Name: More Functions With Features | 4.1

Ready, Set, Go!

Ready

Topic: Reading function values in a piece-wise defined graph.

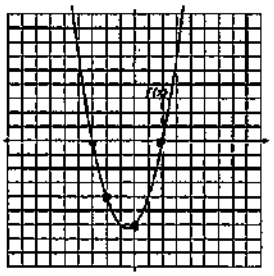
Use the graph to find the indicated function value.

1a. $f(-3) = 0$

b. $f(-2) = -4$

c. $f(0) = -6$

d. $f(2) = 0$

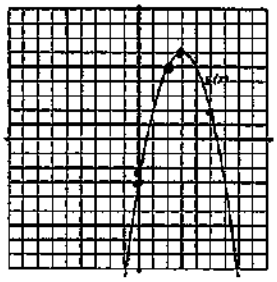


2a. [redacted]

b. [redacted]

c. [redacted]

d. [redacted]

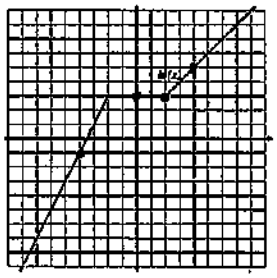


3a. $h(-4) = -1$

b. $h(0) = 3$

c. $h(2) = 3$

d. $h(4) = 5$

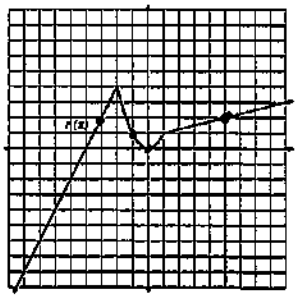


4a. [redacted]

b. [redacted]

c. [redacted]

d. [redacted]



5. Isaac lives 3 miles away from his school. School ended at 3 pm and Isaac began his walk home with his friend Tate who lives 1 mile away from the school, in the direction of Isaac's house. Isaac stayed at Tate's house for a while and then started home. On the way he stopped at the library. Then he hurried home. The graph at the right is a **piece-wise defined function** that shows Isaac's distance from home during the time it took him to arrive home.

a. How much time passed between school ending and Isaac's arrival home? 3.75 hr.

b. How long did Isaac stay at Tate's house? 2.5 - .5 = 2 hr.

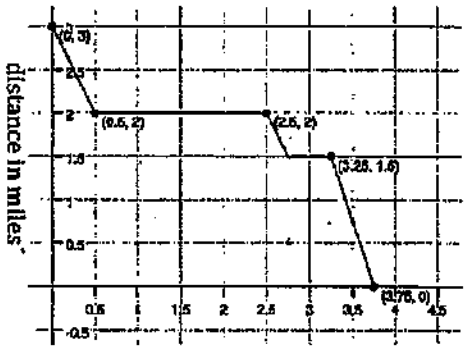
c. How far is the library from Isaac's house? 2 - 1.5 = .5, 6 miles

d. Where was Isaac, 3 hours after school ended? library, 1.5 miles from school

e. Use function notation to write a mathematical expression that says the same thing as question d. $f(3) = 1.5$

f. When was Isaac walking the fastest? How fast was he walking? [3.25, 3.75]

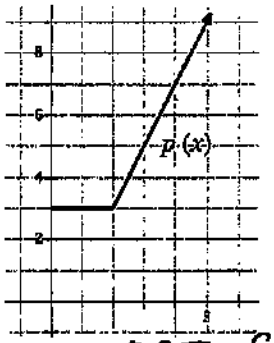
$r = \frac{1.5 - 0}{3.25 - 3.75} = 3$ miles per hour



Set

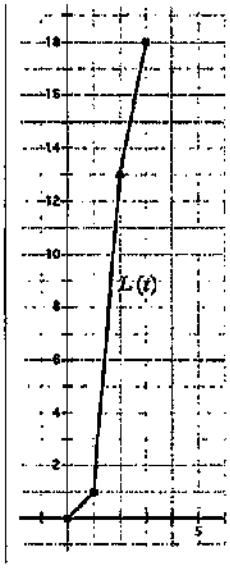
Topic: Writing piece-wise defined functions

6. A parking garage charges $3 for the first two hours that a car is parked in the garage. After that, the hourly fee is $2 per hour. Write a piece-wise function $p(x)$ for the cost of parking a car in the garage for x hours. (The graph of $p(x)$ is shown.)



P(x)

[redacted]



7. Lexie completed an 18 mile triathlon. She swam 1 mile in 1 hour, bicycled 12 miles in 1 hour, and then ran 5 miles in 1 hour. The graph of Lexie's distance versus time is shown. Write a piecewise function $L(t)$ for the graph.

$$L(t) = \begin{cases} 1 & 0 \le t < 1 \\ 12t - 11 & 1 \le t < 2 \\ 5t + 3 & t \ge 2 \end{cases}$$

Go

Topic: Using the point-slope formula to write the equations of lines.

$y = m(x - x_1) + y_1$

$y_1 - y_2 = m(x_1 - x_2)$

$y - y_1 = m(x - x_1)$

Write the equation of the line (in point-slope form) that contains the given slope and point.

8. p: (1, 2); m = 3

[redacted]

9. p: (1, -2); m = -1

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

$y + 2 = -1x + 1$

$y = -1x + 1 - 2$

$\boxed{y = -x - 1}$

10. p: (5, -1); m = 2

[redacted]

Write the equation of the line (in point-slope form) that contains the given points.

11. K (0, 0); L (-4, 5)

$m = \frac{5-0}{-4-0} = -\frac{5}{4}$

$y - 0 = -\frac{5}{4}(x - 0)$

$\boxed{y = -\frac{5}{4}x}$

12. X (-1, 7); Y (3, -1)

[redacted]

13. T (-1, -9); V (5, 18)

$m = \frac{18+9}{5+1} = \frac{27}{6} \div 3 = \frac{9}{2}$

$y - 18 = \frac{9}{2}(x - 5)$

$y = \frac{9}{2}x - \frac{45}{2} + 18$

$y = \frac{9}{2}x - \frac{45}{2} + \frac{36}{2}$

$\boxed{y = \frac{9}{2}x - \frac{9}{2}}$

Name: More Functions With Features | 4.2

Ready, Set, Go!

Ready

Topic: Solving absolute value equations.

Solve for x. (You will have two answers.)

