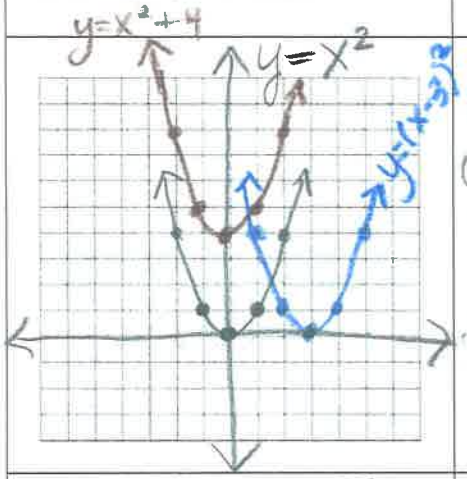
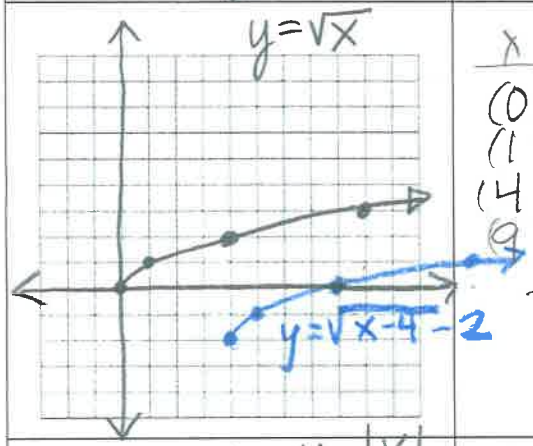
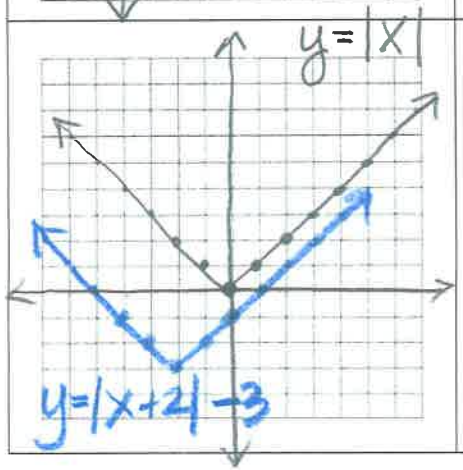
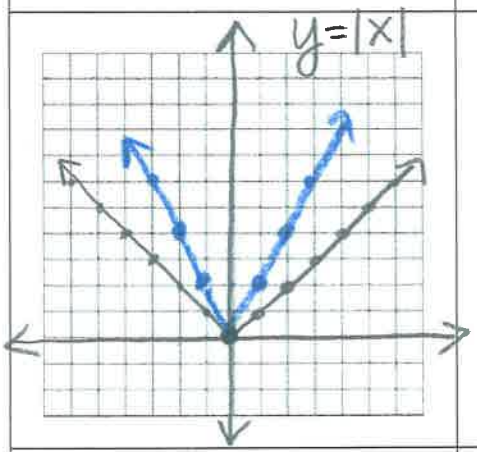
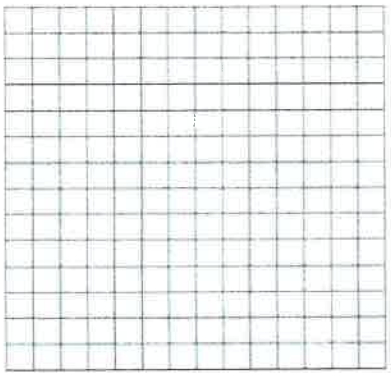
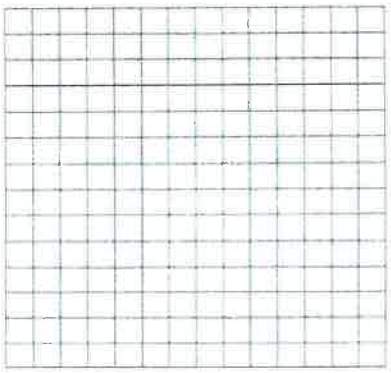
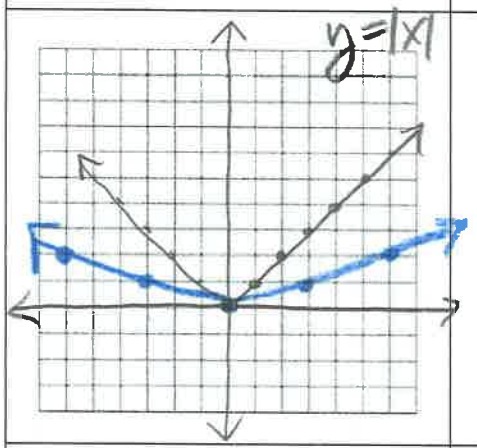
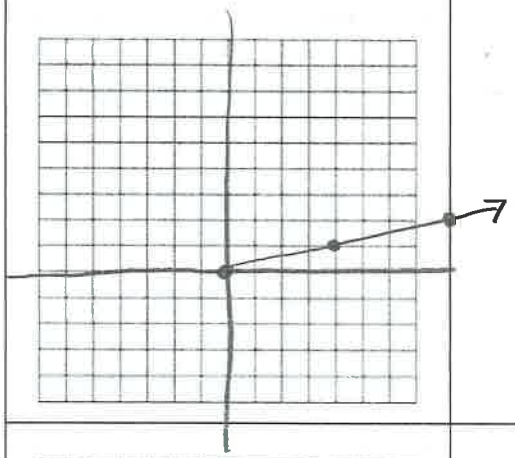
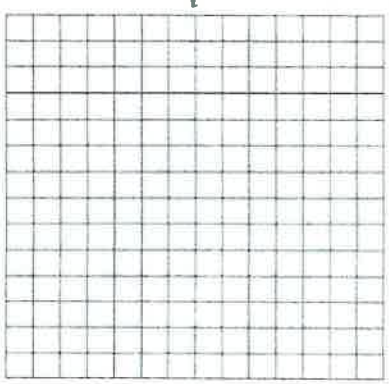
P1

