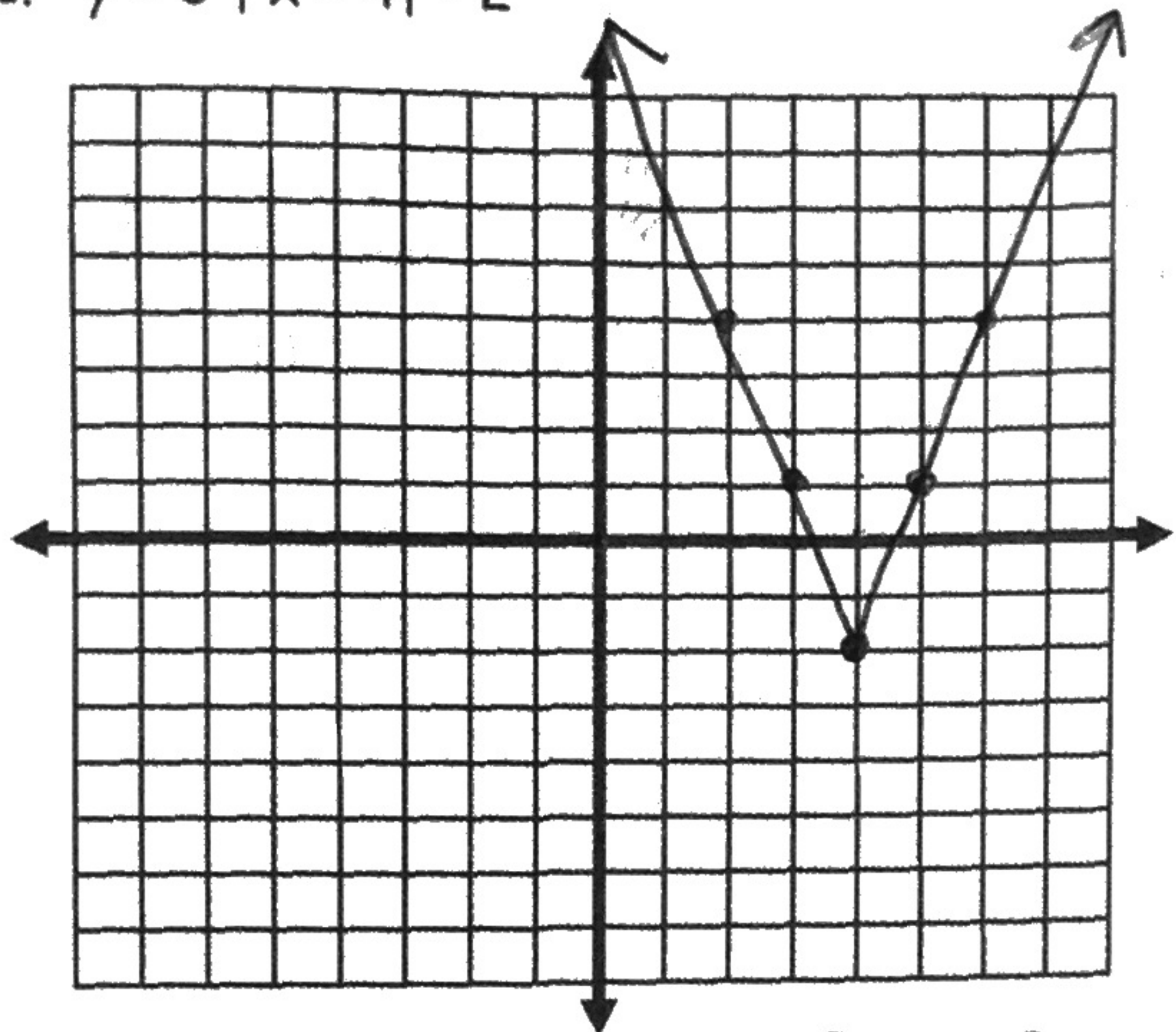


Day 11 HW: Unit 4 Advanced Functions Test Review

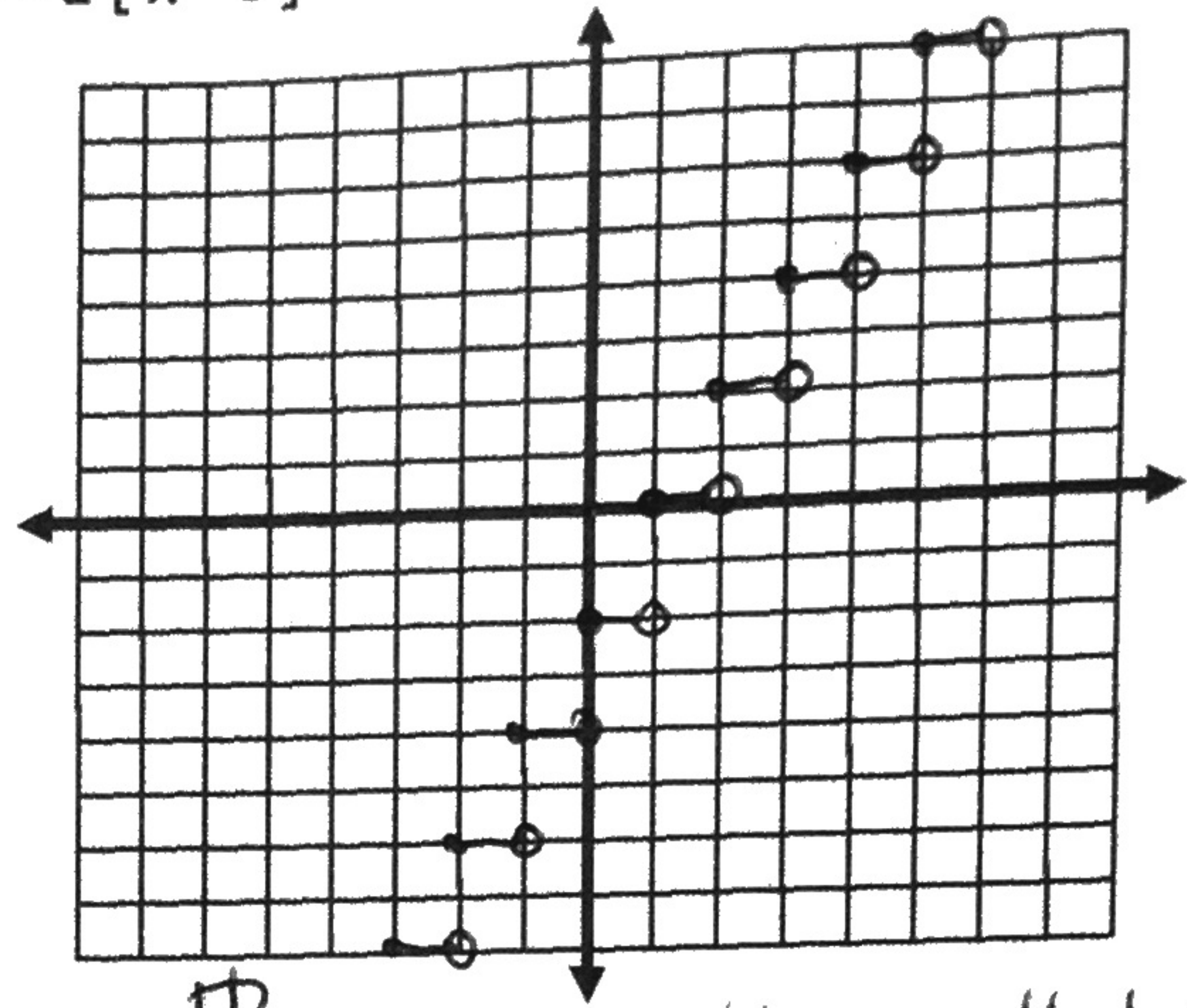
For each equation, draw a graph, indicating at least 5 points. Then tell its domain, its range, and how it was changed from its parent graph.