1. $|x| = 7$

$x = 7, -7$

2. $|x - 6| = 3$

3. $|w + 4| = 11$

$w + 4 = \pm 11$

$w = -4 \pm 11$

$w = 7, -15$

4. $-9|m| = -63$

5. $|3d| = 15$

$3d = \pm 15$

$d = 5, -5$

6. $|3x - 5| = 11$

7. $\frac{-|m+3|}{-1} = \frac{-13}{-1}$

$|m+3| = 13$

$m + 3 = \pm 13$

$m = 10, m = -16$

8. $|-4m| = 64$

9. $2|x+1| - 7 = -3$

$+7 \quad +7$

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

$|x+1| = 2$

$x + 1 = \pm 2$

$x = 1, -3$

10. $5|c+3| - 1 = 9$

11. $-2|2p - 3| - 1 = -11$

$\frac{-2|2p-3|}{-2} = \frac{-10}{-2}$

$|2p - 3| = 5$

$2p - 3 = \pm 5$

$\frac{2p}{2} = \frac{-3 \pm 5}{2}$

$p = 1, -4$

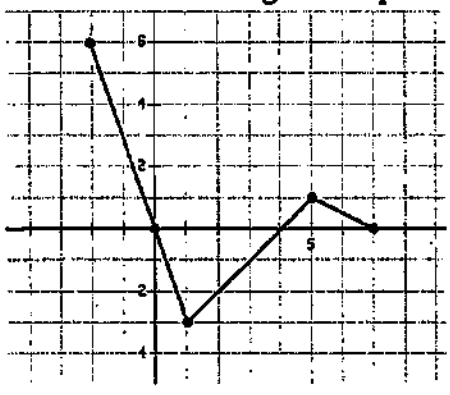
12. Explain why the equation $|m| = -3$ has no solution.

Set

Topic: Reading the domain and range from a graph

State the domain and range of the piece-wise functions in the graph. Use interval notation.

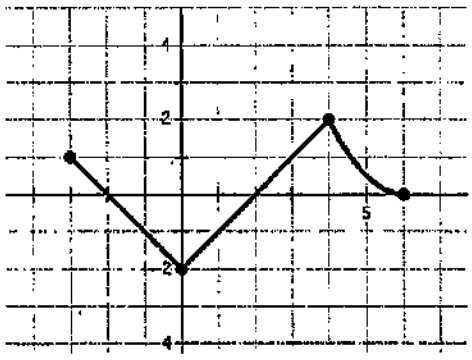
13.



a. Domain: $[-2, 7]$

b. Range: $[-3, 6]$

14.



a. Domain:

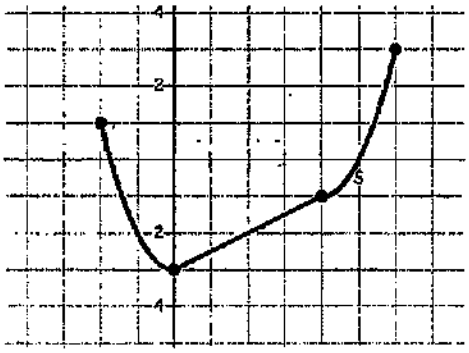
b. Range:

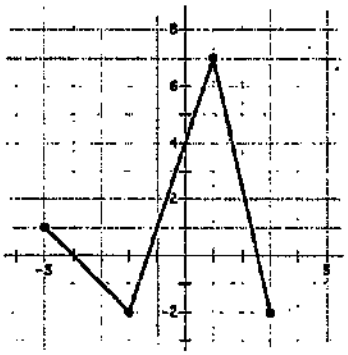
For each of the graphs below write the interval that defines each piece of the graph. Then write the domain of the entire piece-wise function.

Example: (Look at the graph in #14. Moving left to right. Piece-wise functions use set notation.)

Interval 1 $-3 \leq x < 0$
Interval 2 $0 \leq x < 4$
Interval 3 $4 \leq x \leq 6$
Domain: $[-3,6]$ (We can use interval notation on the domain, if it's continuous.)

Pay attention to your inequality symbols! You do not want the pieces of your graph to overlap. Do you know why?



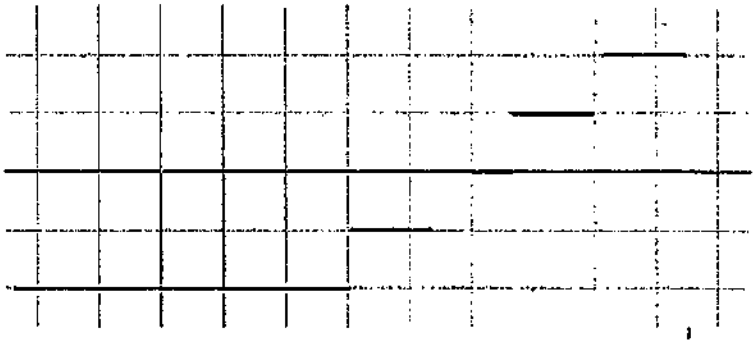


15. a. Interval 1 $-2 \leq x < 0$
b. Interval 2 $0 \leq x < 4$
c. Interval 3 $4 \leq x \leq 6$
d. Domain: $[-2, 6]$

16. a. Interval 1 [redacted]
b. Interval 2 [redacted]
c. Interval 3 [redacted]
d. Domain: [redacted]

17. So far you've only seen continuous piece-wise defined functions, but piece-wise functions can also be non-continuous. In fact, you've had some real life experience with one kind of non-continuous piece-wise function. The graph below represents how some teachers calculate grades. Finish filling in the piece-wise equation. Then label the graph with the corresponding values.

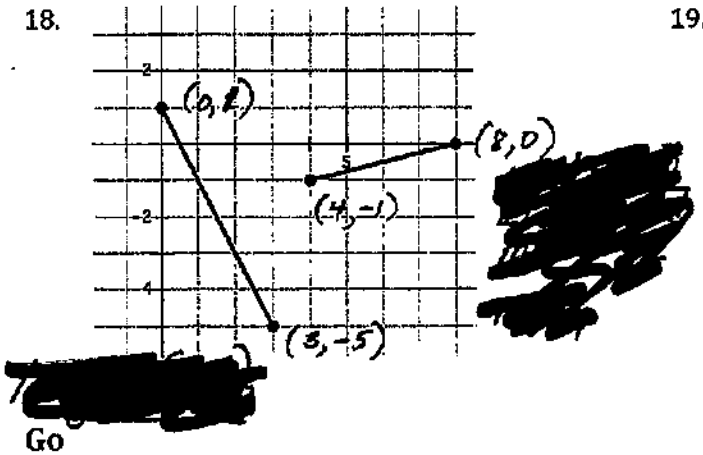
$$f(x) = \begin{cases} A, & 90 \leq x \leq 100 \\ B, & 80 \leq x < 90 \\ C, & 70 \leq x < 80 \\ D, & 60 \leq x < 70 \\ F, & 0 \leq x < 60 \end{cases}$$



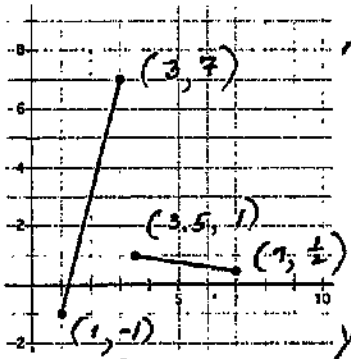
More Functions With Features | 4.2

Write the piece-wise equations for the given graphs.

