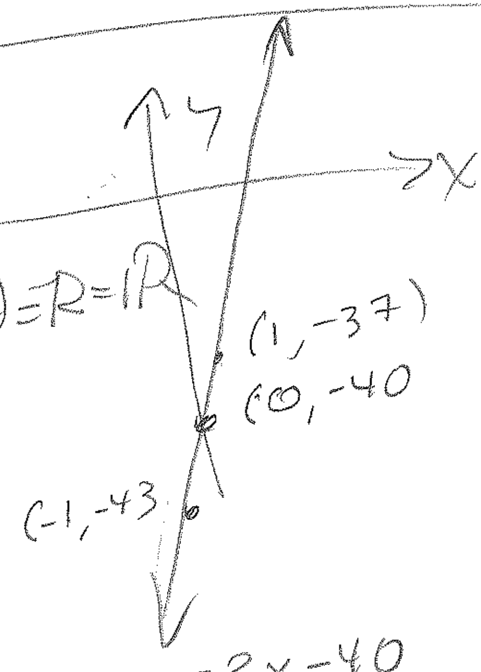


$f(x)=x$



$3f(x)=3x$

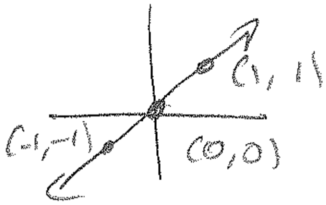
$\mathcal{D}=\mathcal{R}=\mathbb{R}$



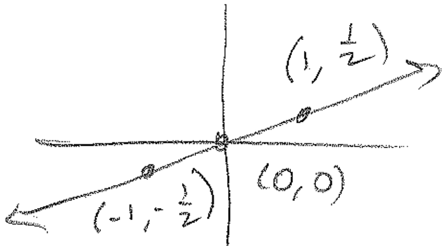
$3f(x)-40=3x-40$

121 §2.3 II #s 51–75, 93–99

51 $y = \frac{1}{2}x - 20$

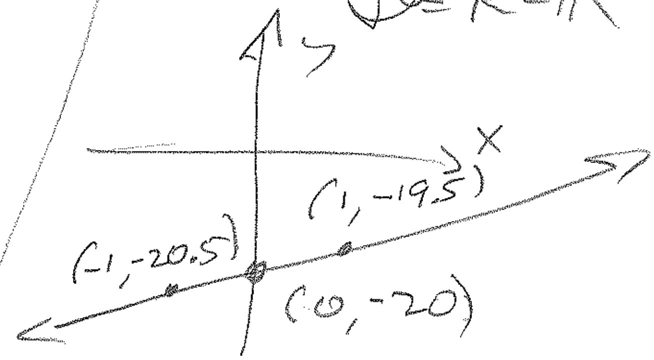


$f(x) = x$



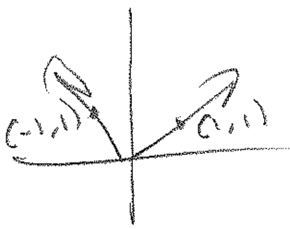
$\frac{1}{2}f(x) = \frac{1}{2}x$

$\mathcal{D}$ $\mathcal{R} = \mathbb{R}$

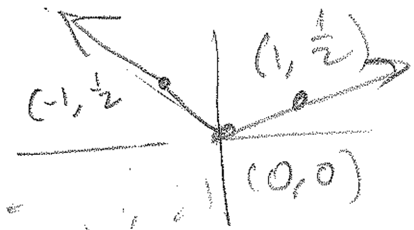


$\frac{1}{2}f(x) - 20 = \frac{1}{2}x - 20$

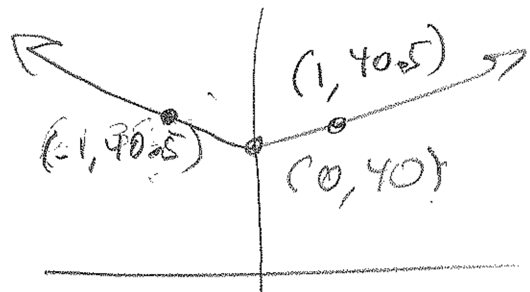
53 $y = \frac{1}{2}|x| + 40$



$f(x) = |x|$



$\frac{1}{2}f(x) = \frac{1}{2}|x|$



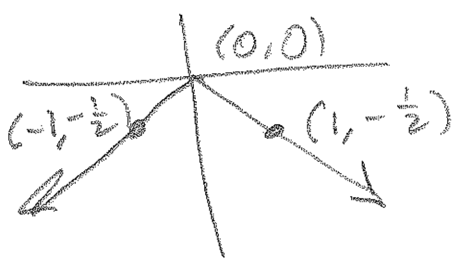
$\frac{1}{2}f(x) + 40 = \frac{1}{2}|x| + 40$

