Name Key HW# 33 Date

Review for Unit Test 6B: Functions and Transformations

1. Labor at the car repair shop can be represented by the function:

$$\text{Total charge for repairs } \begin{cases} 150, & 0 < h \le 1 \\ 150 + 80(h-1), & h > 1 \end{cases}$$ → use this equation

$h > 1$
$3 > 1.$ ✓

If h represents the number of hours worked, what is the charge for a 3 hour car repair?

(a) \$150 (b) \$230 (c) \$310 (d) \$390

$150 + 80(3-1)$
$150 + 160 = 310$

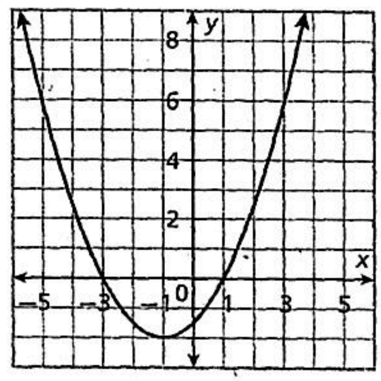
2. The graph to the right is represented by which function?

a. $f(x) = \frac{1}{2}(x-1)^2 - 2$

b. $f(x) = \frac{1}{2}(x+1)^2 - 2$ ← left 1 ← down 2

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

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



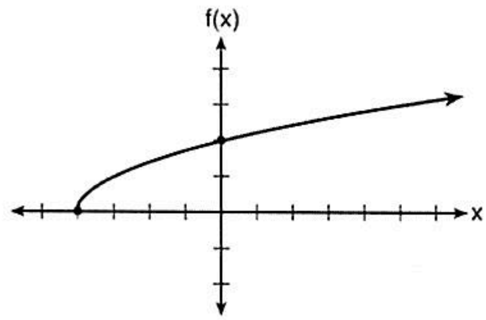
3. The graph of the function $f(x) = \sqrt{x+4}$ is shown below. The domain of the function is

1) $\{x|x > 0\}$

2) $\{x|x \ge 0\}$

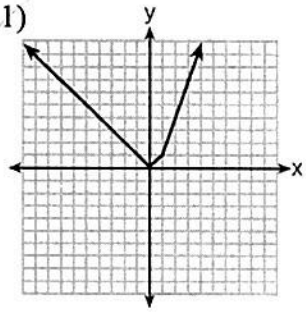
3) $\{x|x > -4\}$

4) $\{x|x \ge -4\}$



4. Which graph represents $f(x) = \begin{cases} |x| & x < 1 \\ \sqrt{x} & x \ge 1 \end{cases}$?

1)



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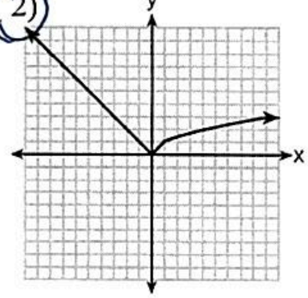

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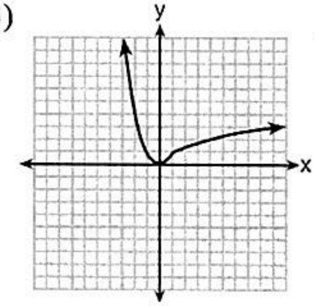
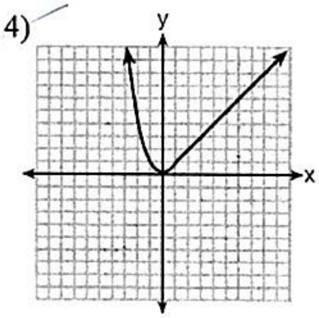


4)



Directions: Match the piecewise function with its graph.

5) $f(x) = \begin{cases} x + 4 & x \le 0 \\ 2x + 3 & x > 0 \end{cases}$ B.

7) $f(x) = \begin{cases} 3x - 2 & x \le 1 \\ x + 2 & x > 1 \end{cases}$ E

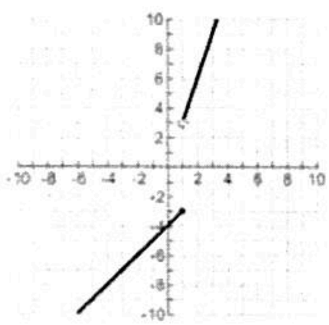
9) $f(x) = \begin{cases} x - 4 & x \le 1 \\ 3x & x > 1 \end{cases}$ A.

