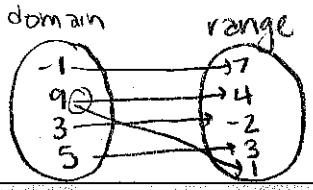
Name: Key Date:
Algebra 1 Band:

Unit 4: Linear Functions Study Guide

LT#1: Determine whether a relation is a function.

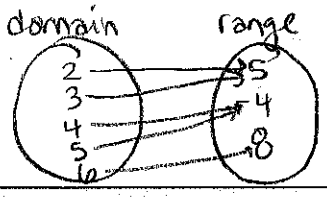
Tell whether each relation is a function.

1. $\{(-1,7), (9,4), (3,-2), (5,3), (9,1)\}$



not a function

2. $\{(2,5), (3,5), (4,-4), (5,-4), (6,8)\}$



function

LT#2: Find domain and range and use function notation.

Evaluate each function for $x = 2$ and $x = 7$.

3. $f(x) = 2x - 8$

$f(2) = 2(2) - 8 = 4 - 8 = -4$

$f(7) = 2(7) - 8 = 14 - 8 = 6$

4. $h(x) = -4x + 61$

$h(2) = -4(2) + 61 = -8 + 61 = 53$

$h(7) = -4(7) + 61 = -28 + 61 = 33$

5. The domain of $t(x) = -3.8x - 4.2$ is $\{-3, -1.4, 0, 8\}$. What is the range?

domain, x	range, f(x)
-3	$-3.8(3) - 4.2 =$
-1.4	$-3.8(-1.4) - 4.2 =$
0	$-3.8(0) - 4.2 = -4.2$
8	$-3.8(8) - 4.2 =$

$m = \frac{\Delta y}{\Delta x} = \frac{\text{rise}}{\text{run}}$

LT#3: Find rates of change from tables.
LT#4: Find slope.

Find the slope of the line that passes through each pair of points.

6. (2,2), (3,1)

$m = \frac{2-1}{2-3} = \frac{1}{-1} = -1$

7. (4,2), (0,2)

$m = \frac{2-2}{4-0} = \frac{0}{4} = 0$

8. (−1,2), (0,5)

$m = \frac{2-5}{-1-0} = \frac{-3}{-1} = 3$

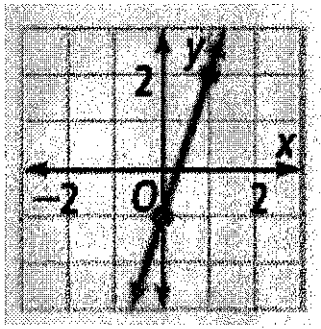
9. (−3,−2), (−3,2)

$m = \frac{-2-2}{-3-(-3)} = \frac{-4}{0}$

undefined

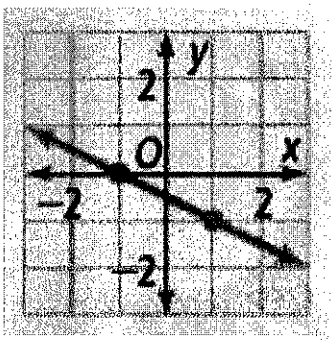
Find the slope of each line.

10.



$m = \frac{3}{1}$

11.



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

LT#5: Write linear equations using slope-intercept form.

Write an equation in slope-intercept form of the line that passes through the given points.

12. $(-3,4), (1,4)$

$m = \frac{4-4}{-3-1} = \frac{0}{-4} = 0$

$y = 4$

13. $(3,-2), (6,1)$

$m = \frac{-2-1}{3-6} = \frac{-3}{-3} = 1$

$y = x + b$

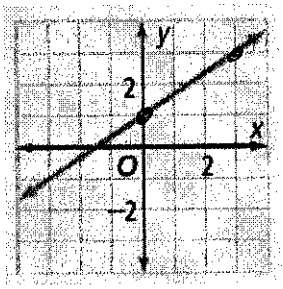
$-2 = 3 + b$

$-5 = b$

$y = x - 5$

Write an equation of each line.

14.

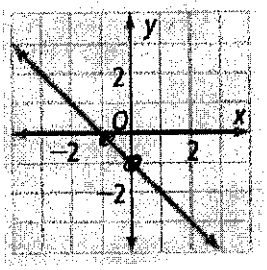


$m = \frac{2}{3}$

$b = 1$

$y = \frac{2}{3}x + 1$

15.