$\mathcal{D} = \mathbb{R}$, $\mathcal{R} = [40, \infty)$

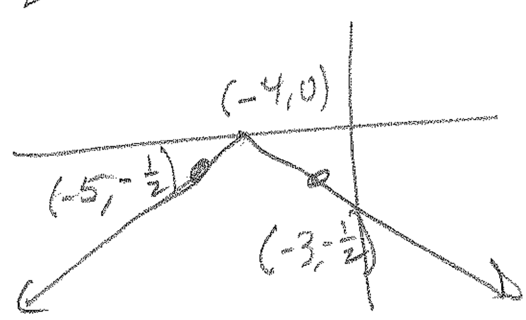
55 $y = -\frac{1}{2}|x+4|$

See $|x|$, above

$-\frac{1}{2}f(x) = -\frac{1}{2}|x|$



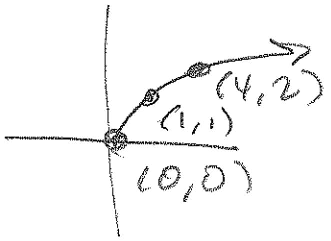
$-\frac{1}{2}f(x+4) = -\frac{1}{2}|x+4|$



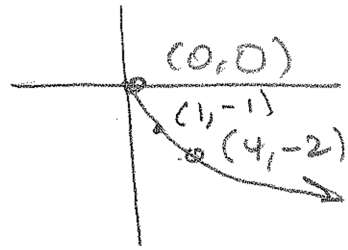
$\mathcal{D} = \mathbb{R}$, $\mathcal{R} = (-\infty, 0]$

121 §2.3 II # 55 57-75, 93-99

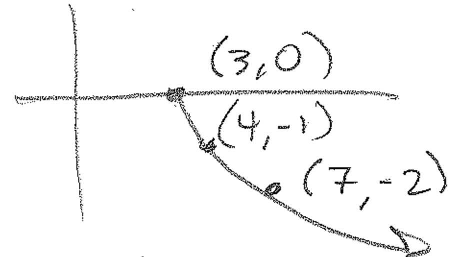
57 $y = -\sqrt{x-3} + 1$



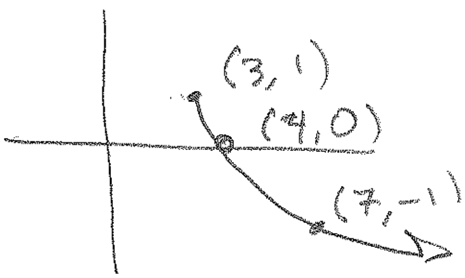
$f(x) = \sqrt{x}$



$-f(x) = -\sqrt{x}$



$-f(x-3) = -\sqrt{x-3}$



$-f(x-3)+1 = -\sqrt{x-3} + 1$

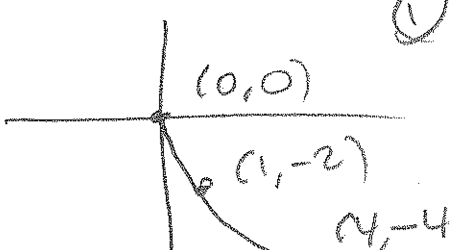
$D = [3, \infty)$, $R = (-\infty, 1]$

59 $y = -2\sqrt{x+3} + 2$

see $f(x) = \sqrt{x}$, above

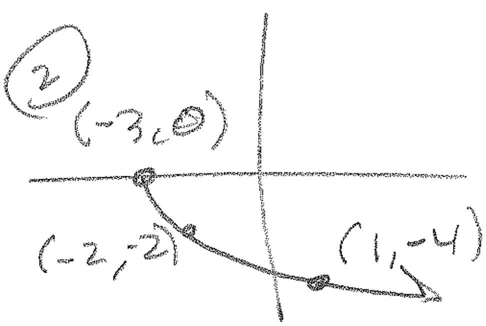
$-2f(x) = -2\sqrt{x}$

1



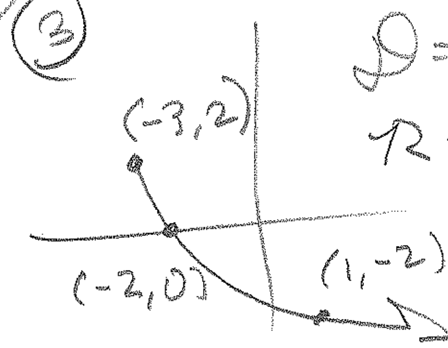
$-2f(x+3) = -2\sqrt{x+3}$

2



$-2f(x+3)+2 = -2\sqrt{x+3} + 2$

3



$D = [-3, \infty)$

$R = (-\infty, 2]$

121 § 2.3 II #s 61-75, 93-99

#s 61-80 Determine algebraically if function is even, odd or neither. Describe symmetry.