1.  $y = 3|x - 4| - 2$



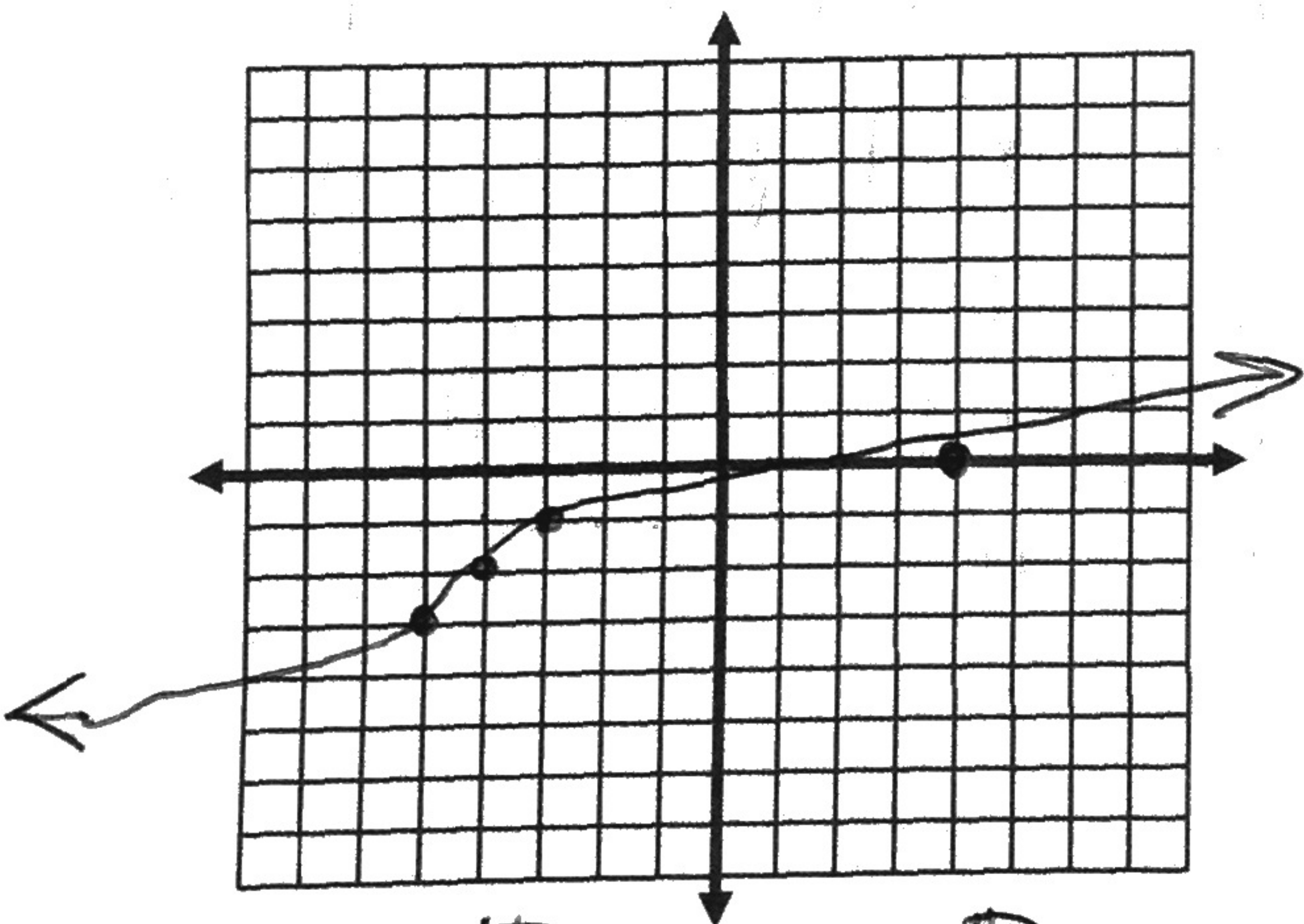
D:  $\mathbb{R}$  R:  $[-2, \infty)$   
 Changed: v. stretch by 3, right 4, down 2

