Number of Solutions

Parallel, Perpendicular, or Neither
Classify each pair of lines.

1. Line 1: $y = 3x - 6$
   Line 2: $y = -\frac{1}{3}x + 4$
   Classification: _____

2. Line 1: $y = 2x + 6$
   Line 2: $6x + 3y + 3 = 0$
   Classification: _____

3. Line 1: $5x + 2y - 10 = 0$
   Line 2: $2x + 5y + 10 = 0$
   Classification: _____

4. Line 1: $y = \frac{1}{5}x + 3$
   Line 2: $y = -5x - 4$
   Classification: _____

5. Line 1: $4x + 3y = 6$
   Line 2: $y = \frac{3}{4}x + 5$
   Classification: _____

6. Line BC: $B(-6,-2), C(-3,3)$
   Line DE: $D(2,0), E(5,5)$
   Classification: _____

7. Line NP: $N(-6,2), P(-3,-4)$
   Line QR: $Q(1,-3), R(3,4)$
   Classification: _____

8. Line PQ: $P(-7,2), Q(-2,10)$
   Line RS: $R(-3,-4), S(5,1)$
   Classification: _____

9. Line 1: $R(4,3), S(1,5)$
   Line 2: $P(5,4), Q(1,-2)$
   Classification: _____

How Many Solutions?
Classify each system: one solution, no solutions, or infinitely many solutions.

10. Eq. 1: $6x + 10y = 20$
    Eq. 2: $3x + 5y = 10$
    Solutions: _____

11. Eq. 1: $x + 4y = 6$
    Eq. 2: $2x + 8y = 3$
    Solutions: _____

12. Eq. 1: $4x - 2y = 9$
    Eq. 2: $4x - 2y = -9$
    Solutions: _____

13. Eq. 1: $2x - 3y = 6$
    Eq. 2: $2x + 3y = 6$
    Solutions: _____

14. Eq. 1: $9x - 6y = 27$
    Eq. 2: $3x - 2y = 9$
    Solutions: _____

15. Eq. 1: $4x + 5y = 10$
    Eq. 2: $8x + 15y = 30$
    Solutions: _____

16. Eq. 1: $6x + 4y = 30$
    Eq. 2: $3x + 2y = 30$
    Solutions: _____

17. Eq. 1: $x - 3y = 4$
    Eq. 2: $10x - 3y = 4$
    Solutions: _____

18. Eq. 1: $2x - 3y = 9$
    Eq. 2: $3x - 4.5y = 13.5$
    Solutions: _____

Graph and Explain

19. Draw this system and explain why it only has one solution.
    Line 1: $2x + y = 3$
    Line 2: $6x + 4y = 3$

20. Draw this system and explain why it doesn't have any solutions.
    Line 1: $2x + y = 3$
    Line 2: $6x + 3y = 15$

21. Draw this system and explain why it has an infinite number of solutions.
    Line 1: $2x + y = 3$
    Line 2: $6x + 3y = 9$

Reasoning

22. If the two equations in a linear system have slopes that are equal, what number of solutions is possible?

23. If the two equations in a linear system have the same y-intercepts, what number of solutions is possible?

24. If the two equations in a linear system have different slopes, one positive and one negative, how many solutions will this system have?

25. If two lines in a linear system have the same slope, how many solutions could there be?

26. Convert each equation to $y = mx + b$ form.
    a) $-x + y = 5 \rightarrow$ _____
    b) $-x - y = 10 \rightarrow$ _____
    c) $-2x + 2y = 10 \rightarrow$ _____
    d) $x + y = 5 \rightarrow$ _____
    Which of the lines are parallel?
    Which ones are perpendicular?