61 $f(x) = x^4 \longrightarrow f(-x) = (-x)^4 = x^4 = f(x)$

EVEN Symmetric about y-axis

63 $f(x) = x^4 - x^3 \longrightarrow f(-x) = (-x)^4 - (-x)^3$

$= x^4 + x^3$ $\boxed{\text{Neither}}$

No symmetry

65 $f(x) = (x+3)^2 \Longrightarrow f(-x) = (-x+3)^2$ OR $(x-3)^2$

Symmetric about $x = -3$ $\boxed{\text{Neither.}}$

67 $f(x) = |x-2| \longrightarrow f(-x) = |-x-2|$ OR $|x+2|$

$\boxed{\text{Neither}}$

Symmetric About $x = 2$

69 $f(x) = x \longrightarrow f(-x) = -x$ $\boxed{\text{ODD}}$

Symmetric thru origin

71 $f(x) = 3x+2 \longrightarrow f(-x) = -3x+2$ $\boxed{\text{Neither}}$

No symmetry

121 § 2.3 II 73-75, 93-99

(73) $f(x) = x^3 - 5x + 1 \Longrightarrow f(-x) = -x^3 + 5x + 1$

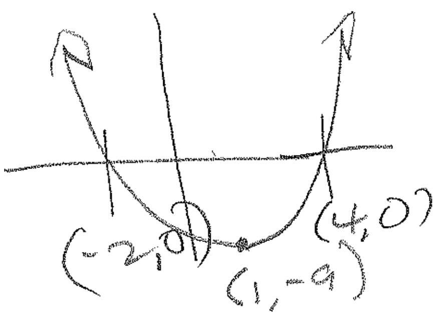
ODD + EVEN No symmetry Neither.

(75) $f(x) = 1 + \frac{1}{x^2} \Longrightarrow f(-x) = 1 + \frac{1}{(-x)^2} = 1 + \frac{1}{x^2}$

$\boxed{\text{EVEN}}$ Symmetric about y-axis.

#s 93-100 Solve each inequality by graph. Give sol'n in interval notation.

(93) $(x-1)^2 - 9 < 0$



$(x-1)^2 = 9$

$x - 1 = \pm 3$

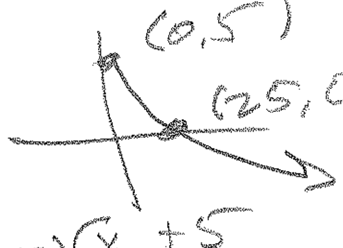
$x = 1 \pm 3 \to 4, -2$

< 0 on $\boxed{(-2, 4)}$

(95) $5 - \sqrt{x} \geq 0$

$\sqrt{x} = 5$

$x = 25$



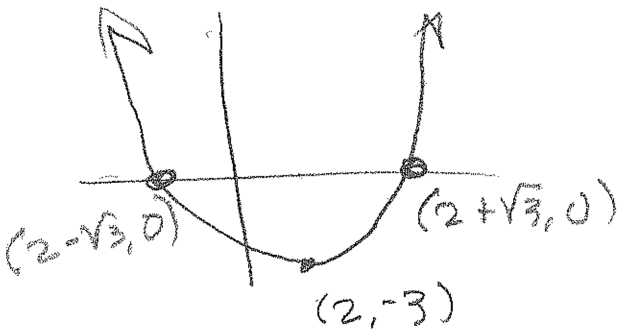
Want ≥ 0:

$\boxed{x \in [0, 25]}$

121 §2.3 II #s 97, 99

97 $(x-2)^2 > 3$

$(x-2)^2 - 3 > 0$



$(x-2)^2 = 3$

$x - 2 = \pm\sqrt{3}$

$x = 2 \pm \sqrt{3}$

Want > 0, so, by graph:

$\boxed{x \in (-\infty, 2-\sqrt{3}) \cup (2+\sqrt{3}, \infty)}$

99 $\sqrt{25-x^2} \geq 0$

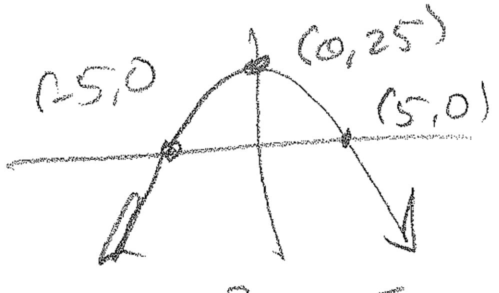
$\sqrt{\text{anything}} \geq 0$

Need domain:

Need $25 - x^2 \geq 0$

$(5-x)(5+x) \geq 0$

$= -(x-5)(x+5)$



$-x^2 + 25$