2.  $y = 2[x - 1]$



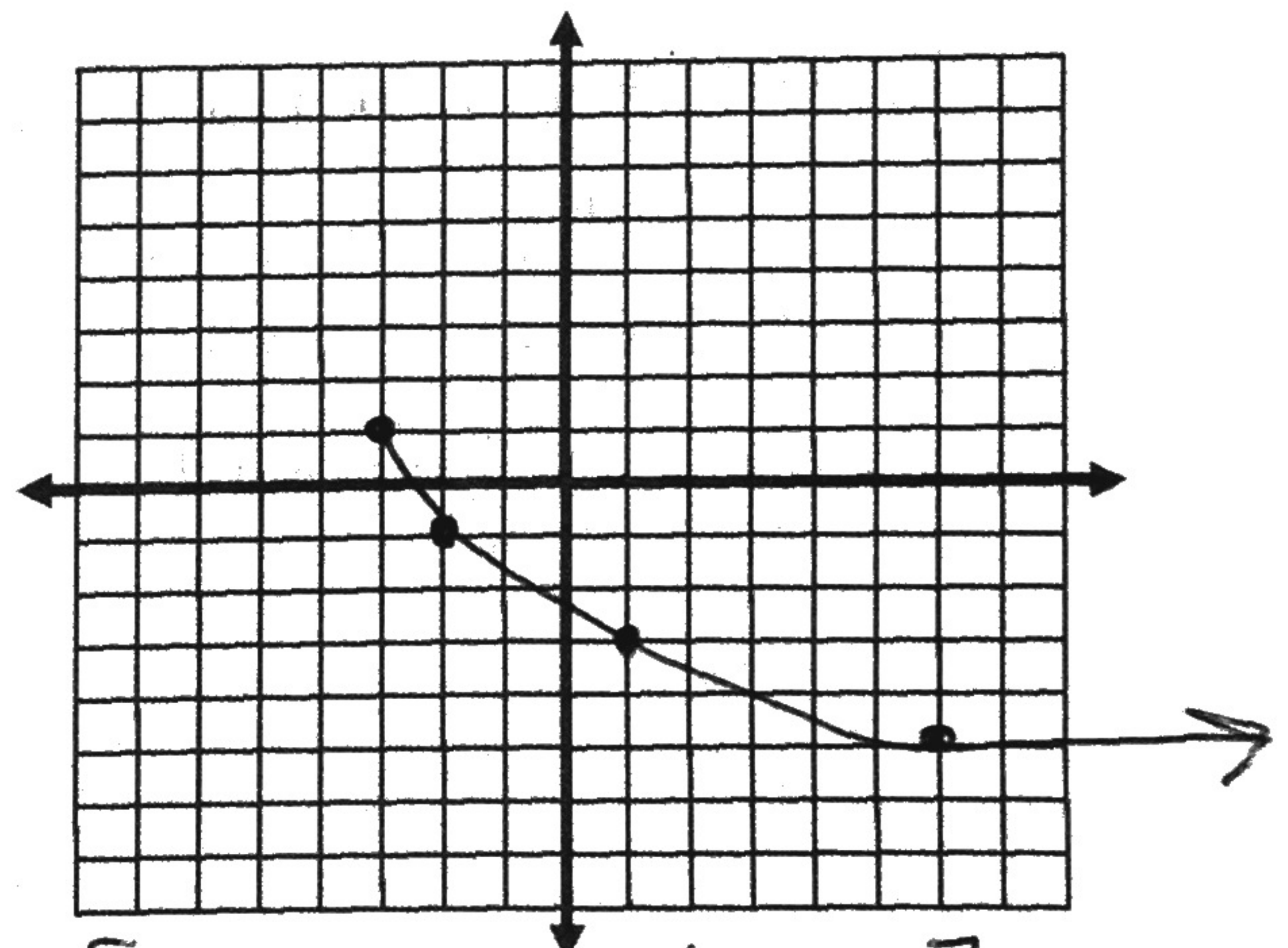
D:  $\mathbb{R}$  R: all integers that are multiples of 2.  
 Changed: v. stretch by 2, right 1

