Geometry H
Section 3.1 – 3.3 Quiz Review

Name: _____ Key _____

Date: _____ Period: _____

You should be able to...

✓ Identify parallel, perpendicular and skew lines. Identify parallel and perpendicular planes.
  (Section 3.1)
✓ Identify corresponding angles, alternate interior angles, consecutive interior angles, and alternate exterior angles. **(Section 3.1)**
✓ Find measure of angles formed by parallel lines intersected by a transversal (Corresponding Angles Postulate, Alternate Interior Angles Theorem, Alternate Exterior Angles Theorem, Consecutive Interior Angles Theorem). **(Section 3.2)**
✓ Prove lines are parallel (Corresponding Angles Converse, Alternate Interior Angles Converse, Alternate Exterior Angles Converse, Consecutive Interior Angles Converse) **(Section 3.3)**

Practice Problems

1. Two lines that are not coplanar and do not intersect are called _____.

   a. Parallel   b. Perpendicular   c. Skew   d. None of the above

Use the diagram of the cube to the right for questions #2 – 4 below.
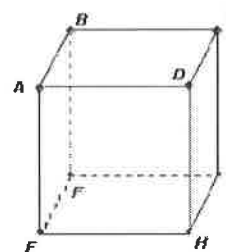
2. $\overleftrightarrow{AD}$ and $\overleftrightarrow{HG}$ are _____.

   a. Parallel lines   b. Perpendicular Lines   c. Skew Lines   d. None

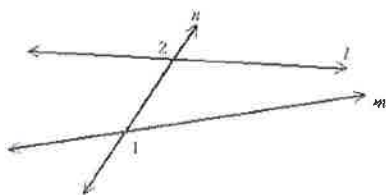3. $\overleftrightarrow{BC}$ and $\overleftrightarrow{AB}$ are _____.

   a. Parallel lines   b. Perpendicular Lines   c. Skew Lines   d. None

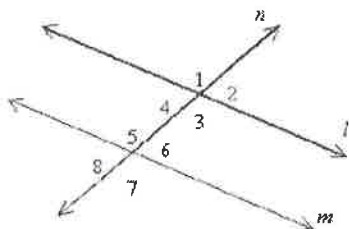4. $\overleftrightarrow{FB}$ and $\overleftrightarrow{GC}$ are _____.

   a. Parallel lines   b. Perpendicular Lines   c. Skew Lines   d. None

5. In the figure below, ∠1 and ∠2 are _____.

    (a.) Alternate exterior angles   c. Consecutive interior angles
    b. Alternate interior angles   d. Corresponding angles

Use the following figure to answer questions 18 – 19.
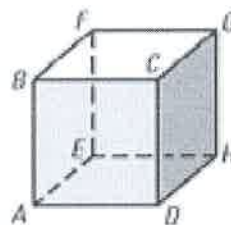

6. In the figure above, ∠6 and ∠3 are _____.

    a. Alternate exterior angles   c. Corresponding angles
    (b.) Consecutive interior angles   d. Alternate interior angles

7. In the figure above, ∠6 and ∠2 are _____.

    a. Alternate interior angles   c. Alternate exterior angles
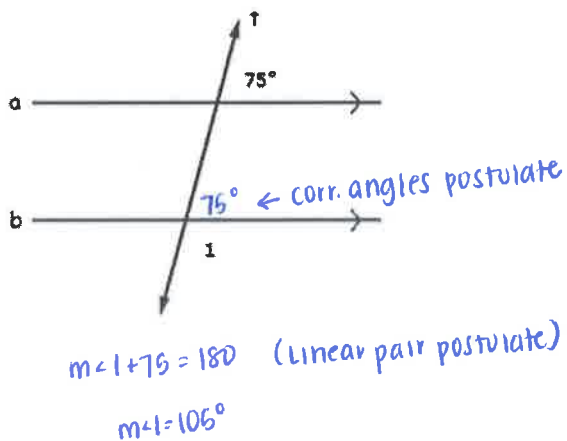   b. Consecutive interior angles   (d.) Corresponding angles

8. Using the diagram below, name **FOUR** pairs of perpendicular lines in the figure.

   ① $\overleftrightarrow{AB}, \overleftrightarrow{BC}$ ③ $\overleftrightarrow{AE}, \overleftrightarrow{EH}$

