Effects of changing m & b
in $y = mx + b$ → *slope-intercept form*

The Family of Lines Applications
classwork

Name _____

Date _____ Period _____

WORD BANK: steeper, flatter, parallel, translates up, translates down, slope, y-intercept
perpendicular (*shifts*)

1.   What is the relationship among the following equations?

   $y = 3x + 1$, $y = 2x + \dfrac{3}{3}$, and $y = 2x - \dfrac{-5}{5}$

   same y-intercept $(0, 1)$

2.   What is the relationship among the following equations?

   $y = \dfrac{2}{4}x - 4$, $y = \dfrac{1}{2}x - 2$, and $y = 0.5x + 2$

   same slope → *parallel*
   different y-int.

3.   Write an equation of a line whose graph is parallel to and betweeen the graphs of
   $y = 2x + 3$ and $y = 2x + 5$

   $\boxed{y = 2x + 4}$ or $\boxed{y = 2x + 3.2}$ $b + 9$

4.   Given the equation $y = x + 5$, write an equation of a line if the graph has been shifted up 9 units.

   $y = x + 14$

5.   Given the equation $y = -2x - 3$, write an equation of a line if the graph has been shifted down 5 units. -5
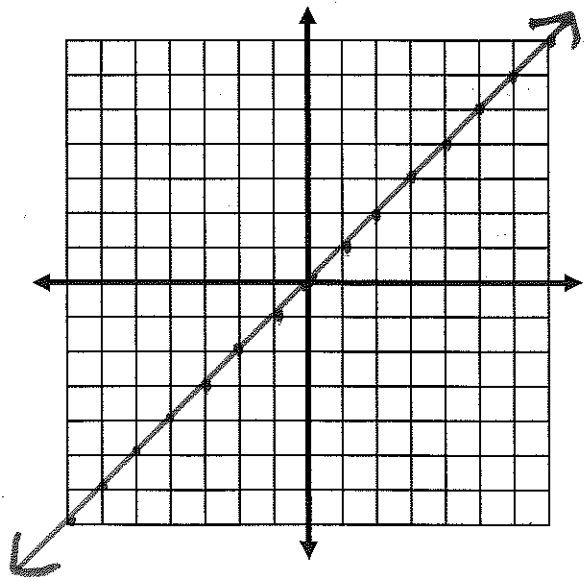
   $b - 5$ $y = -2x - 8$

6.   Sally graphed the line $y = \dfrac{2}{3}x - 4$. Ben graphed another line that was parallel to and 5 units below Sally's line. Write the equation of Ben's line.

   $y = \dfrac{2}{3}x - 9$

7.   Write and graph the linear parent function.

   Equation: $y = x$

8. If the slope of the parent function is changed to $-\frac{1}{2}$, how does the new line compare to the parent? It's flatter, It's now decreasing graph ; It's $\frac{1}{2}$ as steep

9. If the <u>slope</u> of the parent function is changed to <u>3</u>, how does the new line compare to the parent? It's 3 times as steep

10. On a sunny day in February, the temperature began at 32 degrees and <u>increased</u> at a rate of 2 degrees per hour until 5:00 p.m. How would the line change if the temperature began at 40 degrees?

Parallel and translated 8 units up

$y = 2x + 32$ $y = 2x + 40$

11. A cell phone plan can be modeled by the equation $c = 0.50t + \underline{50}$ where the cost, c, is based on the number of text messages, t. If the <u>rate per text message doubles</u>, what is the new slope?

$.50 \times 2 = \$1.00$

How would the graph change?

It's twice as steep

What does the 50 represent in this equation?

There is an initial cost of $50

12. A plumber charges $\underline{\$35 \text{ per hour}}$ and a <u>service fee of $55.</u>   rate   constant $y = 35x + 55$

How would the slope of the line change if the $55 is changed to $50?

It wouldn't

How would the graph change if the <u>rate per hour is doubled?</u> ⟶ m

It would be twice as steep

How would the graph change if the <u>service fee is reduced to $50?</u> ⟶ b

It would be shifted 5 units down

Linear Graphing LG5

Use the word bank to fill in the blanks.

WORD BANK: steeper, flatter, parallel, translates up, translates down, slope, y-intercept
perpendicular

13. **Compare** the graphs of the two equations $y = 3x - 4$ and $y = \dfrac{1}{3}x - 4$.

The slope of the second equation is ___flatter___ than the slope of the first.

The y-intercept of the second equation is ___the same___ the y-intercept of the first.
equivalent to

14. **Compare** the graphs of the two equations $y = 3x - 4$ and $y = -\dfrac{1}{3}x + 4$.

The slope of the second equation is ___perpendicular to the 1st___

The y-intercept of the second equation is ___translated up 8 units___

15. **Compare** the graphs of the two equations $y = 3x - 6$ and $y = 3x - 8$. Use word bank.

The slope of the second equation is ___parallel (same)___

The y-intercept of the second equation is ___translated down 2 units___

16. **Compare** the graphs of the two equations $y = x$ and $y = \dfrac{1}{3}x - 4$. Use word bank.

The slope of the second equation is ___flatter ($\frac{1}{3}$ as steep)___

The y-intercept of the second equation is ___translated down 4 units___