3.  $f(x) = \sqrt[3]{x+4} - 2$



D:  $\mathbb{R}$  R:  $\mathbb{R}$   
 Changed: left + 4, down 2

4.  $f(x) = -2\sqrt{x+3} + 1$



D:  $[-3, \infty)$  R:  $(-\infty, 1]$   
 Changed: reflected over x-axis, v. stretch by 2, left + 3, up 1

Evaluate each expression

5. $\lceil 4.7 \rceil = 4$	6. $\lfloor 4.7 \rfloor = 4.7$	7. $\sqrt{64} = 8$	8. $\sqrt[3]{64} = 4$
9. $\lfloor -4.7 \rfloor = -5$	10. $\lceil -4.7 \rceil = 4.7$	11. $\sqrt{-64} = \text{dne}$	12. $\sqrt[3]{-64} = -4$

13. Solve the following equation for x and write in set notation:

$\left\lceil \frac{3}{2}x - 1 \right\rceil = 8$

$$8 \leq \frac{3}{2}x - 1 < 9$$

$$+1 \quad +1 \quad +1$$

$$9 \leq \frac{3}{2}x < 10$$

$$\frac{9 \cdot 2}{3} \leq \frac{3 \cdot 2}{3}x < \frac{10 \cdot 2}{3}$$

$$18 \leq 3x < 20$$

$$\frac{18}{3} \leq x < \frac{20}{3}$$

$$6 \leq x < \frac{20}{3}$$

14. Write the function so it would be easier to graph. Then, indicate how it's changed from the parent graph.

$f(x) = \sqrt{4x - 28}$   
 $f(x) = \sqrt{4(x - 7)}$   
 $f(x) = 2\sqrt{x - 7}$   
 vertical stretch by 2  
 right + 7



Evaluate given

$$p(x) = \begin{cases} x & \text{if } 0 \leq x < 60 \\ 15 & \text{if } 60 \leq x \leq 90 \end{cases}$$

$$\text{and } g(x) = \begin{cases} 4 - x & \text{if } x > 0 \\ -2x - 2 & \text{if } x < 0 \end{cases}$$