   ② $\overleftrightarrow{FG}, \overleftrightarrow{FE}$ ④ $\overleftrightarrow{CD}, \overleftrightarrow{AD}$
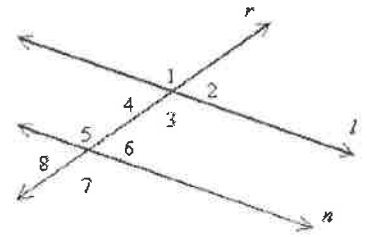

9. Find m∠1 in the figure below given that $\overleftrightarrow{PQ} \parallel \overleftrightarrow{RS}$.

   (a.) 105°

   b. 75°

   c. 115°

   d. 15°

75° ← corr. angles postulate

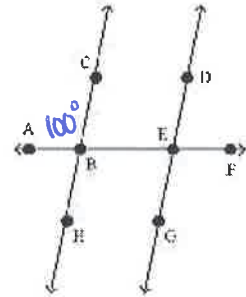m∠1 + 75 = 180 (Linear pair postulate)

m∠1 = 105°

10. In the figure below, $l \parallel n$ and r is a transversal. Which of the following is *not* necessarily true?

    a. $\angle 8 \cong \angle 2$

    b. $\angle 2 \cong \angle 6$

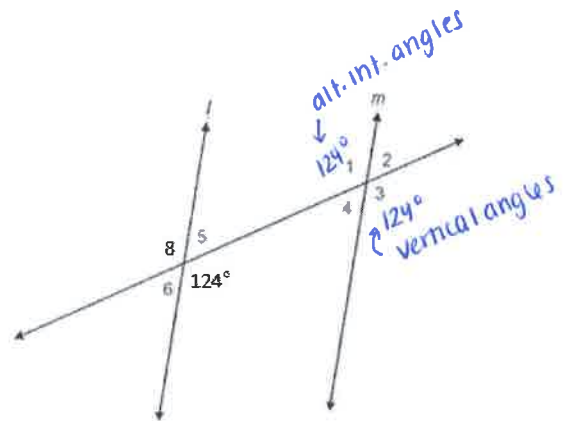   c. $\angle 5 \cong \angle 3$

    (d.) $\angle 4 \cong \angle 7$

11. In the figure shown, $\overleftrightarrow{HC} \parallel \overleftrightarrow{GD}$ and $m\angle ABC = 100°$. Which of the following statements is false?

    a. $m\angle CBE = 80°$

    b. $m\angle DEF = 80°$

    (c.) $\angle DEB$ and $\angle CBE$ are corresponding angles

    d. $\angle CBE$ and $\angle GEB$ are alternate interior angles

12. Use the figure to find the measure of $\angle 3$.

    (a.) 124°

    b.   56°

    c.   79°
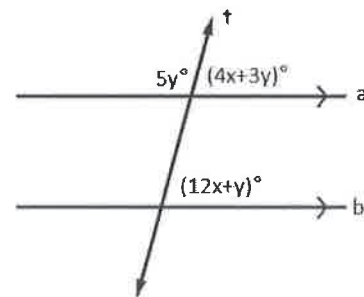
    d. 146°

alt. int. angles
↓
124°₁
124°
vertical angles

13. Please find the values of x and y. Justify each step using the appropriate
theorem/postulate.

$5y+4x+3y=180$

$\rightarrow 4x+8y=180$

$4x+3y=12x+y$

$\rightarrow -8x+2y=0$

$5y° \quad (4x+3y)°$

$(12x+y)°$

System: $\begin{cases} 4x+8y=180 \\ -4(-8x+2y=0) \end{cases} \Rightarrow \begin{array}{l} 4x+8y=180 \\ 32x-8y=0 \\ \hline 36x=180 \end{array}$

$\boxed{x=5}$

$4(5)+8y=180$
$20+8y=180$
$8y=160 \Rightarrow \boxed{y=20}$

14. Given $m \parallel n$, please find the values of x and y. Justify each step using the appropriate theorem/postulate.

$10x+6=7y-9$ (vertical angles thm)

$\rightarrow 10x-7y=-15$

$7y-9+6x+2y=180$

$\rightarrow 6x+9y=189$

System: $^6((10x-7y=-15)$
$\quad\quad\quad -10(6x+9y=189)$

$\Rightarrow 60x-42y=-90$
$\quad -60x-90y=-1890$
$\quad\quad\quad\quad -132y=-1980$

