**For the Unit 2 Performance Task and/or Unit 2 Assessment you should be able to…**

- Identify parallel, perpendicular, and skew lines (section 3.1)
- Identify parallel, perpendicular, or intersecting planes (section 3.1)
- Identify corresponding angles, alternate interior angles, consecutive interior angles, and alternate exterior angles (section 3.1)
- Find measures of angles given parallel lines (section 3.2)
- Prove lines are parallel using the converse (section 3.3)
- Write algebraic proofs and proofs involving parallel lines (sections 2.5, 3.2, and 3.3)
- Find slopes of lines (section 3.4)
- Determine if lines are parallel, perpendicular, or neither using slope (section 3.4)
- Write equations of parallel and perpendicular lines (section 3.5)

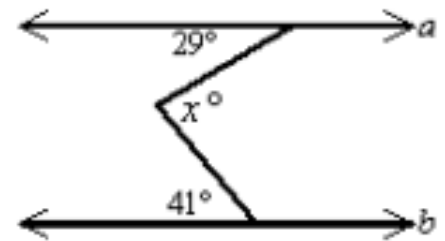**Complete the statement using the figure at the right.**

1. $\angle 1$ and _____ are corresponding angles.

2. $\angle 3$ and _____ are alternate interior angles.

3. $\angle 4$ and _____ are consecutive interior angles.

4. $\angle 7$ and _____ are alternate exterior angles.
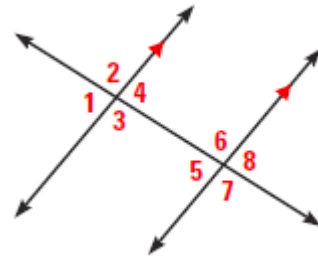
5. In the figure below, $k \parallel l$. What is the value of x and y? Justify your answers.
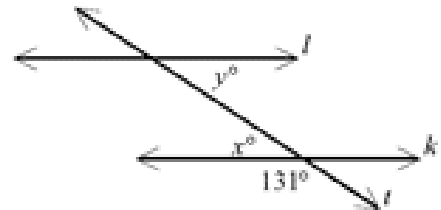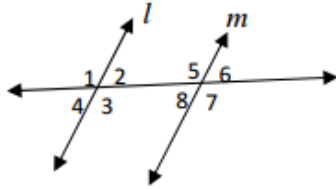
6. Given that $a \parallel b$, what is the value of x? (the figure may not be drawn to scale)
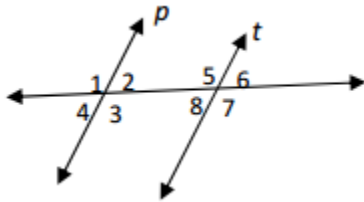
7. Given $l \parallel m$, find the values of x. Be sure to check for extraneous solutions. Diagram is not drawn to scale.

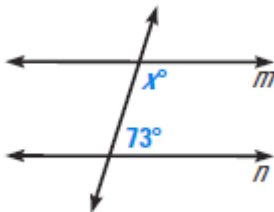   a) $m\angle 3 = (x^2 + 112)°, m\angle 8 = (16x + 131)°$

    b) $m\angle 1 = (x^2 - 7x)°, m\angle 7 = (-x + 7)°$

8. Given $p \parallel t$, $m\angle 1 = (12x - 4y)°$, $m\angle 8 = (x - 4y)°$, and $m\angle 5 = (15x + 8y)°$, find the values of x and y, and the measure of each angle.
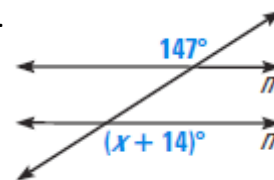

Find the value of x that makes $m \parallel n$. Justify your reasoning with the appropriate theorem or postulate.
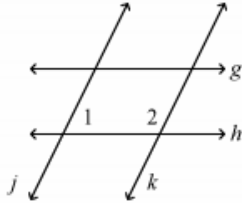
9.

10.

11. Which lines, if any, can you conclude are parallel, given that $m\angle 1 + m\angle 2 = 180°$? Justify your conclusion.