15.  $p(30) = \underline{30}$

17.  $p(60) = \underline{15}$

19.  $p(75) - g(10) = \underline{21}$   
 $15 - -6$

16.  $p(80) = \underline{15}$

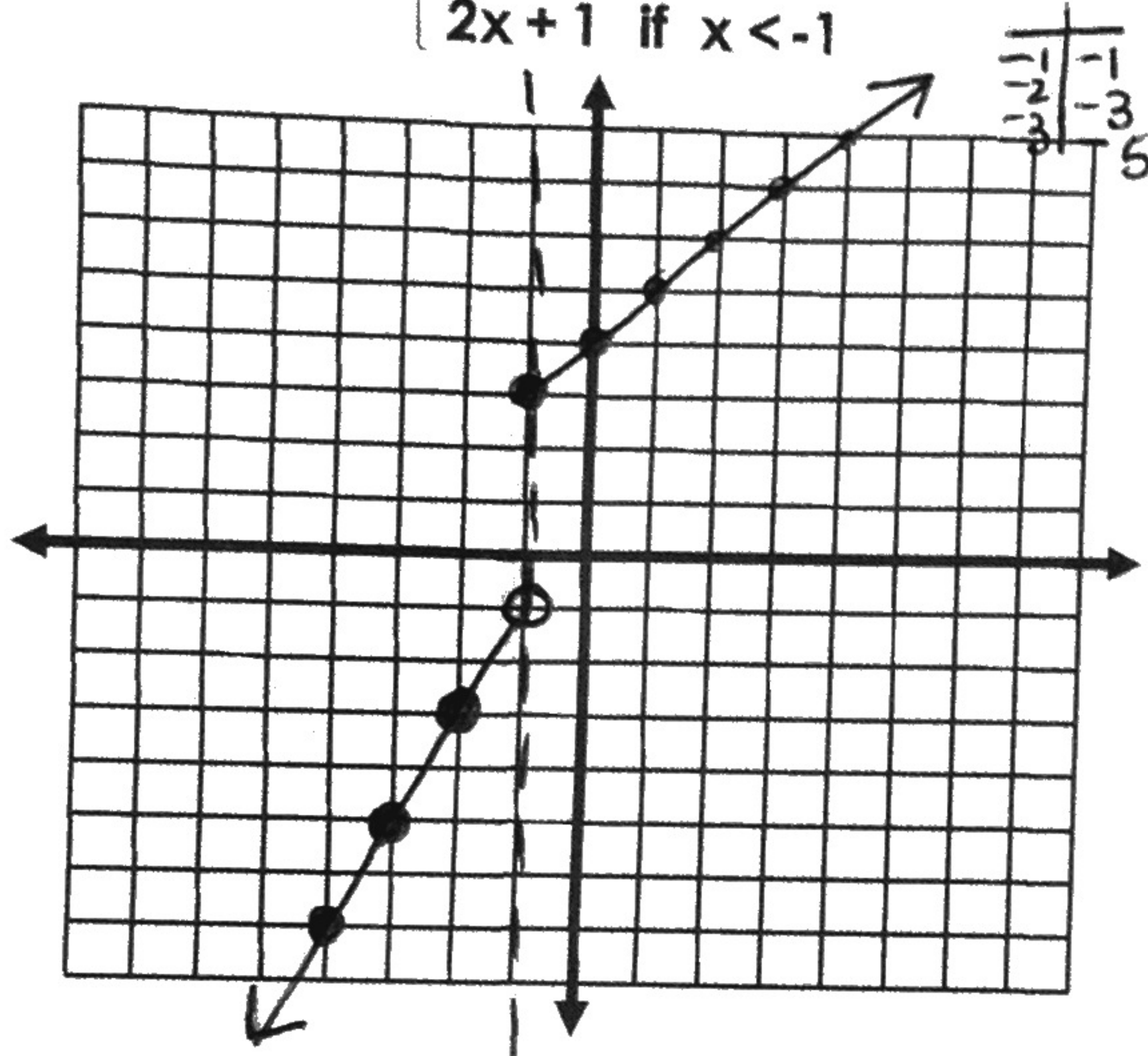
18.  $g(1) = \underline{3}$

20.  $p(5) - g(-5) = \underline{-3}$   
 $5 - 8$

For each equation, draw a graph, indicating at least 5 points. Then tell its domain, its range, and other requested information.

21.

$$g(x) = \begin{cases} x + 4 & \text{if } x \geq -1 \\ 2x + 1 & \text{if } x < -1 \end{cases}$$