18.



19.



$m = \frac{1 - \frac{1}{2}}{8.5 - 7}$

$= \frac{.5}{-3.5} = \frac{\frac{1}{2}}{-3\frac{1}{2}}$

$= -\frac{1}{2} \cdot \frac{2}{7}$

$= -\frac{1}{7}$

$y - \frac{1}{2} = -\frac{1}{7}(x - 7)$

$y = -\frac{1}{7}x + 1 + \frac{1}{2}$

$\boxed{y = -\frac{1}{7}x + 1\frac{1}{2}}$

$m_1 = \frac{7 - (-1)}{3 - 1}$

$m_1 = \frac{8}{2} = 4$

$y + 1 = 4(x - 1)$

$y = 4x - 4 - 1$ $\boxed{y = 4x - 5}$

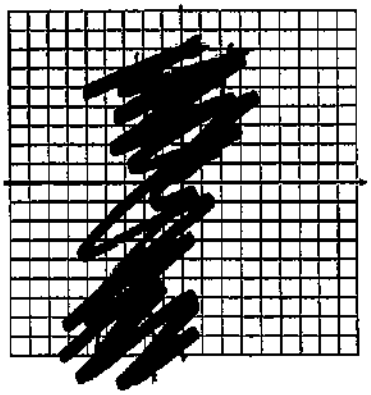
Go

Topic: Transformations on quadratic equations

Beginning with the parent function $f(x) = x^2$, write the equation of the new function $g(x)$ that is a transformation of $f(x)$ as described. Then graph it.

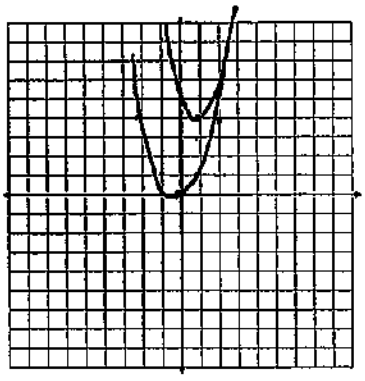
20. Shift $f(x)$ left 3 units, stretch vertically by 2, reflect $f(x)$ vertically, and shift down 5 units.

$g(x) =$ [redacted]



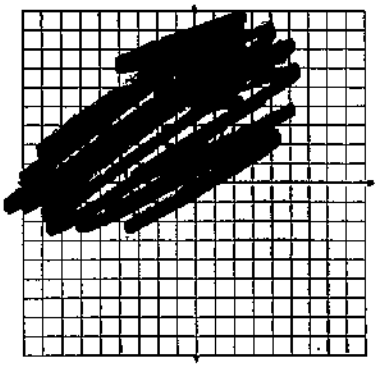
21. Shift $f(x)$ right 1, stretch vertically by 3, and shift up 4 units.

$g(x) = 3(x-1)^2 + 4$



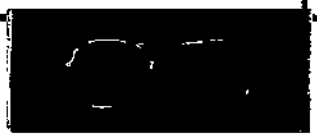
22. Shift $f(x)$ up 3 units, left 6, reflect vertically, and stretch by ½

$g(x) =$ _____



Name: More Functions With Features | 4.3

Ready, Set, Go!



Ready

Topic: Finding the x-intercepts in a quadratic function

Find the x-intercepts of the following quadratic functions.

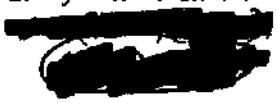
1. $y = x^2 + 3x - 10$

$0 = (x+5)(x-2)$

$x = -5, 2$

$(-5,0)\ (2,0)$

2. $y = x^2 + 8x + 7$

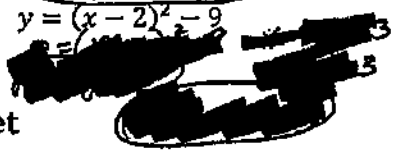


3. $y = 6x^2 + 7x - 20$

$(3x-4)(2x+5)=0$

$x = \frac{4}{3}, \frac{-5}{2}$ $\left(\frac{4}{3},0\right)\left(\frac{-5}{2},0\right)$

4. $y = (x-2)^2 - 9$



5. $y = -(x+3)^2 + 9$

$-9 = -(x+3)^2$

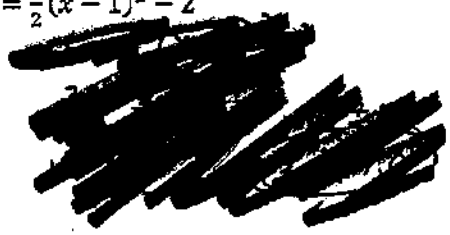
$\sqrt{9} = \sqrt{(x+3)^2}$

$x+3 = \pm 3$

$x = -3 \pm 3$

$(0,0)$ $(-6,0)$

6. $y = \frac{1}{2}(x-1)^2 - 2$



Set

Topic: Absolute value equations

Use the given information to write the indicated form of the function.