12. Which lines, if any, can be proven parallel given the following diagram?
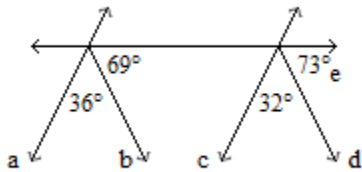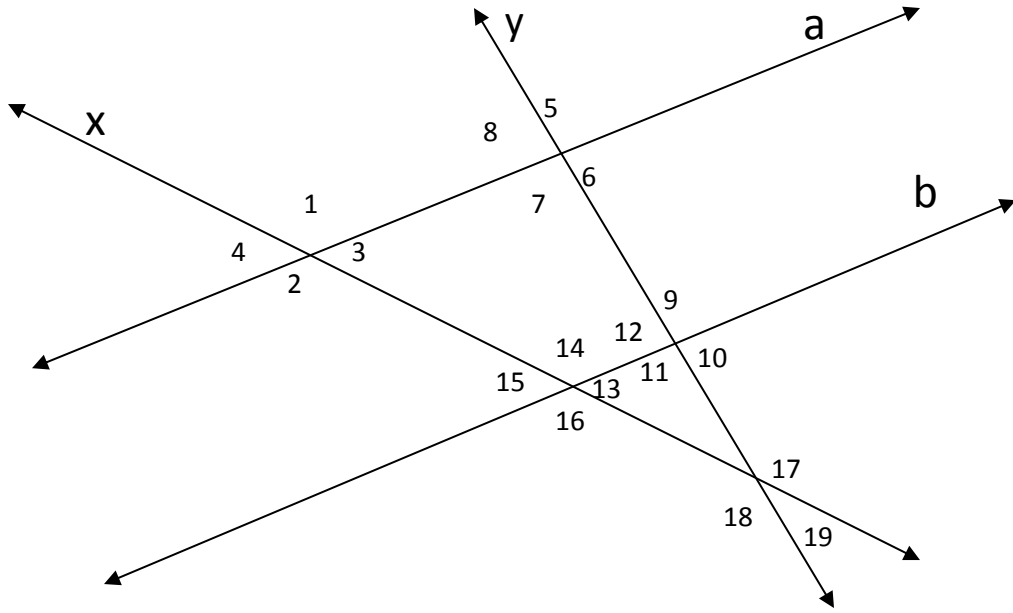

13. Describe how we can use slopes to determine:
    a. if lines are parallel.

    b. if lines are perpendicular.

14. Describe how we can use angle measures to determine:
    a. if lines are parallel.

    b. if lines are perpendicular.

Use the diagram below to complete the chart. Assume $a \parallel b$.

ANGLES	TRANSVERSAL	TYPE	≅, SUPPL., OR NONE (relationship between angles)
15. ∠1 and ∠14			
16. ∠2 and ∠15			
17. ∠7 and ∠9			
18. ∠9 and ∠16			
19. ∠10 and ∠17			
20. ∠16 and ∠14			
21. ∠9 and ∠14			
22. ∠18 and ∠19			
23. ∠1 and ∠16			
24. ∠3 and ∠8			
25. ∠6 and ∠9			
26. ∠12 and ∠13			
27. ∠7 and ∠11			
28. ∠6 and ∠8			
29. ∠4 and ∠13			

Tell whether the lines with given characteristics are *parallel, perpendicular,* or *neither.*

30. Line 1 : $y = -x - 4$

    Line 2 : $-5x + 5y = 20$

31. Line *a* passes through (-5, 6) and (7, -2)

    Line *b* passes through (-12, -2) and (-9, -4)

Write the equation of the line with the given characteristics.

32. Write the equation of the line parallel to $y = 6x - 4$ and passes through point *P*(3, -1).

33. Write the equation of the line perpendicular to $y = 2x - 1$ and passes through the point *P*(2, -3).

34. Determine if line that passes through (7, 1) and (10, 5) and the line that passes through (-8, 5) and (-5, 9) are parallel, perpendicular or neither. Explain.

35. Write an equation in slope-intercept form of the line through points S(–3, –10) and T(0, -1).

36. Write an equation in slope-intercept form of the line parallel to the line $y = -5x + 2$ through point P(–10, 1).
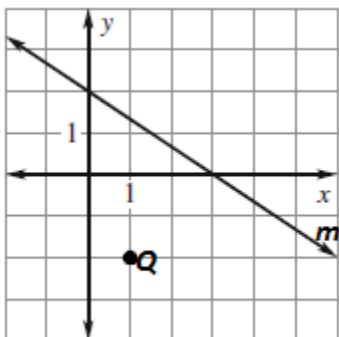
Complete the following:

37. On the coordinate plane, draw a pair of parallel lines (*not* horizontal or vertical). Then write the equations of the two lines.
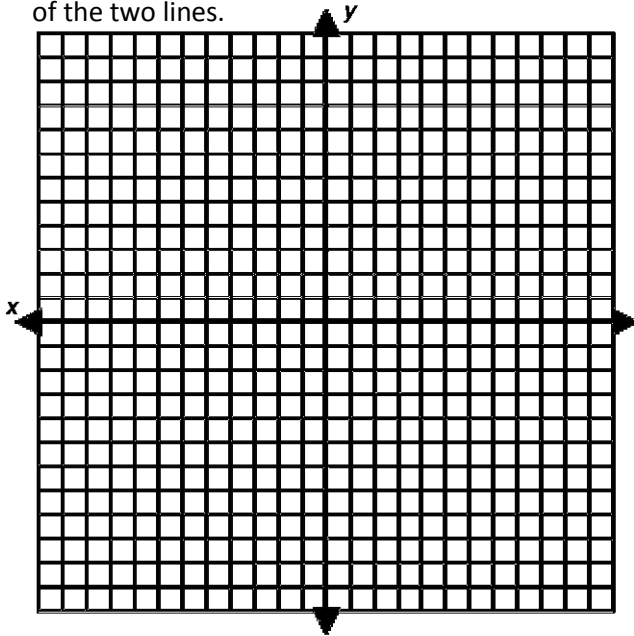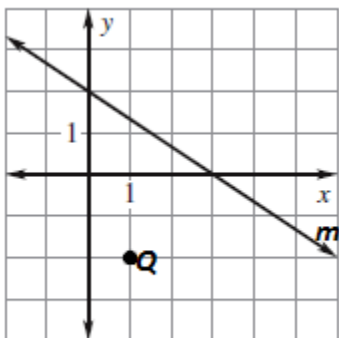
38. On the coordinate plane, draw a pair of perpendicular lines (*not* horizontal or vertical). Then write the equations of the two lines.
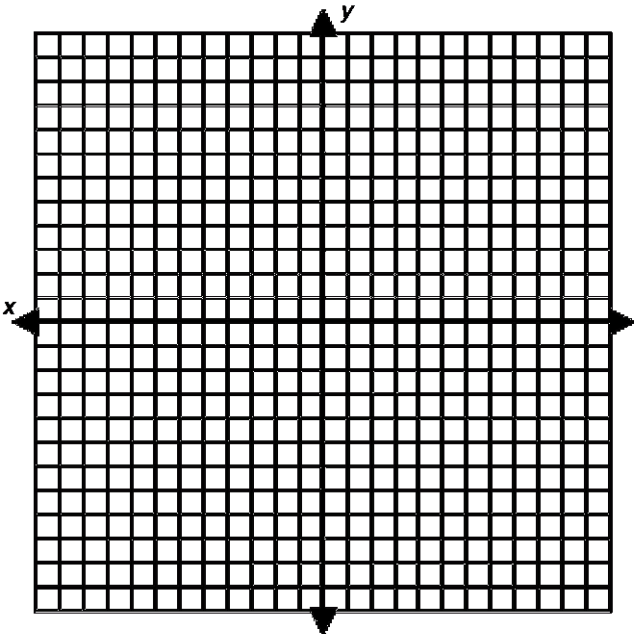
39. Write the equation of the line parallel to line *m* and passes through point *Q*.

40. Write the equation of the line perpendicular to line *m* and passes through point *Q*.

Use the diagram of the cube below to complete the following statements with *parallel, perpendicular, skew,* or *neither*.

41. Plane *ABD* and Plane *EFG* are _____.

42. $\overleftrightarrow{AB}$ and $\overleftrightarrow{GH}$ are _____.

43. $\overleftrightarrow{AE}$ and $\overleftrightarrow{EF}$ _____.

44. $\overleftrightarrow{AB}$ and $\overleftrightarrow{GF}$ are _____.

45. Plane *ABC* and Plane *BFG* are _____.
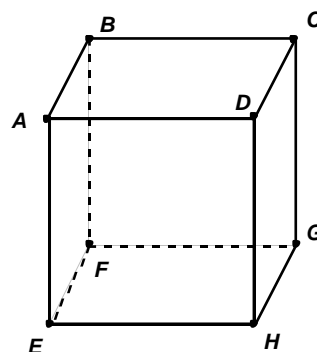
Complete the following proofs. *Note…you should review all of the proofs that we have done. These are just a few samples to help you practice!!!*

46. What property is shown by the following statement?

      If $m\angle 3 \cong m\angle 5$
      And $m\angle 5 \cong m\angle 8$
      Then $m\angle 3 \cong m\angle 8$

47. Given $-8+2(4x-3)=4+2x$, please prove $x=3$.

Statements	Reasons
1. $-8+2(4x-3)=4+2x$	1.
2.	2.
3.	3.
4.	4.
5.	5.
6.	6.