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

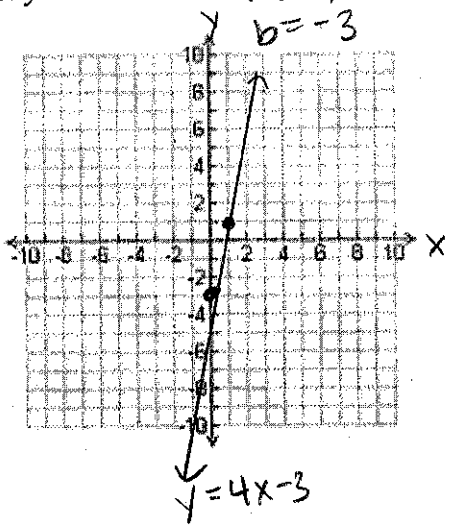
$b = -1$

$y = -x - 1$

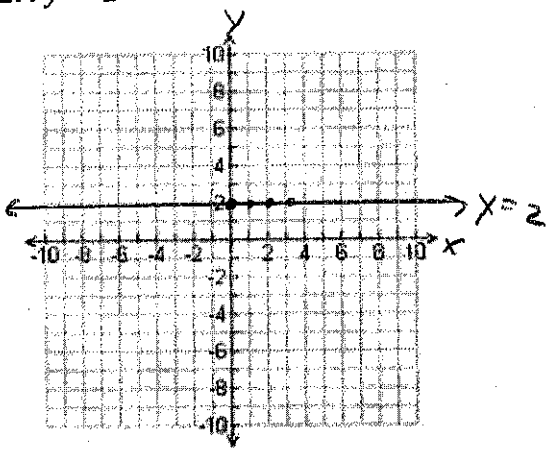
LT#6: Graph linear equations in slope-intercept form.
LT#7: Write and graph linear equations using point-slope form.
LT#8: Graph linear equations using intercepts.
LT#9: Write linear equations in standard form.

Graph each equation.

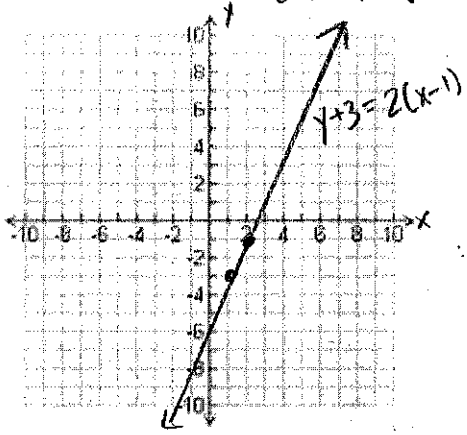
16. $y = 4x - 3$ $m = 4$ $b = -3$



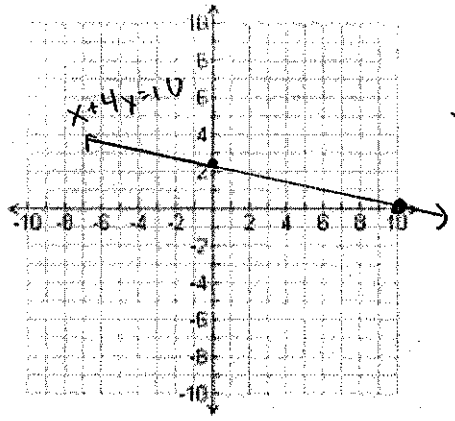
17. $y = 2$ $m = 0$ $b = 2$



18. $y + 3 = 2(x - 1)$ $m=2$ $(x_1, y_1) = (1, -3)$



19. $x + 4y = 10$



x-int ($y=0$)
$x+4(0)=10$
$x=10$
$(10,0)$

y-int ($x=0$)
$0+4y=10$
$4y=10$
$y=\frac{10}{4}=\frac{5}{2}$
$(0,\frac{5}{2})$

LT#10: Determine whether equations of parallel lines and perpendicular lines.

Write an equation of the line that passes though the given point and is parallel to the graph of the given equation.

20. $(2,-1); y = 5x - 2$

$m=5$

$y+1=5(x-2)$

or

$y=5x-11$

21. $(0,-5); y = 9x$ =slopes.

$m=9$

$y+5=9(x-0)$

or

$y=9x-5$

Determine whether the graphs of the two equations are *parallel, perpendicular,* or *neither*. Explain.