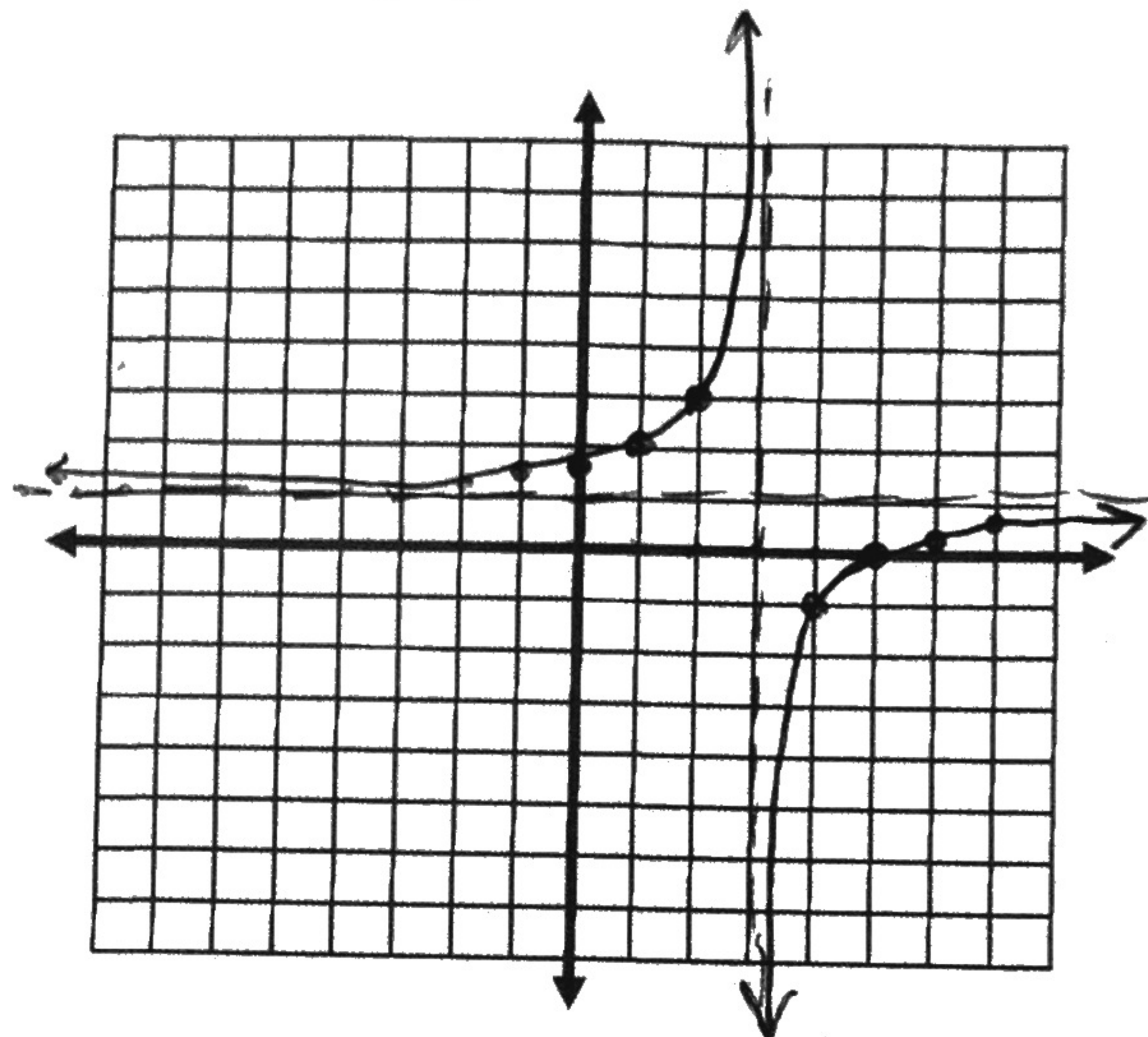


D:  $\mathbb{R}$  R:  $(-\infty, -1) \cup [-1, \infty)$

$g(-4) = \underline{-7}$   $g(4) = \underline{8}$

$g(-1) = \underline{3}$   $g(0) = \underline{4}$

22.  $f(x) = \frac{-2}{x-3} + 1$



D:  $(-\infty, 3) \cup (3, \infty)$  R:  $(-\infty, 1) \cup (1, \infty)$

Changed from parent: right 3, up 1, reflected over x-axis

H.A.:  $y = 1$  V.A.:  $x = 3$

23. There is a relationship between the radius of an orbit and the time of one orbit for the moons of Saturn. The table below lists data for 11 of Saturn's 30 moons. Round answers to the hundredths place.

Moon	Atlas	Prometheus	Pandora	Epimetheus	Janus	Mimas	Enceladus	Tethys	Dione	Helene	Rhea
Radius (100,000 km)	1.38	1.39	1.42	1.51	1.51	1.86	2.38	2.95	3.77	3.77	5.27
Time (days)	0.60	0.61	0.63	0.69	0.70	0.94	1.37	1.89	2.74	2.74	4.52

a. Find the power function model for the data for orbital time versus radius.

$y = .37x^{1.5}$

b. Predict the orbital radius of Titan, which has orbit time of 21.277 days.

$y_2 = 21.277$  is  $y = .37x$  14.75 days  
 zoom 0. intersect

c. Find the orbital time for Phoebe, which has an orbit radius of 12,952,000 km.

~~12952000~~  $\frac{12952000}{100000} = 129.52$   $x = 129.52$   
 $y_1(129.52)$