7. Piecewise equation

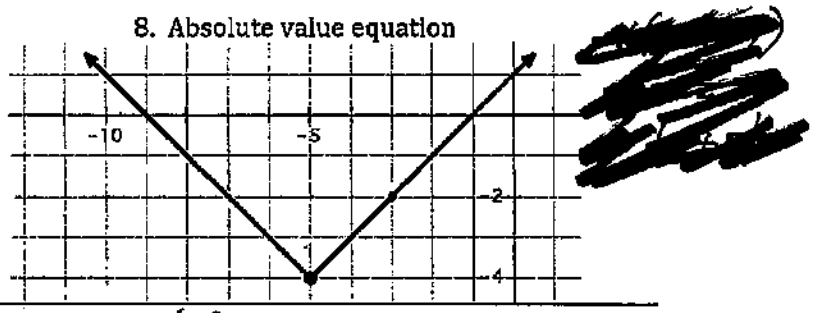
x	$f(x)$
-1	9
0	6
1	3
2	0
3	3
4	6

$m = \frac{6-3}{0-1} = \frac{3}{-1}$

Absolute Value $V(2,0)$

$y = 3|x-2|$

8. Absolute value equation

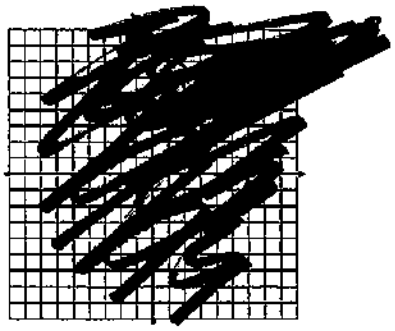


9. Make a table of values. Be sure to include the vertex in the table.

$h(x) = 5|x-6| - 8$

x	$h(x)$
4	2
5	-3
6	-8
7	-3
8	2

10. Graph $f(x) = \begin{cases} -\frac{2}{3}(x-6)+4, & x < 6 \\ \frac{2}{3}(x-6)+4, & x \geq 6 \end{cases}$



Go

Topic: Interpreting absolute value.

Evaluate each expression for the given value of the variable.

11. $-s;\ s = 4$

-4

12. $-t;\ t = -7$

[redacted]

13. $-x;\ x = 0$

0

14. $-w;\ w = -11$

[redacted]

15. $|v|;\ v = -25$

$|-25| = 25$

16. $-(a);\ a = -25$

[redacted]

17. $-(-n);\ n = -2$

$-(-(-2))$

$-(2) = -2$

18. $|-(-p)|;\ p = -6$

[redacted]

19. $|-(-q)|;\ q = 8$

$|-(-8)|$

$= 8$

20. $-|-(-r)|;\ r = -9$

[redacted]

Name: More Functions With Features | 4.4

Ready, Set, Go!

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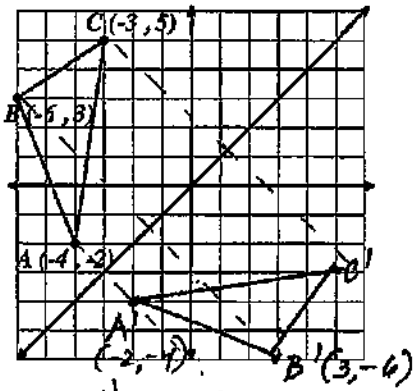
Ready

Topic: Reflecting Images

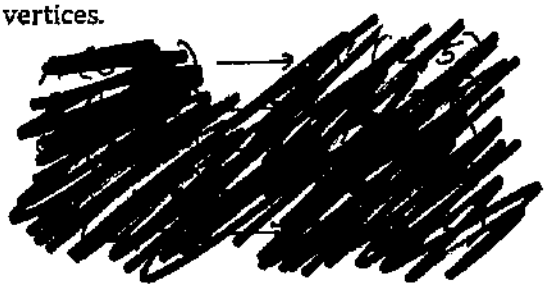
1. Reflect ΔABC across the line y = x. Label the new image as $\Delta A'B'C'$. Label the coordinates of *points* $A'B'C'$. Connect segments AA', BB', and CC'. Describe how these segments are related to each other and to the line y = x.



$A(-4,-2) \longrightarrow A'(-2,-4)$
$B(-6,3) \longrightarrow B'(3,-6)$
$C(-3,5) \longrightarrow C'(5,-3)$

$\overline{AA'}$, $\overline{BB'}$, $\overline{CC'}$ are perpendicular to $y=x$. $y=x$ is a $\perp$ bisector of A and A' B-B', C-C'.

2. On the graph provided to the right, draw a 5-sided figure in the 4th quadrant. Label the vertices of the pre-image. Include the coordinates of the vertices. Reflect the pre-image across the line y = x. Label the image, including the coordinates of the vertices.



3. A table of values for a four-sided figure is given in the first two columns. Reflect the image across the line y = x, and write the coordinates of the reflected image in the space provided.

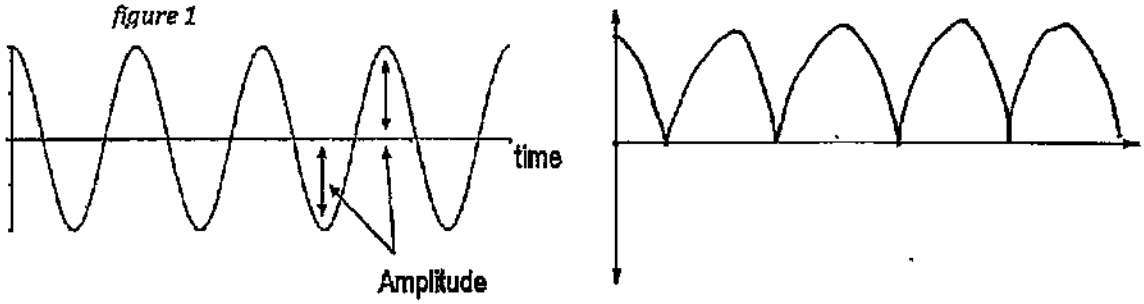
A	(−6,2)	A'	(2,−6)
B	(−4,5)	B'	(5,−4)
C	(−2,3)	C'	(3,−2)
D	(−3,−1)	D'	(−1,−3)

Set

Topic: Absolute value of nonlinear functions

4. *Figure 1* is the graph of a sound wave. The height (or depth) of the graph indicates the magnitude and direction $f(x)$ reaches from the norm or the undisturbed value. In this case that would be the x-axis. When we are only concerned with the distance from the x-axis, we refer to this distance as the **amplitude.** Since distance alone is always positive, **amplitude** can be described as the absolute value of $f(x)$. Use the graph of a sound wave to sketch a graph of the absolute value of the amplitude or $y = |f(x)|$.

figure 1



5. *Figure 2* is a table of values for $g(x) = (x+3)^2 - 9$. What values in the table would need to change if the function were redefined as $h(x) = |g(x)|$?