48. Using the diagram below, prove that $m\angle 5=48°$, given that $m\| l$, $m\angle 1=(2x+44)°$, and $m\angle 5=(5x+38)°$
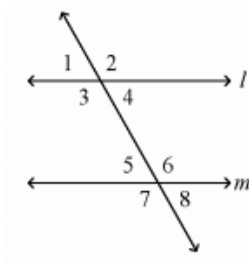
Statements	Reasons
1. $m\| l$, $m\angle 1=(2x+44)°$, $m\angle 5=(5x+38)°$	1. Given
2.	2.
3.	3.
4.	4.
5.	5.
6.	6.
7.	7.

49. Given $m\angle 1=(5x-3)°$, $m\angle 3=(2x+6)°$, prove $m\angle 2=168°$.
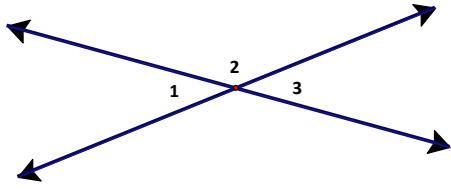
Statements	Reasons
1. $m\angle 1=(5x-3)°,$ $m\angle 3=(2x+6)°$	1. Given
2.	2.
3.	3.
4.	4.
5.	5.
6.	6.
7.	7.
8.	8.

50. Given the first two statements and reasons, what reason is used for the third statement?

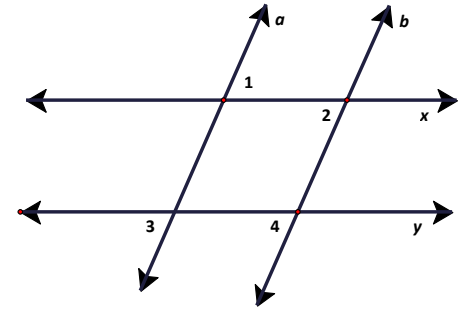| Statements	Reasons
1. $\angle 1$ and $\angle 2$ are supplementary	1. Given
2. $\angle 2 \cong \angle 3$	2. Given
3. $\angle 1$ and $\angle 3$ are supplementary	3.

51. Given $m\angle ABC=(15x+32)°$, $m\angle DEF=(9x+68)°$ and $m \parallel n$, please prove $x=6$.

Statements	Reasons
1. $m\angle ABC=(15x+32)°,$ $m\angle DEF=(9x+68)°,$ $m \parallel n$	1.
2.	2.
3.	3.
4.	4.
5.	5.
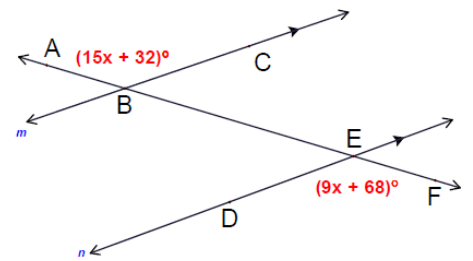
52. Given $\angle 1 \cong \angle 3$, prove $\angle 2 \cong \angle 4$.

Statements	Reasons
1.	1.
2.	2.
3.	3.

53. Given $\angle 1 \cong \angle 2$, $\angle 3 \cong \angle 4$, Prove $\overleftrightarrow{AB} \parallel \overleftrightarrow{CD}$

Statements	Reasons
1.	1. Given
2.	2.
3.	3.
4.	4.
5.	5.
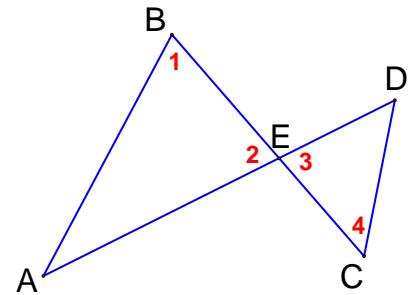
54. Given: $m\angle LNF = (3x - 15)°$, $m\angle EFN = (2x + 10)°$, $\overleftrightarrow{LN} \parallel \overleftrightarrow{EF}$. Please prove: $x = 37$.

Statements	Reasons
1. $m\angle LNF = (3x - 15)°$ $m\angle EFN = (2x + 10)°$ $\overleftrightarrow{LN} \parallel \overleftrightarrow{EF}$	1.
2.	2.
3.	3.
4.	4.
5.	5.
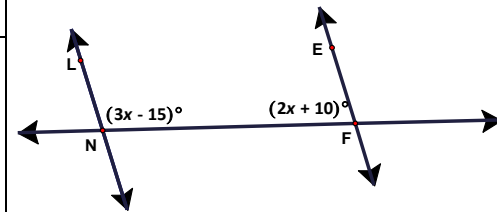
55. Given: $\angle 1 \cong \angle 2$, $\angle 1 \cong \angle 4$. Please prove $x \parallel y$.