24. Write an equation for the translation of  $y = \frac{6}{x}$  that has the asymptotes  $x = -3$  and  $y = -7$ .

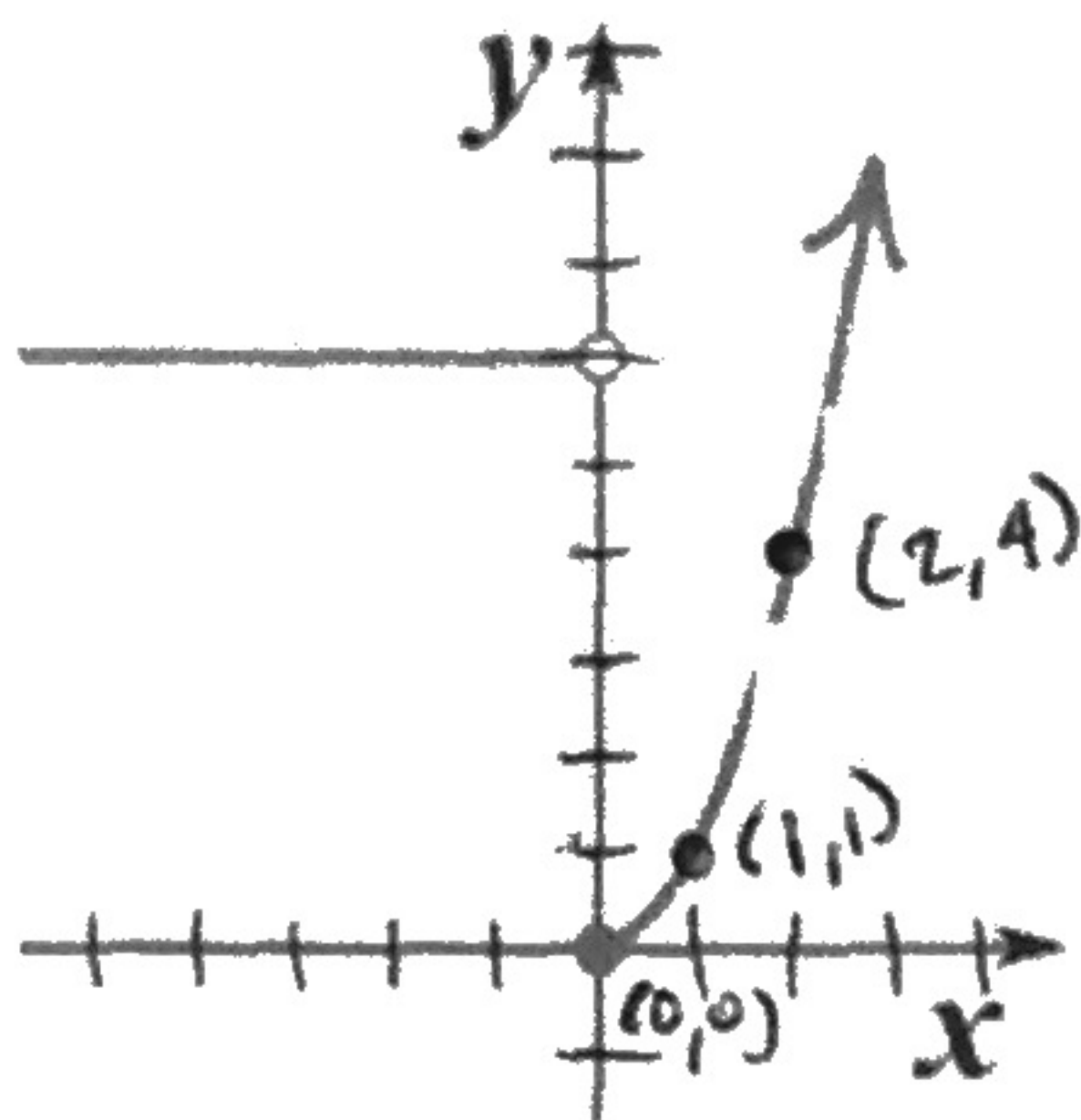
$y = \frac{6}{x+3} - 7$



Unit 4 Packet Honors Common Core Math 2

Write a piecewise function for the following graphs. Then determine their domain and range.

25.