$h(x) = |(x+3)^2 - 9|$

negative values of $g(x)$ become positive

6. Graph $h(x) = |g(x)|$.

$(-4, -5) \rightarrow (-4, 5)$

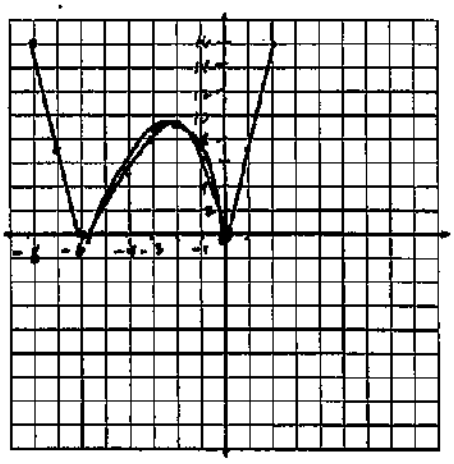
$(-3, -8) \rightarrow (-3, 8)$

$(-2, -9) \rightarrow (-2, 9)$

$(-1, -8) \rightarrow (-1, 8)$

figure 2

x	$g(x)$
-8	16
-7	7
-6	0
-4	-5 +5
-3	-8 +8
-2	-9 +9
-1	-8 +8
0	0
1	7
2	16



7. Write the piece-wise equation for $h(x) = |g(x)|$, as defined in question 6. Let the domain be all real numbers in the interval [-8, 2].

$-8 \leq x < 6$

$$g(x) = \begin{cases} (x+3)^2 - 9 & 0 \leq x \leq 2 \\ -(x+3)^2 - 9 & 6 \leq x < 0 \end{cases}$$

Go

Topic: Simplifying radical expressions.

Simplify. Write the answers in simplest radical form. Some answers may consist of numbers with no radical sign.

8. $(-7-2\sqrt{5})+(6+8\sqrt{5})$

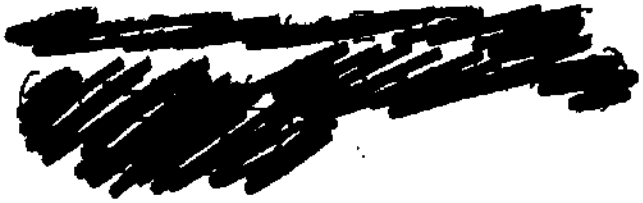
9. $(-10-\sqrt{13})-(-11+5\sqrt{13})$

$-10-\sqrt{13}+11-5\sqrt{13}$

$(-10+11)+(\sqrt{13}-5\sqrt{13})$

$1-6\sqrt{13}$

10. $(4-\sqrt{50})+(7+3\sqrt{18})-(12-2\sqrt{72})$



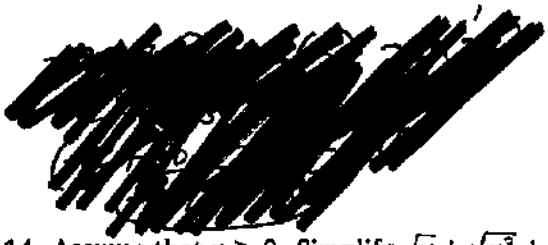
11. $\sqrt{98}+\sqrt{8}$

$\sqrt{49(2)}+\sqrt{4(2)}$

$7\sqrt{2}+2\sqrt{2}$

$9\sqrt{2}$

12. $(-2-7\sqrt{5})+(2\sqrt{125})-3\sqrt{625}$



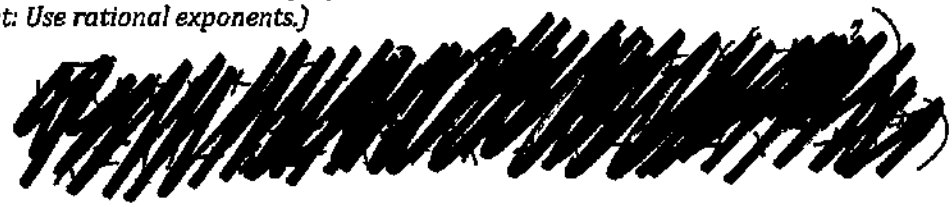
13. $(3r^2-8\sqrt{3b^2})-(2r^2-3\sqrt{27b^2})$

$3r^2-8b\sqrt{3}-2r^2+3b\cdot 3\sqrt{3}$

$r^2-8b\sqrt{3}+9b\sqrt{3}$

$r^2+b\sqrt{3}$

14. Assume that $x \geq 0$. Simplify $\sqrt{x}+\sqrt{x^3}+\sqrt{x^5}+\sqrt{x^7}+\sqrt{x^9}+\sqrt{x^{11}}+\sqrt{x^{13}}+\sqrt{x^{15}}$.
(Hint: Use rational exponents.)



Name: More Functions With Features | 4.5

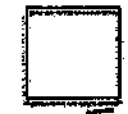
Ready, Set, Go!

Ready

Topic: Square roots

The area of a square is given. Find the length of the side.

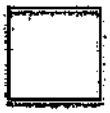
1. $16\ in^2$



$s = \sqrt{16} = 4in$

2. $(x-11)^2\ ft^2$

3. $(25a^2+60a+36)\ cm^2$



$(5a+6)(5a+6)$

$(5a+6)^2$

$s = (5a+6)\ cm$

4. If the length of the side of a square is $(x-24)$ cm, what do we know about the value of x?

Complete the table of values for $f(x)=\sqrt{x}$. Write answers in simplest radical form.

5.

x	$f(x)$
1	1
4	2
9	3
16	4
25	5
36	6
49	7
64	8
81	9
100	10

6.

x	$f(x)$
25	
50	
75	
100	
125	
150	
175	
200	
225	
250	

7.

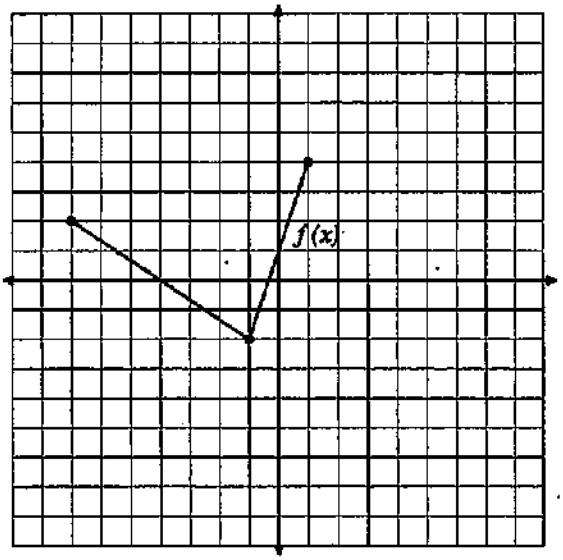
x	$f(x)$
$x^2-2x+1=$	$(x-1)^2 \rightarrow (x-1)$
$x^2-4x+4=$	$(x-2)^2 \rightarrow (x-2)$
$x^2-6x+9=$	$(x-3)^2 \rightarrow (x-3)$
$x^2-8x+16=$	$(x-4)^2 \rightarrow (x-4)$
$x^2-10x+25=$	$(x-5)^2 \rightarrow (x-5)$
$x^2-12x+36=$	$(x-6)^2 \rightarrow (x-6)$
$x^2-14x+49=$	$(x-7)^2 \rightarrow (x-7)$
$x^2-16x+64=$	$(x-8)^2 \rightarrow (x-8)$
$x^2-18x+81=$	$(x-9)^2 \rightarrow (x-9)$
$x^2-20x+100=$	$(x-10)^2 \rightarrow (x-10)$

