Geometry
Unit 2 Review

Name: ______________________________

Date: ____________________ Period: _______

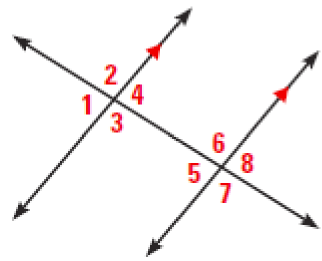
For the Unit 2 Performance Task and/or Unit 2 Assessment you should be able to…

- ✓ Identify parallel, perpendicular and skew lines. Identify parallel planes. (Section 3.1)
- ✓ Identify angles formed by 3 intersecting lines. (Section 3.1)
- ✓ Find angle measures formed by parallel lines cut by a transversal (Section 3.2)
- ✓ Use angle relationships to prove that lines are parallel (Section 3.3)
- ✓ Write logical arguments about parallel lines – Proofs. (Section 2.5 with 3.2 and 3.3)
- ✓ Identify parallel and perpendicular lines using slope. (Section 3.4)
- ✓ Write and graph equations of parallel and perpendicular lines (Section 3.5)

Practice Problems

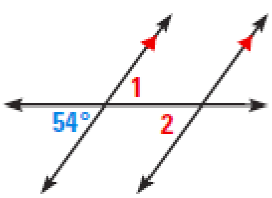
Complete the statement using the figure at the right.

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.



Find $m\angle 1$ and $m\angle 2$. Explain your reasoning.

5.



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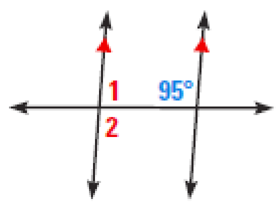

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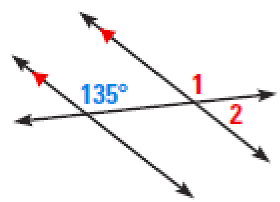
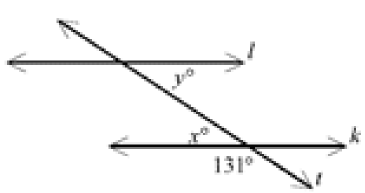
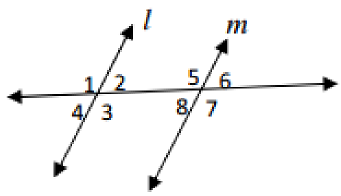


8. In the figure below, $k \parallel l$, what is the value of x and y? Justify your answers.



9. Given $l \parallel m$, find the values of x. Diagram is not drawn to scale.

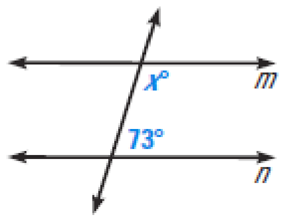


a) $m\angle 3 = (3x+5)°,\ m\angle 5 = (4x-15)°$

b) $m\angle 2 = (7x+24)°,\ m\angle 5 = 72°$

Find the value of *x* that makes $m \parallel n$. Explain your reasoning.

10.



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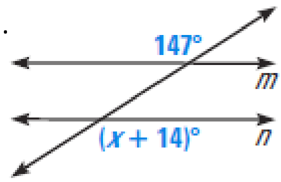
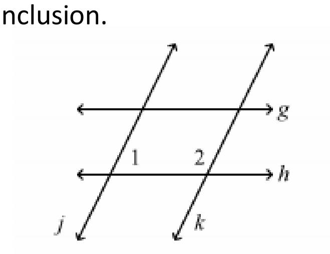


12. Which lines, if any, can you conclude are parallel, given that $m\angle 1 + m\angle 2 = 180°$? Justify your conclusion.



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.

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

15. Line 1 : $y = \frac{1}{2}x + 3$
    Line 2 : $y = 2x - 2$

16. 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.

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

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

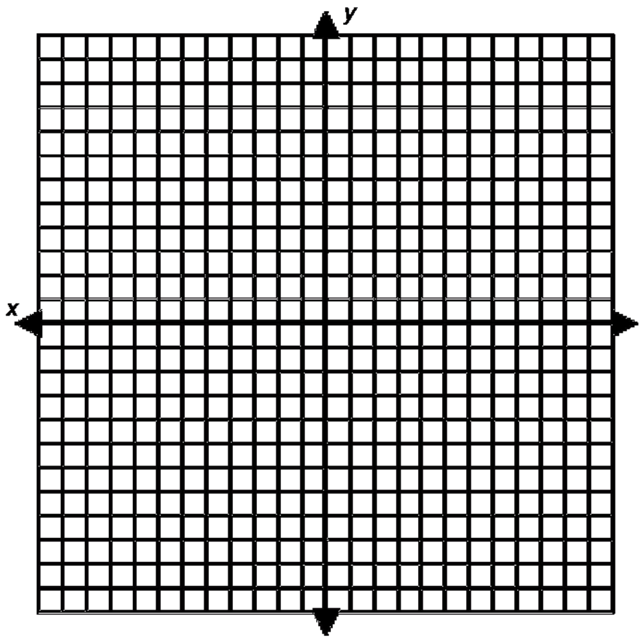
19. Determine if line that passes through (7, 1) and (10, 5) and the line that passes through (-8, 5) and (-5, 9) are parallel, perpendicular or neither. Explain.