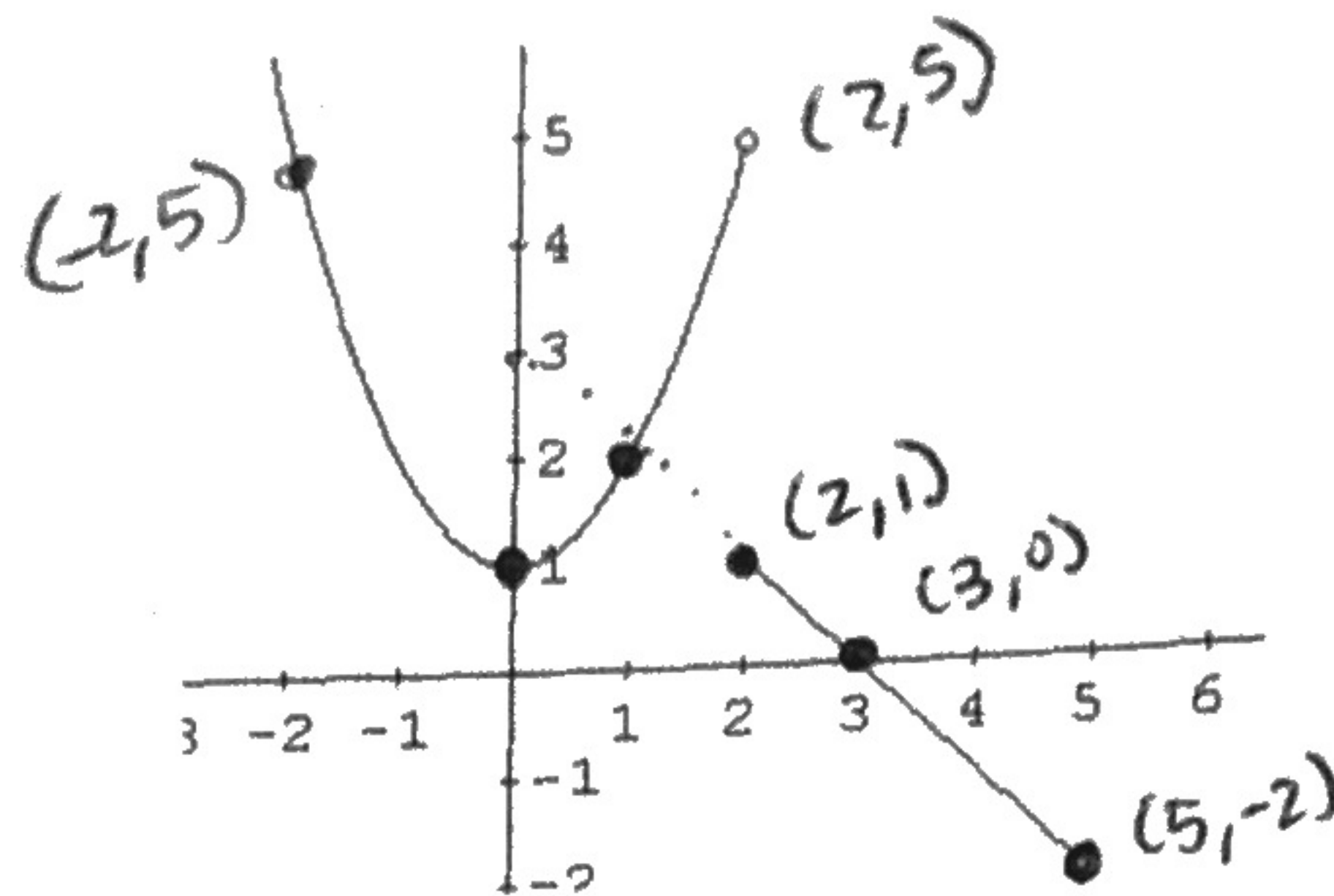


Stat → edit  
 $\frac{L_1}{0} \quad \frac{L_2}{0}$   
 $\frac{1}{2} \quad \frac{1}{4}$   
 Stat → Calc → quadreg

$$f(x) = \begin{cases} 6 & ; x < 0 \\ x^2 & ; x \geq 0 \end{cases}$$

D:  $\mathbb{R}$       R:  $[0, \infty)$

26.



$$f(x) = \begin{cases} x^2 + 1 & ; x < 2 \\ -x + 3 & ; x \geq 2 \end{cases}$$

D:  $\mathbb{R}$       R:  $(-\infty, \infty) / \mathbb{R}$

Solve the following. Show all your work! Use separate paper, if needed. SADMEP

27.  $\sqrt{x+14} = (x-16)^2$

$x+14 = x^2 - 32x + 256$   
 $0 = x^2 - 33x + 242$   
 $0 = (x-11)(x-22)$   
 $x = 11, 22$

28.  $\sqrt{11+14} = 11-16$

$5 \neq -5$   
 extraneous  
 $\sqrt{24+14} = 22-16$   
 $6 = 6 \checkmark$

$(x+2)^{3/4} - 3 = 24$

$(79+2)^{3/4} - 3 = 24$   
 $27-3 = 24$   
 $24 = 24 \checkmark$

$((x+2)^{3/4})^{4/3} = (27)^{4/3}$   
 $x+2 = 81$   
 $x = 79$

29.  $\frac{5}{2x-2} = \frac{15}{x^2-1}$

$5(x^2-1) = 15(2x-2)$   
 $5x^2 - 5 = 30x - 30$   
 $5x^2 - 30x + 25 = 0$   
 $5(x^2 - 6x + 5) = 0$   
 $5(x-5)(x-1) = 0$   
 $x = 5, 1$   
 EV: 1  
 so  $x = 5$

30.  $\frac{x+3}{x} = \frac{7}{x+2} = \frac{14}{x^2+2x}$

EV: 0, -2, 2  
 LCD:  $x(x+2)$

$(x+3)(x+2) - 7x = 14$   
 $x^2 + 5x + 6 - 7x = 14$   
 $x^2 - 2x - 8 = 0$   
 $(x-4)(x+2) = 0$   
 $x = 4, -2 \rightarrow$  EV

$x = 4$

31. Find x when y = 5, if y varies inversely as x and x = 6 when y = -18

32. The current I in an electrical conductor varies inversely with the resistance R of the conductor. The current is  $\frac{1}{3}$  amps when the resistance is 360  $\Omega$ .

Use this information to write an equation to model the relationship.

$xy = k$   
 $6 \cdot 18 = k$   
 $108 = k$

$x \cdot 5 = 108$

$x = 21.6$

$y = \frac{k}{x}$

$360 = \frac{k}{\frac{1}{3}}$

$k = 120$

$y = \frac{120}{x}$

Identify the data in each table as a direct variation or an inverse variation. Then write an equation to model the data.

$xy = k$  inverse

33.

x	2	4	10	12.5
y	4	8	20	25

as x increases, y increases: direct

$2x = y$

34.

x	0.2	1	3	10
y	12	2.4	0.8	0.24

as x increases, y decreases

$2 \cdot 12 = k$   
 $k = 2.4$

$y = \frac{2.4}{x}$

direct  
 $k = \frac{y}{x}$   
 $k = \frac{4}{2}$   
 $k = 2$