$\boxed{y=15}$
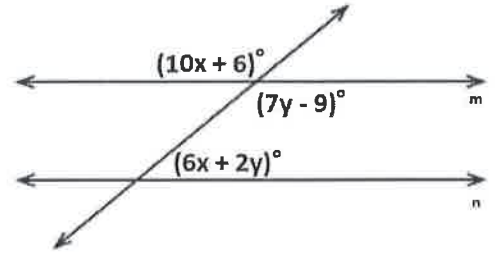
$10x-7(15)=-15$
$10x-105=-15$
$10x=90 \Rightarrow \boxed{x=9}$

(diagram: two parallel lines m and n cut by a transversal; angles labeled $(10x+6)°$, $(7y-9)°$, $(6x+2y)°$)

15. Given the diagram below, please solve for x and y.

$2x+3+3y+5+3x-10=180$

$5x+3y-2=180$

$\rightarrow 5x+3y=182$

$133=3x-10+3y+5$

$133=3x+3y-5$

$\rightarrow 3x+3y=138$

System: $\begin{cases} 5x+3y=182 \\ -1(3x+3y=138) \end{cases}$
$\Rightarrow$ $5x+3y=182$
$\quad -3x-3y=-138$
$\quad\quad\quad 2x=44$
$\boxed{x=22}$

$3(22)+3y=138$
$66+3y=138$
$3y=72$
$\boxed{y=24}$

(diagram: intersecting lines with angles $124°$, $(2x+3)°$, $(3y+5)°$, $133°$, $(3x-10)°$, $133°$, $3x-10+3y+5$ ← supplementary)
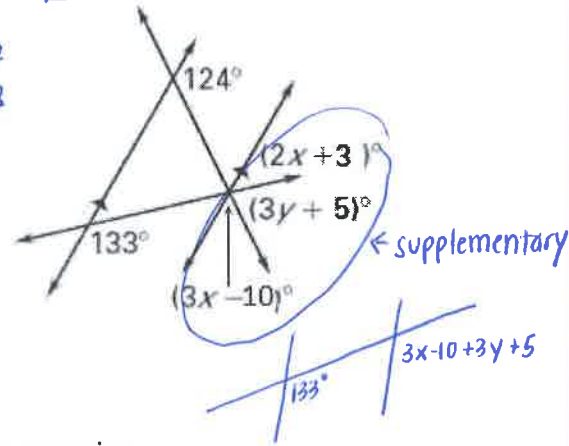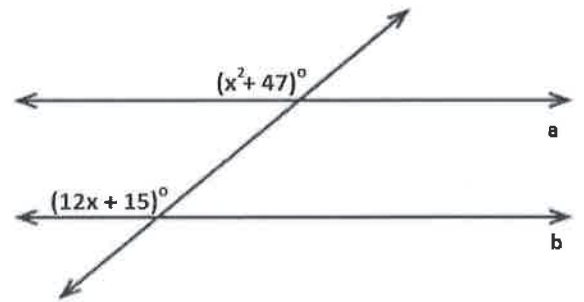
16. Please find the value of x that will make $a \parallel b$. Please justify your reasoning.

$x^2+47=12x+15$

$x^2-12x+47-15=0$

$x^2-12x+32=0$

$(x-4)(x-8)=0$

$\boxed{x=4, \ x=8}$
$\quad\quad\uparrow$
both solutions
work

Check:
$x=4: (4)^2+47=63°$
$12(4)+15=63°$

$x=8: (8)^2+47=111°$
$12(8)+15=111°$

by corresponding angles converse

(diagram: two lines a and b cut by a transversal; angles labeled $(x^2+47)°$ and $(12x+15)°$)

17. Using the figure below, which theorem guarantees l and m are parallel?

a. Alternate Interior Angles Converse
b. Consecutive Interior Angles Converse
c. Corresponding Angles Converse
d. Alternate Exterior Angles Converse *(circled)*

(diagram: two lines l and m cut by a transversal n)
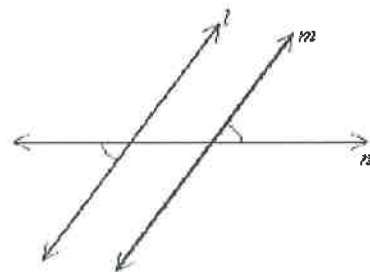
18. Find the value of x that will allow you to prove that $\overleftrightarrow{CD} \parallel \overleftrightarrow{EF}$ if m∠ 1 = (3x + 30)° and m∠ 2 = 81°.
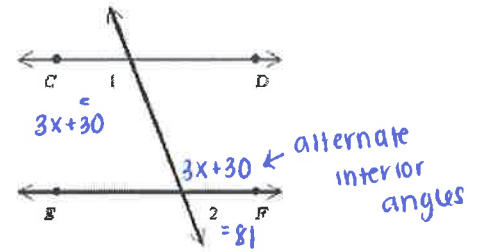   State which theorem or postulate you used for each step.