6) $f(x) = \begin{cases} 3x - 1 & x \ge -1 \\ -5 & x < -1 \end{cases}$ D.

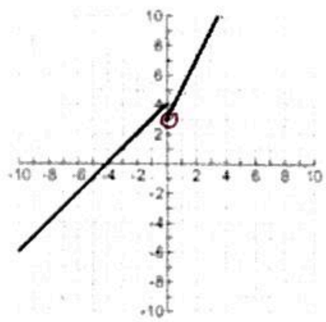
8) $f(x) = \begin{cases} -3x - 1 & x \le 1 \\ -5 & x > 1 \end{cases}$ C

10) $f(x) = \begin{cases} 2x + 4 & x \ge 0 \\ x + 4 & x < 0 \end{cases}$ F.

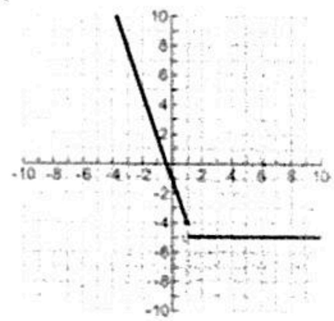
A



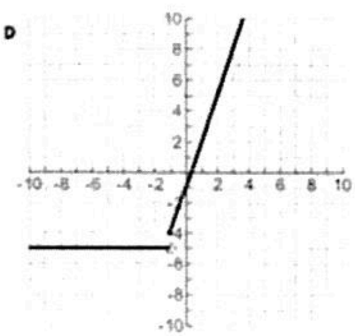
B



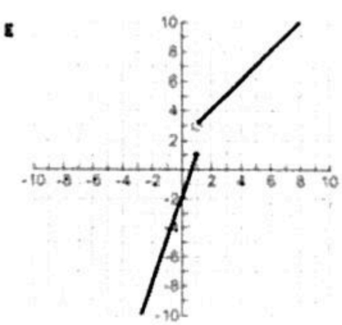
C



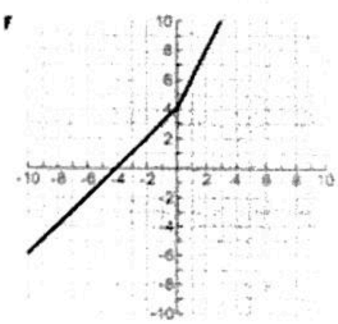
D



E



F



11. Which is the parent quadratic function?

(a) $f(x) = x^2$ (b) $f(x) = ax^2$ (c) $f(x) = (x-h)^2 + k$ (d) $f(x) = a(x-h)^2 + k$

12. Given $f(x) = 3x + 2$ and $g(x) = -2x - 4$, find $h(x) = f(x) - g(x)$.

$h(x) = f(x) - g(x)$
$(3x+2) - (-2x-4)$
$3x + 2 + 2x + 4$

(a) $h(x) = x - 2$ (b) $h(x) = x + 6$ (c) $h(x) = 5x + 6$ (d) $h(x) = 5x - 2$

$h(x) = 5x+6$

13. Given the graph of the line represented by the equation $f(x) = -2x + b$, if b is increased by 4 units, the graph of the new line would be shifted 4 units

a) right b) up c) left d) down

14. Melissa graphed the equation $y = x^2$ and Dave graphed the equation $y = -5x^2$ on the same coordinate grid. What is the relationship between the graphs that Melissa and Dave drew?

(a) Dave's graph is wider and opens in the opposite direction from Melissa's graph.

reflected.

(b) Dave's graph is narrower and opens in the opposite direction from Melissa's graph.

(c) Dave's graph is wider and is three units below Melissa's graph.

(d) Dave's graph is narrower and is three units to the left of Melissa's graph.

right 2 →up 3

15. The graph of $g(x) = (x-2)^2 + 3$ can be obtained from the graph of $f(x) = x^2$ using which transformation?

a) Translate -2 units horizontally and 3 units vertically.

b) Translate 3 units horizontally and -2 units vertically.

c) Translate 2 units horizontally and 3 units vertically.

d) Translate 2 units horizontally and -3 units vertically.

16.

The function $C(t)$ gives the cost C of buying t tickets to a museum exhibit when a group discount is offered.

$$C(t) = \begin{cases} 20t \text{ if } 0 \le t < 10 \\ \boxed{18t \text{ if } t \ge 10} \end{cases}$$

$t \ge 10$

$10 \ge 10$ ✓

Which statement describes what $C(10)$ represents?

