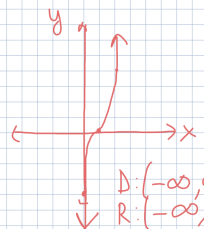
Homework 11-20

For 2 – 5, sketch each function on a separate piece of graph paper, including a minimum of 3 points. Then state the domain, range and coordinates of *x* and *y* intercepts.

3. $y = 4(x-1)^3$ right one, vertical stretch by a factor of 4

right 1 mult. y's by 4

$(-1,-1)$	$(0,-1)$	$(0,-4)$
$(0,0)$	$(1,0)$	$(1,0)$
$(1,1)$	$(2,1)$	$(2,4)$



D: $(-\infty,\infty)$

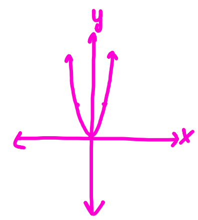
R: $(-\infty,\infty)$

x-int: $(1,0)$

y-int: $(0,-4)$

5. $y = (3x)^4$ horizontal shrink by a factor of $\frac{1}{3}$

x^4	mult. x's by $\frac{1}{3}$
$(-1,1)$	$(-\frac{1}{3},1)$
$(0,0)$	$(0,0)$
$(1,1)$	$(\frac{1}{3},1)$



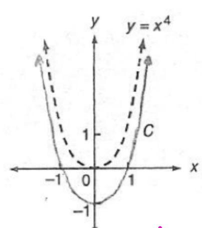
D: $(-\infty,\infty)$

R: $[0,\infty)$

x-int: $(0,0)$ y-int: $(0,0)$

For 6 – 9, find the equation of the curve *C* which is obtained from the dashed curve by a horizontal or vertical shift, or a combination of the two.

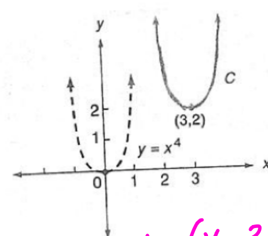
6.



↓ 1

$y = x^4 - 1$

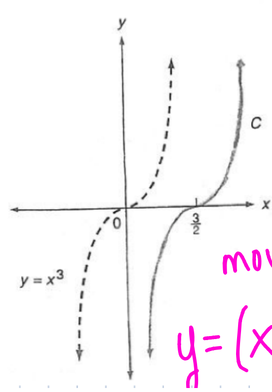
7.



right 3
↑ 2

$y=(x-3)^4+2$

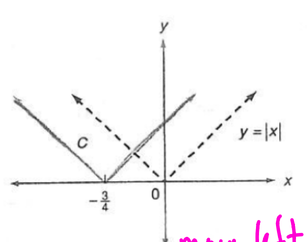
8.



move right $\frac{3}{2}$

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

9.



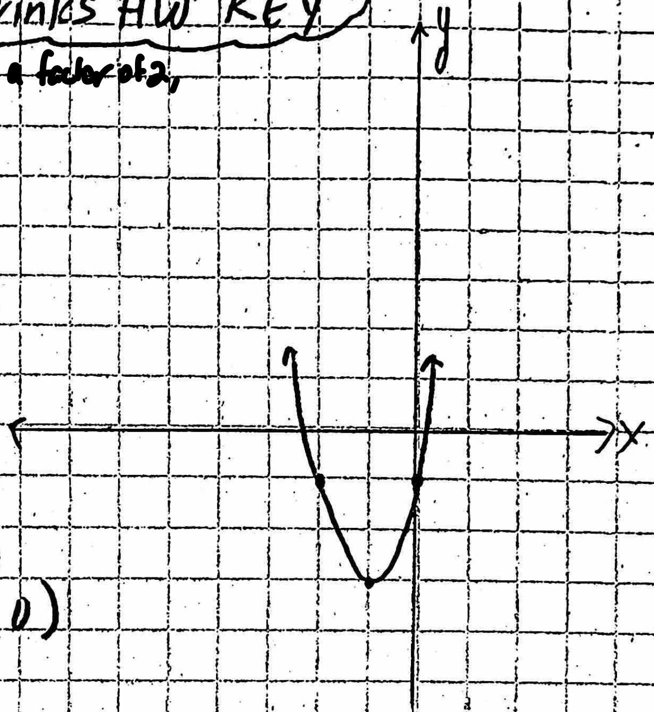
move left $\frac{3}{4}$

$y=|x+\frac{3}{4}|$

Vertical and Horizontal Stretches and Shrinks HW KEY

① $f(x) = 2(x+1)^2 - 3$ left one, vertical stretch by a factor of 2, ↓3

	left one	mult. ys by 2	↓ 3
$(-1,1)$	$(-2,1)$	$(-2,2)$	$(-2,-1)$
$(0,0)$	$(-1,0)$	$(-1,0)$	$(-1,-3)$
$(1,1)$	$(0,1)$	$(0,2)$	$(0,-1)$