Set Topic: Inverse functions

8. Given: $f(x) = \{(-13,5)(-9,-9)(-5,-2)(-1,-5)(0,-4)(4,6)(9,10)(14,32)\}$

Find $f^{-1}(x) =$ [redacted]

9. The function $f(x)$ is shown on the graph. Graph $f^{-1}(x)$ on the same set of axes.



10. Is the graph of $f^{-1}(x)$ also a function? Justify your answer.

[redacted]

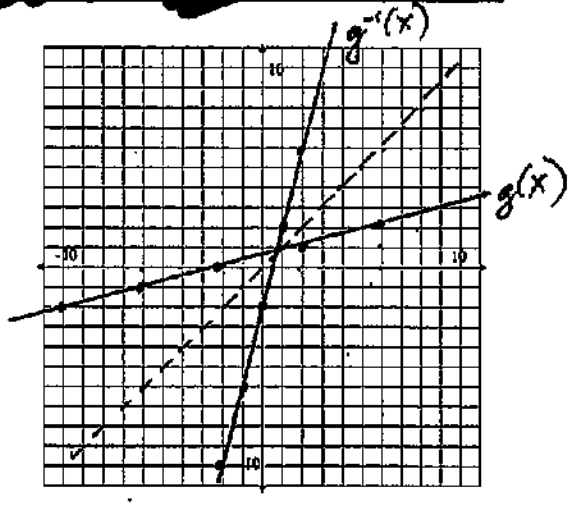
11. I am going on a long trip to Barcelona, Spain. I am only taking one suitcase and it is packed very full. I plan to arrive completely exhausted at my hotel in the middle of the night. The only thing I will want to take out of my suitcase is a pair of pajamas. So when I packed my suitcase at home, did I want to put my pajamas in first, somewhere in the middle, or last? Explain.

12. Write the inverse function for the table of values.

Input x	-10	-6	-2	2	6
Output $g(x)$	-2	-1	0	1	2

Input x	[redacted]
Output $g^{-1}(x)$	

13. Use the points in problem 12. Graph $g(x)$ in black and $g^{-1}(x)$ in a different color on the coordinate grid at the right. Graph the line of reflection for the corresponding points.



14. Is $g^{-1}(x)$ also a function? Justify your answer.

[redacted]

Go

Topic: Multiplying square roots

Multiply. Write your answers in simplest radical form.

15. $\sqrt{3}(4+5\sqrt{3})$

$4\sqrt{3}+5\sqrt{3}\cdot\sqrt{3}$

$4\sqrt{3}+15$

16. $6\sqrt{11}(2-\sqrt{11})$ [redacted]

17. $(1-7\sqrt{2})(1-\sqrt{2})$

$1-1\sqrt{2}-7\sqrt{2}+7(2)$

$15-8\sqrt{2}$

18. $(3+2\sqrt{13})(3-2\sqrt{13})$ [redacted]

19. $(4+3\sqrt{5})(4-3\sqrt{5})$

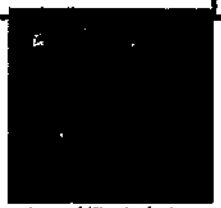
$16-12\sqrt{5}+12\sqrt{5}-9(5)$

$16-45=-29$

20. $(1-3\sqrt{6})(5-2\sqrt{6})$ [redacted]

Name: More Functions With Features | 4.6

Ready, Set, Go!

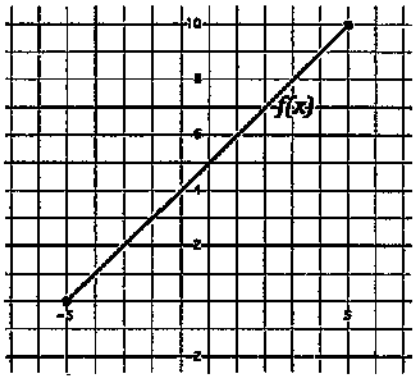


Ready

Topic: Identifying features of functions

Given each representation of a function, determine the domain and range. Then indicate whether the function is discrete, continuous, or discontinuous and increasing, decreasing, or constant.

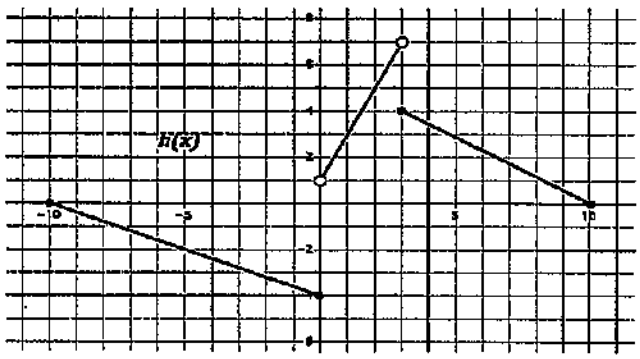
1.



Description of Function:

Continuous and increasing
D: [-5, 5]
R: [0, 10]

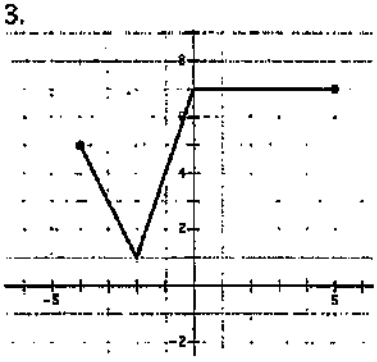
2.



Description of Function:

[redacted]

3.