$3x + 30 + 81 = 180$ (linear pair postulate)
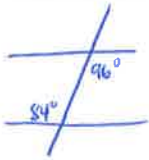
$3x + 111 = 180$ (combine like terms)

$3x = 69$ (subtraction property)

$\boxed{x = 23}$ (division property)

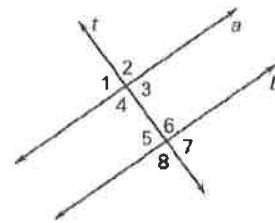*C*   1   *D*

$3x + 30$

$3x + 30$ ← alternate interior angles

E   2   *F*

$= 81$

Use the following given angle measures to decide whether lines a and b are parallel. Explain.

19. m∠ 3 = 96° , m∠ 5 = 84°

96°

84°

No, the lines are **not** parallel because
<3 would have to be congruent to <5
by the alt. interior angles converse

20. m∠ 5 = 79° , m∠ 4 = 79°

79°

79°
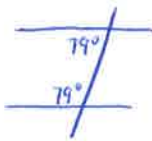
No, the lines would **not** be parallel because
<5 + <4 = 180 in order for the lines to be parallel
by the consec. interior angles converse

21. m∠ 2 = 81° , m∠ 6 = 81°

81°

81°
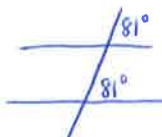
Yes, the lines are parallel since <2 ≅ <6.
Because <2 ≅ <6 by corresponding angles
converse, then a // b.

True or False:

22. If two parallel lines are intersected by a transversal, then alternate exterior angles have
    measures of 90 degrees.   False – alt. ext angles must have congruent measures

23. If two parallel lines are intersected by a transversal, then consecutive interior angles are
    supplementary.   True

24. If two lines are intersected by a transversal and alternate interior angles are equal in measure,
    then the lines are parallel.   True

25. If two lines are intersected by a transversal and corresponding angles are supplementary, then
    the lines are parallel.   False- corresponding angles must have congruent measures

Answer Key :

1. C ✓
2. C ✓
3. B ✓
4. A ✓
5. A ✓
6. B ✓
7. D ✓
8. Sample answer: $\overrightarrow{AB}$ and $\overleftrightarrow{BC}$, $\overrightarrow{AB}$ and $\overleftrightarrow{AD}$, $\overleftrightarrow{FG}$ and $\overleftrightarrow{GH}$, $\overleftrightarrow{GH}$ and $\overleftrightarrow{DH}$ ✓
9. A ✓
10. D ✓
11. C ✓
12. A ✓
13. x = 5 , y = 20 ✓
    Sample answer : $4x+3y = 12x + y$ Corresponding Angles Postulate
    $\qquad\qquad\qquad 5y+4x+3y = 180$ Linear Pair Postulate
14. x = 9, y =15 ✓
    Sample answer: $10x+6 = 7y-9$ Vertical Angles Theorem
    $\qquad\qquad\qquad 7y-9+6x+2y = 180$ Consecutive Interior Angles Theorem
15. x = 22, y = 24 ✓
16. x = 4 or x = 8, Corresponding Angles Converse ✓
17. D ✓

18. The angle next to ∠1 is also 81° because of corresponding angles.

    ∠1 + 81 = 180 because they make a linear pair (are supplementary)
    3x + 30 + 81 = 180 by substitution
    x = 23 ✓
19. Line a and line b are not parallel. ✓

    In order to be parallel, ∠3 ≅ ∠5 by the alternate interior angles converse

20. Line a and line b are not parallel. ✓

    In order to be parallel, m∠4 + m∠5 = 180 by the consecutive interior angles converse

21. Line a and line b are parallel because ∠2 ≅ ∠6 by the corresponding angles converse ✓

22. False – Alternate exterior angles have to have the same measure ✓
23. True – By the consecutive interior angles converse ✓
24. True – By the alternate interior angles converse ✓
25. False – Corresponding angles must have the same measure ✓