D: $(-\infty, \infty)$
R: $[-3, \infty)$

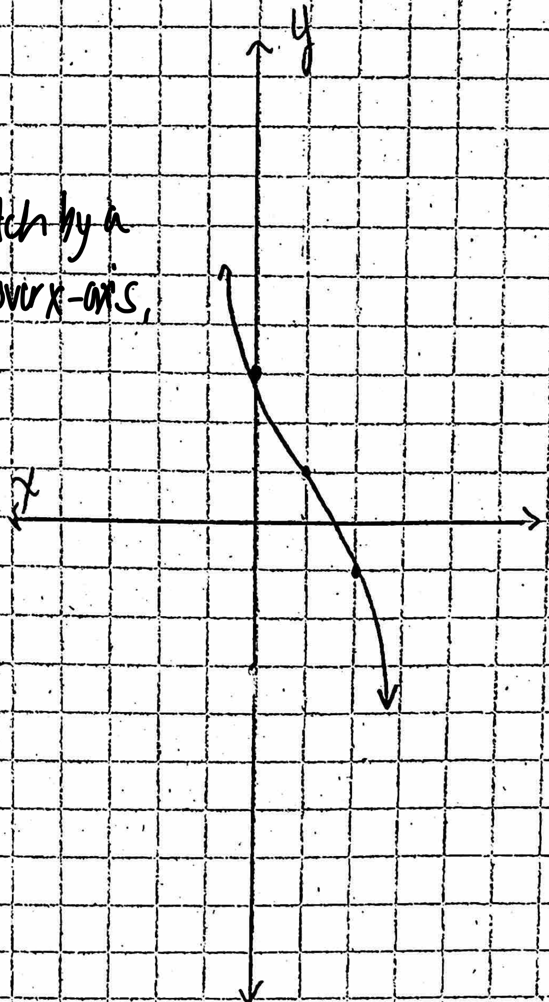
y-intercept $(0,-1)$
x-int: $\left(-1 \pm \sqrt{3/2}, 0\right)$

$0 = 2(x+1)^2 - 3$
$3 = 2(x+1)^2$
$\frac{3}{2} = (x+1)^2$
$\pm\sqrt{\frac{3}{2}} = x+1$
$x = -1 \pm \sqrt{3/2}$

↗ right one, vertical stretch by a factor of 2, reflect over x-axis, up 1

② $f(x) = -2(x-1)^3 + 1$

	right one	mult. y's by -2	+ 1
$(-1,-1)$	$(0,-1)$	$(0,2)$	$(0,3)$
$(0,0)$	$(1,0)$	$(1,0)$	$(1,1)$
$(1,1)$	$(2,1)$	$(2,-2)$	$(2,-1)$



D: $(-\infty, \infty)$
R: $(-\infty, \infty)$

y-int: $(0,3)$
x-int: $\left(1 + \sqrt[3]{\frac{1}{2}}, 0\right)$

$0 = -2(x-1)^3 + 1$
$-1 = -2(x-1)^3$
$\frac{1}{2} = (x-1)^3$
$\sqrt[3]{\frac{1}{2}} = x-1$

$x = 1 + \sqrt[3]{\frac{1}{2}}$

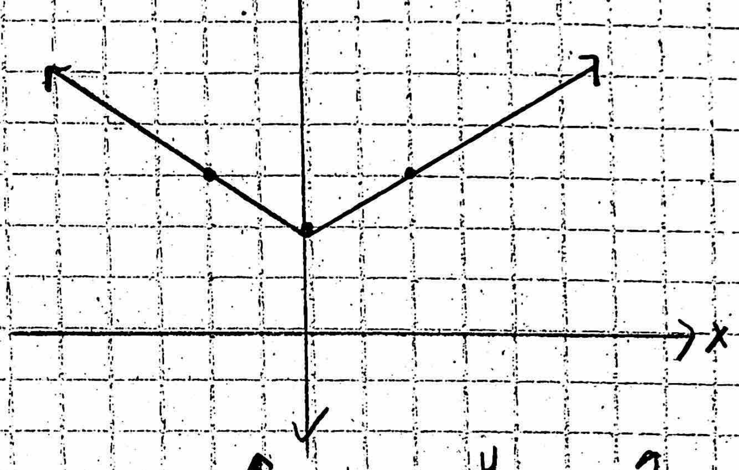
③ $f(x) = \left|\frac{1}{2}x\right| + 2$

horizontal stretch by a factor of 2, ↑2

	mult x's by 2	↑2
(−1,1)	(−2,1)	(−2,3)
(0,0)	(0,0)	(0,2)
(1,1)	(2,1)	(2,3)