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

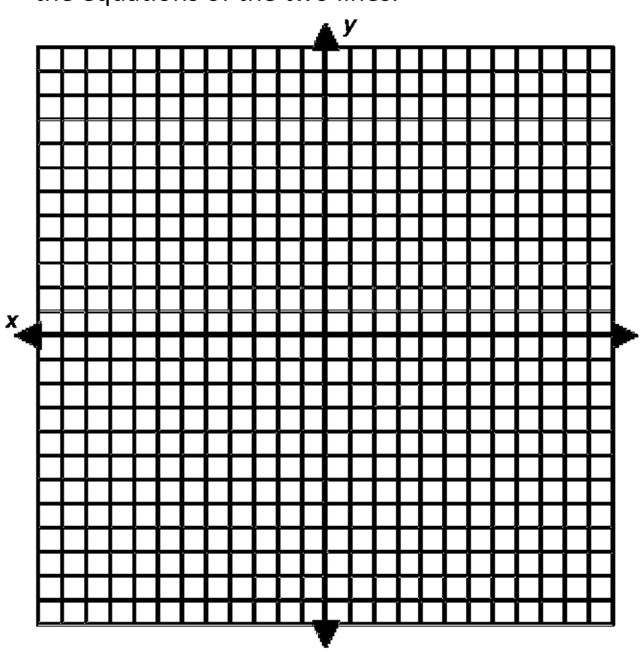
21. Write an equation in slope-intercept form of the line parallel to the line $y = -5x + 2$ through point P(–10, 1).

Complete the following:

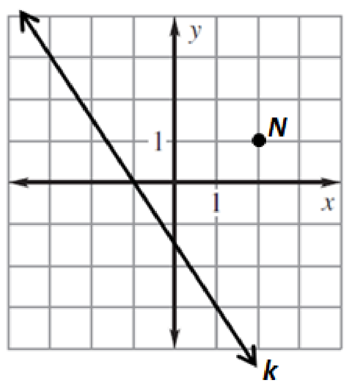
22. On the coordinate plane, draw a pair of parallel lines (*not* horizontal or vertical). Then write the equations of the two lines.



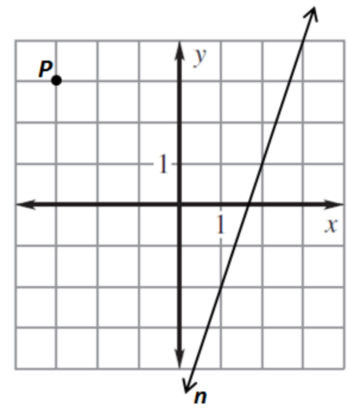
23. On the coordinate plane, draw a pair of perpendicular lines (*not* horizontal or vertical). Then write the equations of the two lines.



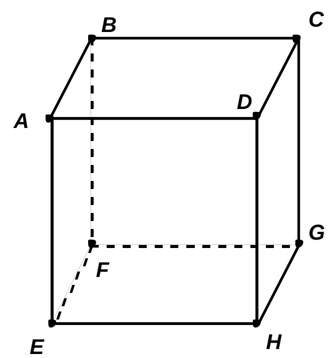
24. Please write the equation of the line parallel to line *k* that passes through point *N*.



25. Please write the equation of the line perpendicular to line *n* that passes through point *P*.



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



26. Plane *ABD* and Plane *EFG* are ___________________.
27. $\overleftrightarrow{AB}$ and $\overleftrightarrow{GH}$ are ___________________.
28. $\overleftrightarrow{AE}$ and $\overleftrightarrow{EF}$ ___________________.
29. $\overleftrightarrow{AB}$ and $\overleftrightarrow{GF}$ are ___________________.
30. 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!!!***

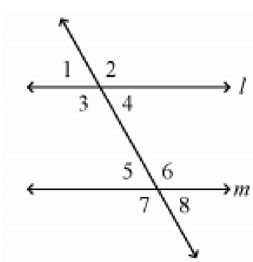
31. What property is shown by the following statement?