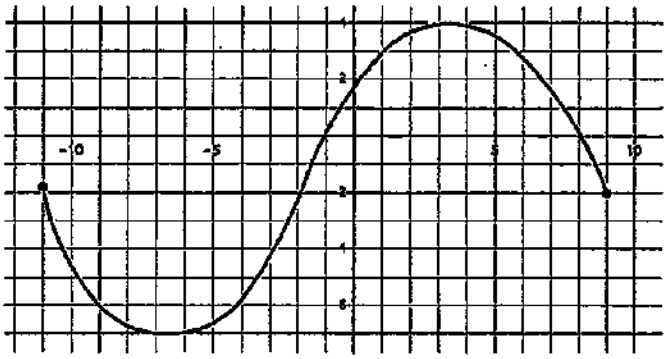


Description of Function:

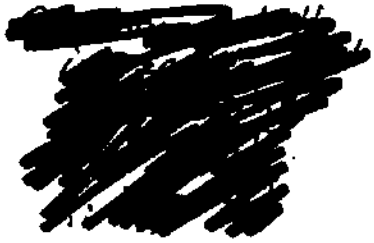
Continuous decreasing, increasing and constant
D: [-4, 5]
R: [1, 7]

More Functions With Features | 4.6

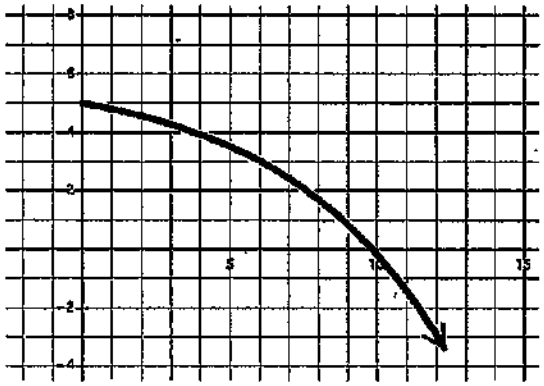
4.



Description of Function:



5.



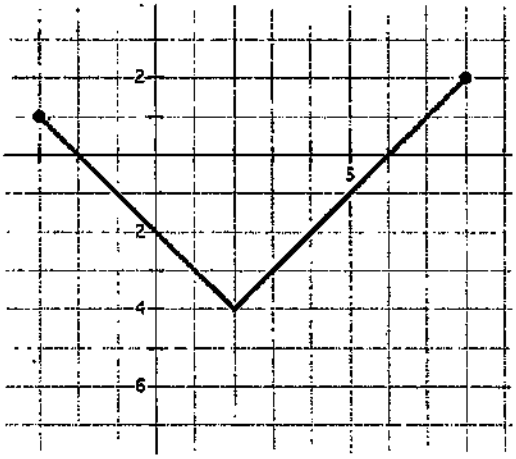
Description of Function:

Continuous decreasing

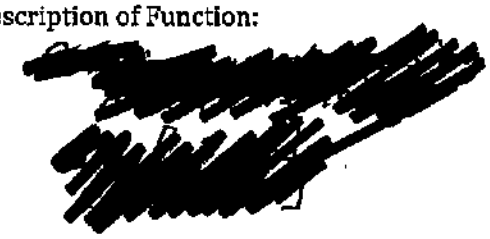
D: $[0, \infty)$

R: $[5, \infty)$

6.



Description of Function:



Set

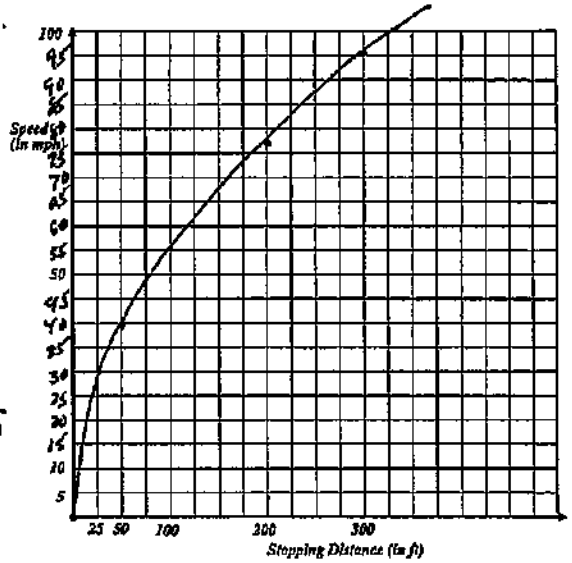
Topic: Square root functions

The speed limit for driving in a school zone is 20mph. That seems so slow if you're riding in a car. But have you ever wondered how quickly you could come to a complete stop going that speed (even if you had super quick reflexes)? It would take you over 13 feet! The **speed of a vehicle** s and the **stopping distance** d are related by the function $s(d) = \sqrt{30d}$.

Fill in the table of values for $s(d)$. (Round to nearest whole number.) Then graph $s(d)$ and answer the questions.

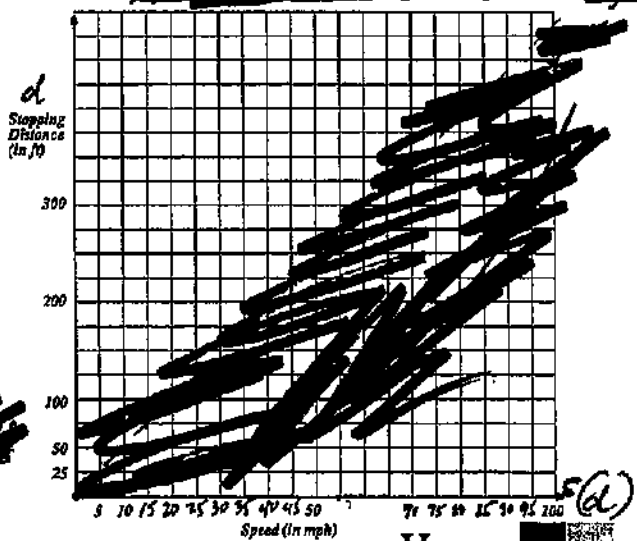
7.

d ft	$s(d)$ mph	
25	≈ 27	$\sqrt{30(25)}$
50	≈ 39	$\sqrt{30(50)}$
100	≈ 55	$\sqrt{30(100)}$
200	≈ 77	$\sqrt{30(200)}$
300	≈ 95	$\sqrt{30(300)}$



8. If you were a police officer investigating the site of an accident, you would be able to measure the length of the skid marks on the road and then approximate the speed of the driver. The driver swears he was sure he was going under 60 mph. The tire marks show a pattern for 150 feet. Is the driver's sense of his speed accurate? Justify your answer.

9. Use your answers in problem 8 to make a graph of stopping distance as a function of speed.



10. How are the two graphs related?

Go

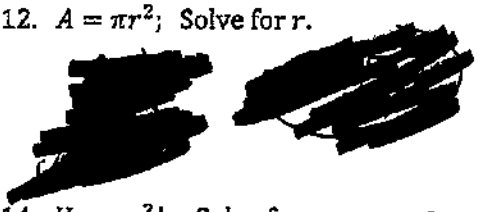
Topic: Solving for a variable.