$18(10) = 180$

A. 10 tickets cost \$200.

B. $\boxed{\text{10 tickets cost \$180.}}$

C. 10 tickets cost \$20.

D. 10 tickets cost \$18.

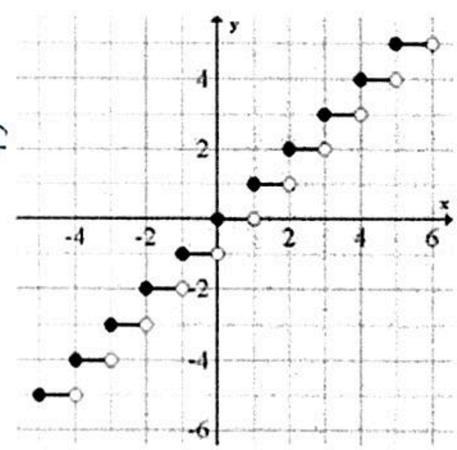
17. The step function $f(x)$ is graphed below. Which of the following is a correct statement for $f(x)$?

(a) (–2,–3) is a solution. → (-2,-3) is NOT the only solution

(b) Domain: $(-\infty, \infty)$ → The Domain is the set of ALL integers

(c) Range: $(-\infty, \infty)$ Not ALL values of y are included

(d) $f(x)$ is continuous → f(x) is not continuous b/c made up of pieces of line segments.



18. Write an equation for a quadratic function that is shifted 3 units to the right, reflected in the x-axis, and stretched horizontally (made wider) by a factor of $\frac{1}{4}$.

$y = x^2$ ← parent graph

$y = -\frac{1}{4}(x-3)^2$

shifted to right

reflected in x-axis

wider

19. Write an equation for an absolute value function that is shifted 1 unit up, shifted 3 units to the left, and stretched vertically (made narrower) by a factor of 4 .

$y = |x|$ parent function

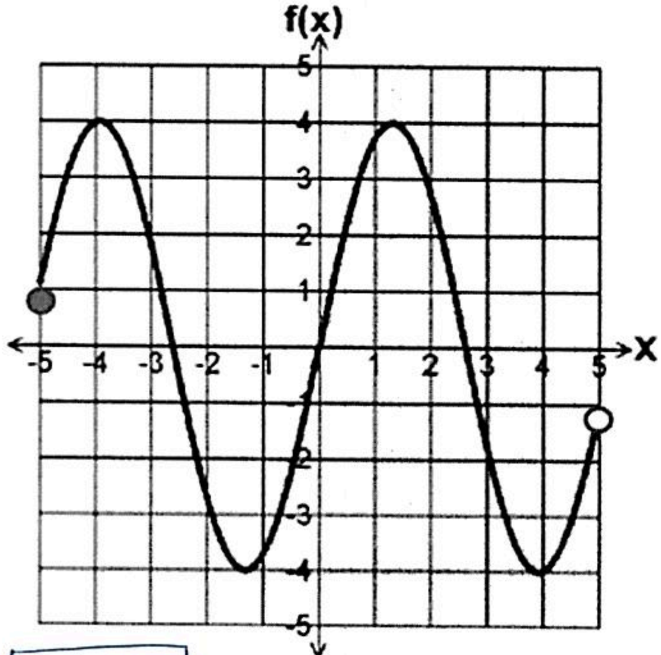
$f(x) = 4|x+3|+1$

narrower; shifted to left; up 1

20. Answer the following questions based on the accompanying diagram.

a. State the **domain**

- Set Builder Notation: $\{x \mid -5 \le x < 5\}$
- Interval Notation: $[-5,5)$



b. State the **range**

- Set Builder Notation: $\{y \mid -4 \le y \le 4\}$
- Interval Notation: $[-4,4]$

c. Is $f(x)$ a function? Justify your answer.

Yes, b/c it passes V.L.T.

d. Find $f(-3)$ $x=-3$, so $\boxed{y=2}$

e. Find x if $f(x) = 4$ $y=4$, 2 values $\boxed{x=-4 \text{ \& } 1.5}$

f. Find $f(5)$ $x=5$ $\boxed{\{\,\}}$

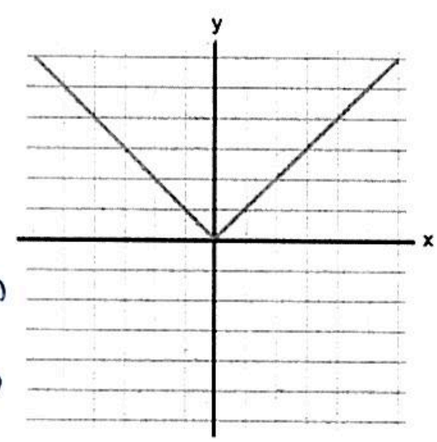
21. The graph to the right shows the function $f(x)$.