D: $(-\infty,\infty)$
R: $[2,\infty)$

y-int: (0,2)
x-int: none



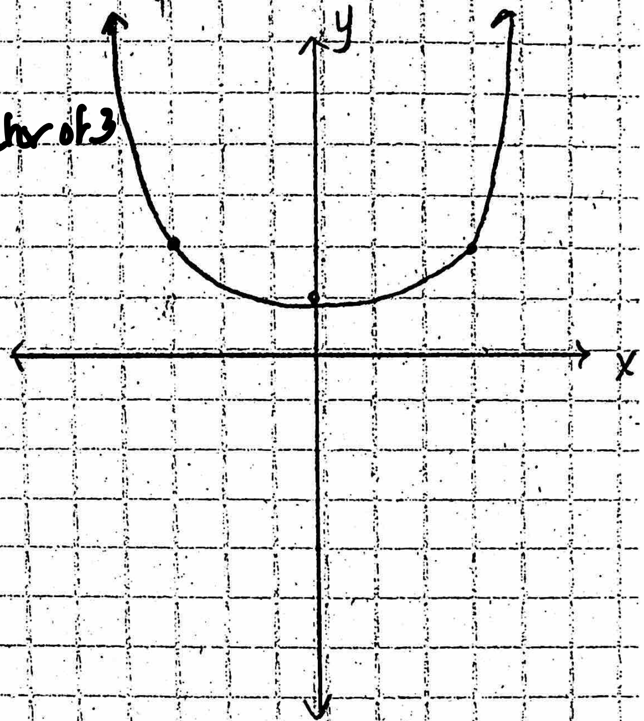
④ $f(x) = \left(\frac{1}{3}x\right)^4 + 1$

horizontal stretch by a factor of 3
↑1

	mult x's by 3	↑ 1
(−1,1)	(−3,1)	(−3,2)
(0,0)	(0,0)	(0,1)
(1,1)	(3,1)	(3,2)

D: $(-\infty,\infty)$
R: $[1,\infty)$

y-int: (0,1)
x-int: none



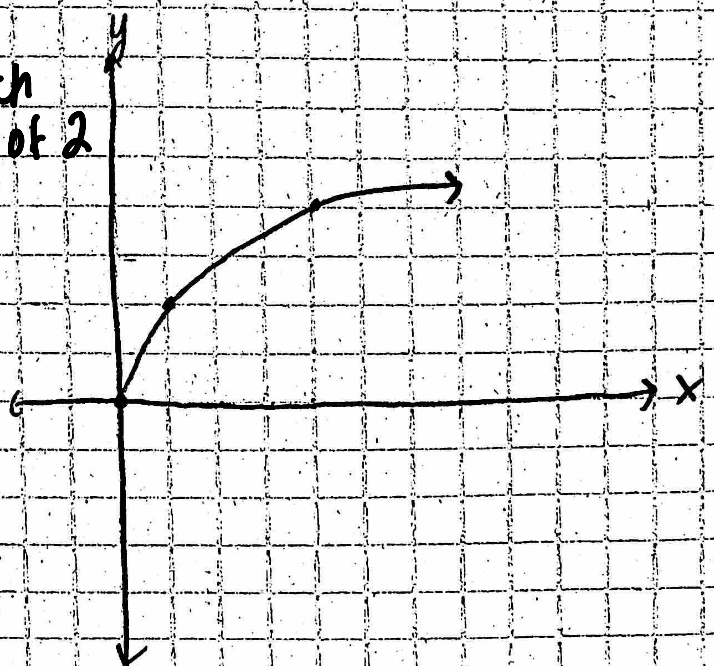
⑤ $f(x) = 2\sqrt{x}$

vertical stretch by a factor of 2

	mult. y's by 2
(0,0)	(0,0)
(1,1)	(1,2)
(4,2)	(4,4)

D: $[0,\infty)$
R: $[0,\infty)$

y int: (0,0)
x-int: (0,0)

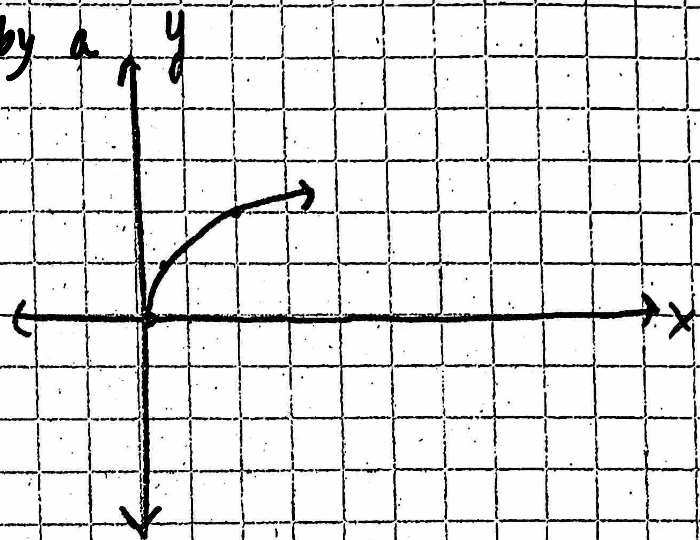


⑥ $f(x) = \sqrt{2x}$

horizontal shrink by a factor of $\frac{1}{2}$

mult. x's by $\frac{1}{2}$

$(0,0)$	$(0,0)$
$(1,1)$	$(\frac{1}{2},1)$
$(4,2)$	$(2,2)$



D: $[0,\infty)$
R: $[0,\infty)$

y-int: $(0,0)$
x-int: $(0,0)$