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

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

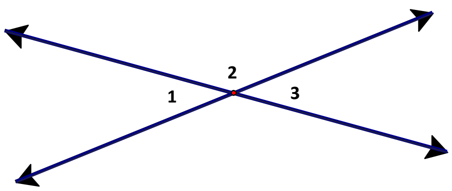
Statements	Reasons
1. $-8+2(4x-3)=4+2x$	1.
2.	2.
3.	3.
4.	4.
5.	5.
6.	6.

33. Using the diagram below, prove that $m\angle 5=48°$, given that $m \parallel l$, $m\angle 1=(2x+44)°$, and $m\angle 5=(5x+38)°$



Statements	Reasons
1. $m \parallel l$, $m\angle 1=(2x+44)°$, $m\angle 5=(5x+38)°$	1. Given
2.	2.
3.	3.
4.	4.
5.	5.
6. $m\angle 5=(5(2)+38)°$	6.
7. $m\angle 5=48°$	7.

34. Given $m\angle 1=(5x-3)°$, $m\angle 3=(2x+6)°$, prove $m\angle 2=168°$.



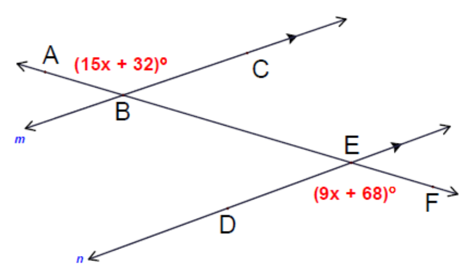
Statements	**Reasons**
1. $m\angle 1=(5x-3)°$, $m\angle 3=(2x+6)°$	1. Given
2.	2.
3.	3.
4.	4.
5.	5.
6. $m\angle 2+m\angle 3=180$	6.
7.	7. Substitution
8. $m\angle 2=168°$	8.

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

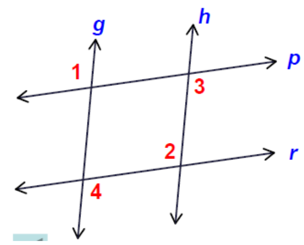
Statements	Reasons
1. $\angle 1$ and $\angle 2$ are supplementary	1. Given
2. $\angle 2 \cong \angle 3$	2. Given
3. $\angle 1$ and $\angle 3$ are supplementary	3.

36. 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. $x=6$	5.

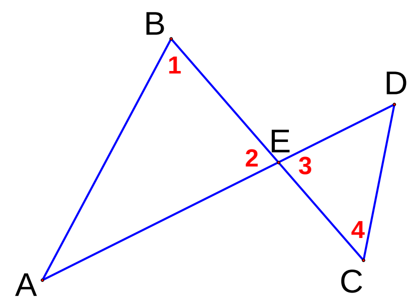


37. Given $\angle 1 \cong \angle 3$, prove $\angle 2 \cong \angle 4$.



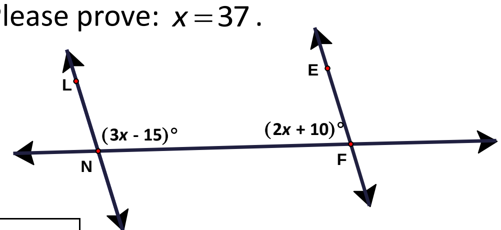
Statements	Reasons
1.	1.
2. $g \parallel h$	2.
3.	3.

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



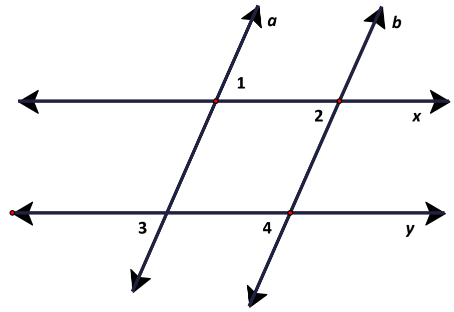
Statements	Reasons
1. $\angle 1 \cong \angle 2$	1. Given
2. $\angle 2 \cong \angle 3$	2.
3. $\angle 3 \cong \angle 4$	3.
4. $\angle 1 \cong \angle 4$	4.
5.	5.

39. Given: $m\angle LNF = (3x - 15)^\circ$, $m\angle EFN = (2x + 10)^\circ$, $\overleftrightarrow{LN} \parallel \overleftrightarrow{EF}$. Please prove: $x = 37$.