22. $y = 6x + 2$ $m=6$
$18x - 3y = 15$

$-3y=-18x+15$

$y=6x-5$ $m=6$

parallel (=slopes)

23. $2x - 5y = 0$
$y + 3 = \frac{5}{2}x \Rightarrow y=\frac{5}{2}x-3$ $m=\frac{5}{2}$

$-5y=-2x$

$y=\frac{2}{5}x$ $m=\frac{2}{5}$

neither
(≠ slopes or neg. reciprocal slopes)

Write an equation of the line that passes through the given point and is perpendicular to the graph of the given equation.

negative reciprocal slopes

24. $(3,5); y = -3x + 7$

$m=\frac{1}{3}$

$y-5=\frac{1}{3}(x-3)$

or

$y=\frac{1}{3}x+4$

25. $(4,10); y = 8x - 1$

$m=-\frac{1}{8}$

$y-10=-\frac{1}{8}(x-4)$

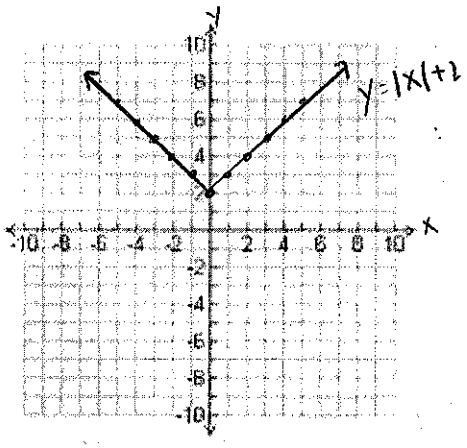
or

$y=-\frac{1}{8}x+10\frac{1}{2}$

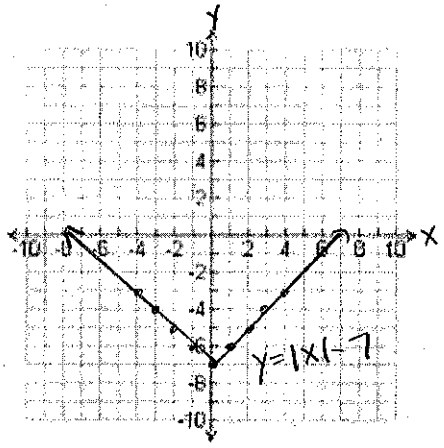
LT#11: Graph an absolute value function.
LT#12: Translate the graph of an absolute value function.

Graph each function by translating $y = |x|$.

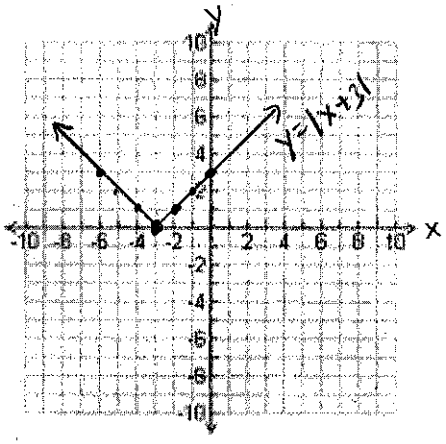
26. $y = |x| + 2$ up 2



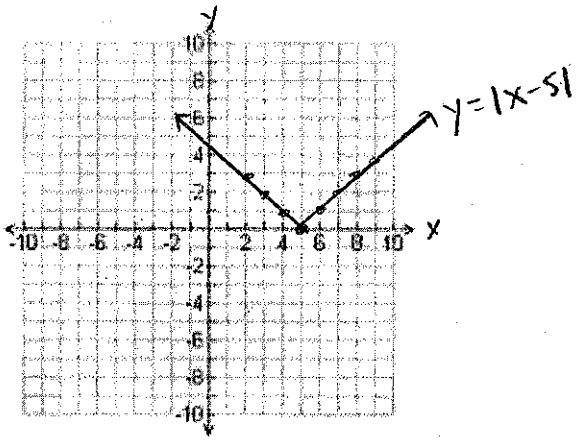
27. $y = |x| - 7$ down 7



28. $y = |x + 3|$ left 3



29. $y = |x - 5|$ right 5



BONUS PROBLEM!

The table below shows the income tax for a single person's monthly income. Graph the step function for this information.

Tax Rates for Single Persons

If Monthly Income Is	Computed Tax Is
$0–$904.00	0%
$904.01–$3,004.00	10%
$3,004.01–$5,642.00	25%
$5,642.01–$12,038.00	30%