Statements	Reasons
1.	1.
2.	2.
3.	3.
4.	4.
5.	5.
6.	6.
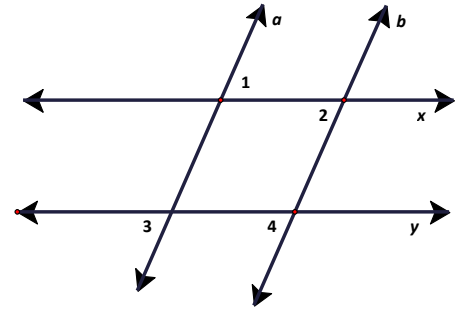
56. Given: $\angle 1 \cong \angle 3$, $\angle 1 \cong \angle 2$
Prove: $\angle 3 \cong \angle 4$
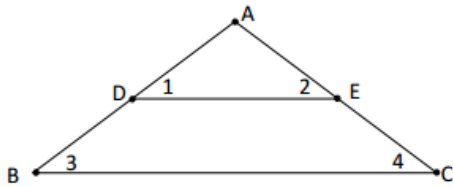
Statements	Reasons
1. $\angle 1 \cong \angle 3$, $\angle 1 \cong \angle 2$	1.
2. $\angle 3 \cong \angle 2$	2.
3. $\overleftrightarrow{DE} \parallel \overleftrightarrow{BC}$	3.
4. $\angle 4 \cong \angle 2$	4.
5. $\angle 3 \cong \angle 4$	5.

ANSWER KEY:

1.) $\angle 5$

2.) $\angle 6$

3.) $\angle 6$

4.) $\angle 2$

5.) $x = 49$: Linear Pair Postulate

$y = 49$: Alternate Interior Angles Theorem

6.) $x = 70$

7.) a) $x = -7$

b) $x = -1$

8.) $x = 12, \ y = -3, \ m\angle 1 = 156°, \ m\angle 5 = 156°, \ m\angle 8 = 24°$

9.) x = 107 and m||n would be because of the Consecutive Interior Angles Converse Theorem.

10.) x = 133 and m||n would be because of the Alternate Exterior Angles Converse Theorem.

11.) $j \parallel k$ by the consecutive interior angles converse

12.) $a \parallel c$ by the corresponding angles converse

13.) A) Slopes are equal; B) Slopes are opposite reciprocals or the product of the slopes equals -1.

14.) A) We can look for one pair of Alternate Interior/Alternate Exterior/Corresponding angles and see if they're congruent. Another option would be to see if one pair of consecutive interior angles are supplementary. If one of those works, then we can use the correct "Converse" theorem/postulate to justify the parallel lines.

B) Angles should measure 90° when lines are perpendicular.

15.) x; corresponding; congruent

16.) x; consecutive interior; supplementary

17.) y; alternate interior, congruent

18.) b; alternate exterior; congruent

19.) y; none; none

20.) x or b; vertical angles; congruent

21.) b; corresponding; congruent

22.) x; linear pair; supplementary

23.) x; alternate exterior; congruent

24.) a; alternate interior; congruent

25.) y; consecutive interior; supplementary

26.) b; alternate interior; congruent

27.) y; corresponding; congruent

28.) a or y; vertical angles; congruent

29.) x; alternate exterior; congruent

30.) The lines are perpendicular, $m_{line \ 1} \cdot m_{line \ 2} = -1$

31.) Parallel

32.) y = 6x − 19

33.) y = -½x − 2

34.) The lines are parallel, each line has a slope of $\dfrac{4}{3}$

35.) $y = 3x - 1$

36.) $y = -5x - 49$

37.) Answers may vary, just make sure the slopes are the same and the lines have different y-intercepts.

38.) Answers may vary, just make sure that the slopes are opposite reciprocals of each other and/or that the product of the slopes is -1.

39.) $y = -\dfrac{2}{3}x - \dfrac{4}{3}$

40.) $y = \dfrac{3}{2}x - \dfrac{7}{2}$

41.) Parallel

42.) Parallel

43.) Perpendicular

44.) Skew

45.) Perpendicular

46.) Transitive Property

47.) Through 56.) Check answer key solutions on my website!