Statements	Reasons
1. $m\angle LNF = (3x - 15)^\circ$ $m\angle EFN = (2x + 10)^\circ$ $\overleftrightarrow{LN} \parallel \overleftrightarrow{EF}$	1.
2.	2.
3.	3.
4.	4.
5.	5.

40. Given: $\angle 1 \cong \angle 2$, $\angle 1 \cong \angle 4$. Please prove $x \parallel y$.



Statements	Reasons
1. $\angle 1 \cong \angle 2$	1.
2. $a \parallel b$	2.
3. $\angle 3 \cong \angle 4$	3.
4. $\angle 1 \cong \angle 4$	4.
5. $\angle 1 \cong \angle 3$	5.
6. $x \parallel y$	6.

Unit 2 Review Answer Key

1) $\angle 5$
2) $\angle 6$
3) $\angle 6$
4) $\angle 2$
5) m$\angle 1$ = 54° using the Vertical Angles Theorem; m$\angle 2$ = 54° using the Corresponding Angles Postulate
6) m$\angle 1$ = 85° using the Consecutive Interior Angles Theorem; m$\angle 2$ = 95° using the Alternate Interior Angles Theorem
7) m$\angle 1$ = 135° using the Corresponding Angles Postulate; m$\angle 2$ = 45° using the Linear Pair Postulate (with $\angle 1$)
8) $x = 49$: Linear Pair Postulate
   $y = 49$: Alternate Interior Angles Theorem
9) a) $x = 20$
   b) $x = 12$
10) x = 107 and m||n would be because of the Consecutive Interior Angles Converse Theorem.
11) x = 133 and m||n would be because of the Alternate Exterior Angles Converse Theorem.

12) $j \parallel k$ by the consecutive interior 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) Neither

16) Parallel

17) $y = 6x - 19$

18) $y = -\frac{1}{2}x - 2$

19) The lines are parallel, each line has a slope of $\frac{4}{3}$

20) $y = 3x - 1$

21) $y = -5x - 49$

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

23) 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.

24) $y = -\frac{3}{2}x + 4$

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

26) Parallel

27) Parallel

28) Perpendicular

29) Skew

30) Perpendicular

31) Transitive Property

32)

Statements	**Reasons**
1. $-8 + 2(4x - 3) = 4 + 2x$	1. Given
2. $-8 + 8x - 6 = 4 + 2x$	2. Distributive Property
3. $8x - 14 = 4 + 2x$	3. Combine Like Terms
4. $6x - 14 = 4$	4. Subtraction Property
5. $6x = 18$	5. Addition Property
6. $x = 3$	6. Division Property

33)

Statements	Reasons
1. $m\angle 1 = (5x-3)^\circ, \quad m\angle 3 = (2x+6)^\circ$	1. Given
2. $5x-3=2x+6$	2. Vertical Angles Theorem
3. $3x-3=6$	3. Subtraction Property
4. $3x=9$	4. Addition Property
5. $x=3$	5. Division Property
6. $m\angle 2+m\angle 3=180$	6. Linear Pair Postulate
7. $m\angle 2+12=180$	7. Substitution Property
8. $m\angle 2=168^\circ$	8. Subtraction Property

34)

Statements	Reasons
1. m Pl, $m\angle 1=(2x+44)^\circ$, $m\angle 5=(5x+38)^\circ$	1. Given
2. $2x+44=5x+38$	2. Corresponding Angles Postulate
3. $44=3x+38$	3. Subtraction Property
4. $6=3x$	4. Subtraction Property
5. $x=2$	5. Division Property
6. $m\angle 5=(5(2)+38)^\circ$	6. Substitution Property
7. $m\angle 5=48^\circ$	7. Simplification

35) Substitution

36) Key step: Use the Alternate Exterior Angles Theorem to get 15x+32=9x+68 and solve from there.

37) Key steps: Use the Alternate Exterior Angles Converse Theorem to justify step 2. Then the Alternate Interior Angles Theorem will justify why $\angle 2 \cong \angle 4$ in step 3.

38) Key Steps: Use the Vertical Angles Theorem to justify step 2. Use the Transitive property to justify step 4. Finish the proof with the Alternate Interior Angles Converse Theorem

39) Key Step: Use the Consecutive Interior Angles Theorem to get (3x – 15) + (2x + 10) = 180 and solve from there.

40) Key Steps: Use the Alternate Interior Angles Converse Theorem to get a||b in step 2. Use the Corresponding Angles Postulate to get $\angle 3 \cong \angle 4$ in step 3. Use the Transitive Property to justify why $\angle 1 \cong \angle 3$ in step 5. Finish the proof off with the Alternate Exterior Angles Converse Theorem.