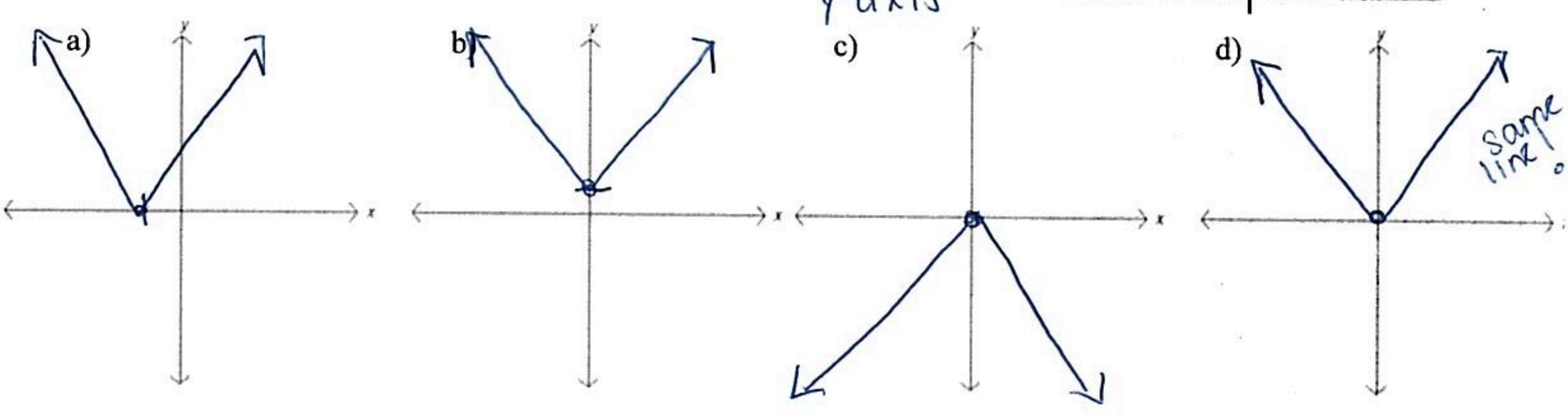
a) Sketch the graph that represents the function $f(x + 1)$ left 1

b) Sketch the graph that represents the function $f(x) + 1$ up 1

c) Sketch the graph that represents the function $-f(x)$ reflection in x-axis

d) Sketch the graph that represents the function $f(-x)$ reflection in y-axis





≤ find t.O.I.

22. Using your calculator, solve the following systems of equations to the *nearest tenth.*

$f(x) = 1.5x^2 - 9x + 11.5$

$g(x) = -0.2x^2 - 0.4x + 2.8$

$\boxed{(1.4, 1.8)\ (3.7, -1.3)}$

Use 2ND Trace key!
#5 intersect & move spider to P.O.I. & hit enter.

Do 2ND Trace Again to get 2ND P.O.I!

23. A rocket is launched from the ground and follows a parabolic path represented by the equation $y = -x^2 + 10x$. At the same time, a flare is launched from a height of 10 feet and follows a straight path represented by the equation $y = -x + 10$. Find the coordinates of the point or points where the paths intersect. Show how you arrived at your answer(s). Look at Table! → same y-values.

$\boxed{(1,9) \text{ and } (10,0)}$

*In calc type
$Y_1 = -X^2 + 10X$
$Y_2 = -X + 10$
2ND graph

X	Y_1	Y_2
1	9	9
10	0	0

24. Given the functions: $f(x)=|x|$ and $h(x)=|2x|$

a) Graph and label the functions $f(x)=|x|$ and $h(x)=|2x|$ on the graph provided for the domain $\boxed{-4 \le x \le 2}$.