Solve the following for the indicated variable.

11. $C = 2\pi r$; Solve for r.

$\frac{C}{2\pi} = \frac{2\pi r}{2\pi}$ $\quad r = \frac{C}{2\pi}$

12. $A = \pi r^2$; Solve for r.

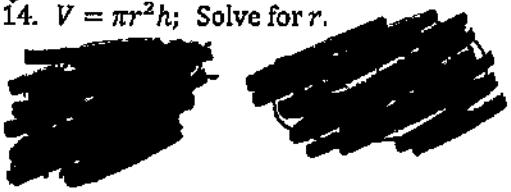


13. $V = \pi r^2 h$; Solve for h.

$\frac{V}{\pi r^2} = \frac{\pi r^2 h}{\pi r^2}$

$h = \frac{V}{\pi r^2}$

14. $V = \pi r^2 h$; Solve for r.

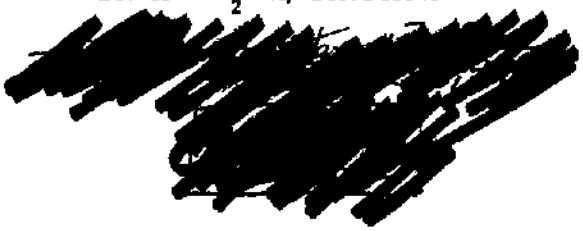


15. $V = e^3$; Solve for e.

$\sqrt[3]{V} = \sqrt[3]{e^3}$

$e = \sqrt[3]{V}$

16. $A = \frac{b_1+b_2}{2}h$; Solve for h



Name: More Functions With Features | 4.7

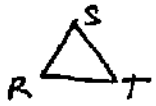
Ready, Set, Go!

Ready

Topic: Geometric symbols

Make a sketch that matches the geometric symbols. Label your sketch appropriately.

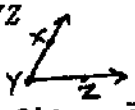
1. ΔRST



2. $\overleftrightarrow{AB}$

[redacted]

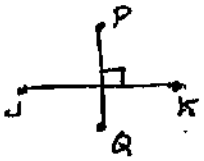
3. $\angle XYZ$



4. $\overrightarrow{GH}$

[redacted]

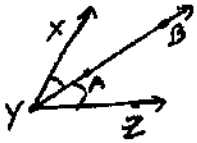
5. $\overline{JK} \perp \overline{PQ}$



6. Point S bisects $\overline{MN}$.

[redacted]

7. $\overrightarrow{AB}$ bisects $\angle XYZ$

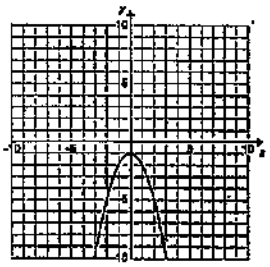


Set

Topic: Features of functions

Find the following key features for each function:

8.



a. Domain and range

[redacted]

b. Intercepts

[redacted]

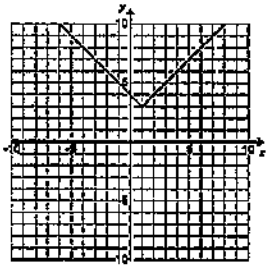
c. Location and value of maxima/minima

[redacted]

d. Intervals where function is increasing or decreasing

[redacted]

9.



a. Domain and range

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

b. Intercepts

$(0, 4)$ y-int

c. Location and value of maxima/minima

$(1, 3)$

d. Intervals where function is increasing or decreasing

D: $(-\infty, 1)$
I: $(1, \infty)$

10.

$$f(x) = \begin{cases} -(x+3), & x < -3 \\ (x+3), & x \geq -3 \end{cases}$$

a. Domain and range

[redacted]

b. Intercepts

[redacted]

c. Location and value of maxima/minima

[redacted]

d. Intervals where function is increasing or decreasing

[redacted]

Write a function that meet the given requirements.

11. A function that is always decreasing $y = -2x$
12. A function that is symmetrical about the line x=3 [redacted]
13. A function with a minimum of 5 at $x = 1$ $y = |x-1|+5$; $y = \sqrt{x-1}+5$
14. A function that is increasing from $(-\infty, 2)$ then decreasing from $[2, \infty)$ [redacted]
15. A function with one real root $y = (x-1)^2$
16. A function that has a domain from $[-2, \infty)$ [redacted]
17. A function with a range from $[0, \infty)$ $y = |x|$; $y = x^2$
18. A function with a common factor of 2 [redacted]
19. A function that is also a geometric sequence $y = \frac{1}{2}\cdot 3^x$; $y = 2^x$
20. A function with x-intercepts at (-1, 0) and (1,0) [redacted]

Go

Topic: Inverse Functions

Find the inverse of each function. If the inverse is not a function, restrict the domain.

21. $f(x) = x^2$; $f^{-1}(x) = \sqrt{x}$ $y = x^2 \rightarrow \sqrt{x} = \sqrt{y^2}$
22. $g(x) = 2x + 4$; $g^{-1}(x) =$ [redacted] y
23. $f(x) = (x+1)^2$; $f^{-1}(x) = \sqrt{x} - 1$ $y = (x+1)^2 \rightarrow \sqrt{x} = \sqrt{(y+1)^2} \rightarrow \sqrt{x} = y+1$
24. $h(x) = \frac{1}{3}x + 6$ $h^{-1}($ [redacted]
25. $f(x) = \{(-3,5)(-2,-9)(-1,-2)(0,-5)(1,-4)(2,6)(3,10)(4,8)\}$;

$f^{-1}(x) = \{(5,-3)(-9,-2)(-2,-1)(-5,0)(-4,1)(6,2)(10,3)(8,4)\}$

Write the piecewise-defined function for the following absolute value functions

26. $h(x) = |x+3|$ [redacted]
27. $f(x) = |x^2 - 4| + 1$ $\begin{cases} x^2 - 3 & x \le -2 \text{ or } x \ge 2 \\ -x^2 + 5 & -2 < x < 2 \end{cases}$ (4, 1)
28. $g(x) = 5|x+3|$ [redacted]
29. $f(x) = |x^2 - 16|$ [redacted] $\begin{cases} x^2 - 16 & x \le -4 \text{ or } x \ge 4 \\ -x^2 + 16 & -4 < x < 4 \end{cases}$