Parent F. ion & Graph	First 5 Points	Domain/Range	Horizontal Shift INSIDE $y=(x-h)^2+k$	Vertical Shift OUTSIDE
	$y=x^2$ (-2,4) (-1,1) (0,0) (1,1) (2,4)	$y=x^2$ D: x all ℝ R: y ≥ 0 Range changes with vertex and reflections	counter-intuitive LEFT/RIGHT All x's shift by + or − h EX: $y=(x-3)^2$ (3,0) h k (-2,4) → (1,4) (-1,1) (2,1) (0,0) (3,0) vertex (1,1) (4,1) (2,4) (5,4)	intuitive UP/DOWN All y's shift b + or − k $y=x^2+4$ (0,4) h k (-2,4) → (-2,8) (-1,1) (-1,5) (0,0) (0,4) (1,1) (1,5) (2,4) (2,8)
	x, y (0,0) (1,1) (4,2) (9,3)	$y=\sqrt{x}$ D: x ≥ 0 R: y ≥ 0 Both change based on vertex & reflections	BOTH $y=\sqrt{x-4}-2$ (4, −2) vertex h k (0,0) → (4,−2) (1,1) (5,−1) (4,2) (8,0) (9,3) (13,1)	
	$y=\|x\|$ x | |x| -2 | 2 -1 | 1 0 | 0 1 | 1 2 | 2	$y=\|x\|$ D: x all ℝ R: y ≥ 0 Range changes with vertex and vertical reflections	$y=\|x-h\|+k$ $y=\|x+2\|-3$ (h,k) vertex (-2,-3) (-2,2) → (-4,-1) (-1,1) → (-3,-2) (0,0) (-2,-3) vertex (1,1) (-1,-2) (2,2) (0,-1)	

Parent Function & Graph	First 5 Points	Domain/Range	Vertical Stretch OUTSIDE $a>1$	Vertical Shrink
	(-2, 2) (-1, 1) (0,0) (1, 1) (2, 2)	$y=\|x\|$ D: x all $\mathbb{R}$ R: $y \geq 0$ vertical stretch by 2	$y=a\|x-h\|+k$ y values change by a factor of a $y=2\|x\|$ (0,0) vertex (-2,2) → (-2,4) (-1,1) (-1,2) (0,0) (0,0) (1,1) (1,2) (2,2) (2,4)	$0<a<1$ $y=\frac{1}{2}\|x\|$ vertical shrink by 2
				
				

Parent Function & Graph	First 5 Points	Domain/Range	Horizontal Stretch	Horizontal Shrink
			$y=\left\|\frac{x}{b}\right\|$ Dividing on inside x values get bigger (stretch) $y=\left\|\frac{x}{3}\right\|$ x mult by 3 (-2,2) → (-6,2) (-1,1) (-3,1) (0,0) (0,0) (1,1) (3,1) (2,2) (6,2)	Multiplying inside x values shrink
			$y=\left\|\frac{x}{4}\right\|$	horizontal stretch by 4
			$y=a\left\|\frac{x-h}{b}\right\|+k$	$y=\|2x\|$ horizontal shrink by 2