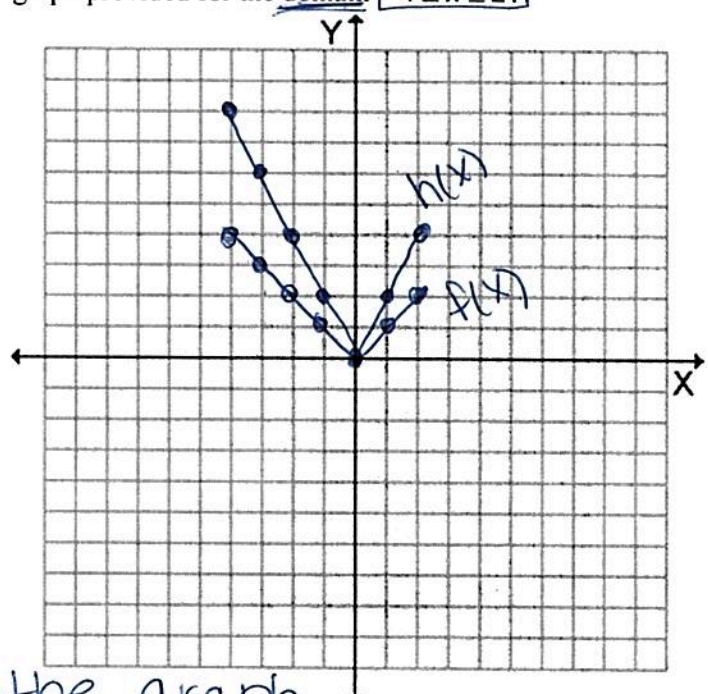
Interval stated, No arrows

$Y=|x|$

x	y
-4	4
-3	3
-2	2
-1	1
0	0
1	1
2	2

$Y=|2x|$

x	y
-4	8
-3	6
-2	4
-1	2
0	0
1	2
2	4



b) Explain how increasing the coefficient changed the graph of $y = f(x)$.

↑ coefficient makes the graph narrower (stretched vertically)

c) Using this graph, determine and state *all* values of x for which $f(x) = h(x)$.

P.O.I. = (0,0) $\boxed{X=0}$

25. The function is defined below.

a) Graph: $h(x) = \begin{cases} x - 3, & x < 0 \\ 0, & x = 0 \\ -3x + 4, & x > 0 \end{cases}$ open, closed, open

$y = x - 3$

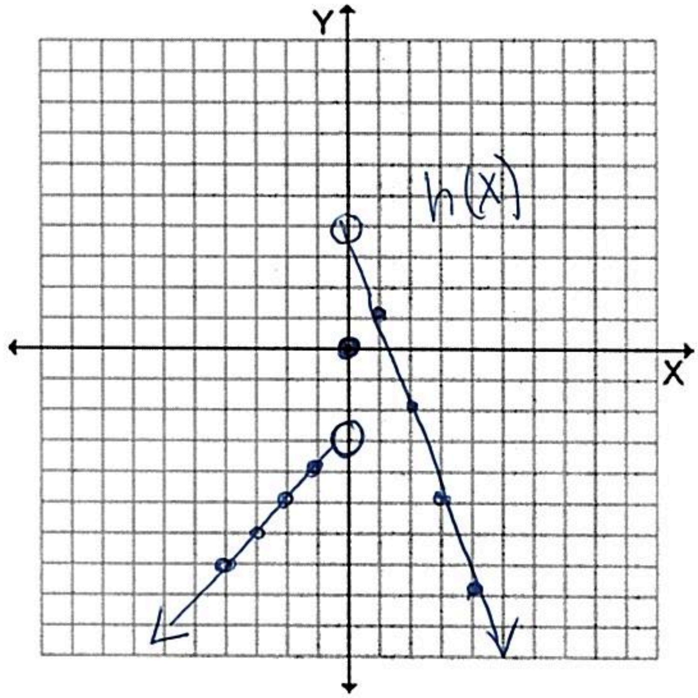
x	y
0	-3
-1	-4
-2	-5
-3	-6
-4	-7

$y = 0$

x	y
0	0

$y = -3x + 4$

x	y
0	4
1	1
2	-2
3	-5
4	-8



b) What kind of graph is this?

Piecewise Linear function

26. The No Leak Plumbing Company charges $60 for an hour or any fraction thereof for labor. Write an inequality for each hour interval. Include a table and then graph it below.

0-1 hour $60

More than 1 hour to 2 hours $120

More than 2 hours to 3 hours is $180

More than 3 hours to 4 hours $240

More than 4 hours to 5 hours $300

$$f(x) = \begin{cases} 60, & 0 < x \leq 1 \\ 120, & 1 < x \leq 2 \\ 180, & 2 < x \leq 3 \\ 240, & 3 < x \leq 4 \\ 300, & 4 < x \leq 5 \end{cases}$$