Topic: 2.8 Equations of Parallel and Perpendicular Lines

1. Draw an example of parallel lines.
2. If you were to determine the slope of both lines you drew, what would you predict?
3. Draw an example of perpendicular lines.
4. If you were to determine the slope of both lines you drew, what would you predict?
5. Graph two equations with the same slope. Write their equations. What do you notice?
6. Is it possible for these two equations to intersect? How do you know?
7. Show algebraically that these two equations cannot intersect.
8. There is actually one way for these two equations to intersect, but it is trivial. Can you determine when?
9. Parallel lines have what kind of slopes and y-intercepts?
10. Let's physically count rise over run, graph the equation: $y = \frac{3}{5}x + 2$.
11. At the point $(5, 5)$ now graph a line that is perpendicular to that line, be exact, and use a ruler. What do you notice about the slope of that line?
12. Perpendicular lines have what kind of slopes and y-intercepts?
13. We are going to see a lot of problems asking about $ax + by = c$. Convert $2x + 3y = 5$ to slope-intercept form $y = mx + b$.
14. I claim that we do not have to convert all standard form equations $ax + by = c$ to slope-intercept form if we can do it generally/use structure. Convert $ax + by = c$ to slope-intercept form. Determine the slope and the y-intercept in terms of a, b, and c.
15. The slope only depends on what?
16. Compare the equations $3x + 4y = 5$ and $3x + 4y = 7$, do you think they are parallel or perpendicular? Could you tell without solving for slope-intercept form and graphing?
17. What about $3x + 4y = 5$ and $-3x - 4y = 7$? Are they parallel or perpendicular? Could you tell without solving for slope-intercept form and graphing?
18. Compare the equations $3x + 4y = 5$ and $-4x + 3y = 7$, do you think they are parallel or perpendicular? Could you tell without solving for slope-intercept form and graphing?
19. Can you generalize? If I have two equations in form of $y = mx + b$ or $ax + by = c$ when will those equations be parallel? Perpendicular?