Name Answers Date ______ Per ______

Geometry - Chapter 3 Review

Identify each statement as true (T) or false (F). For many of the problems, it would help (but not necessary) to make a drawing or to do a counterexample.

1) If two angles are vertical angles, then they are congruent. T

2) If two angles are a linear pair, then they are congruent. F

3) If two parallel lines are cut by a transversal, then the corresponding angles, alternate interior angles, and alternate exterior angles are supplementary. F

4) If two lines are cut by a transversal to form pairs of congruent corresponding angles, congruent alternate interior angles, and congruent alternate exterior angles, then the lines are parallel. T

5) The x-coordinate of the midpoint of a segment is the average of the x-coordinates of the segment's endpoints. T

6) If (a,b) and (c,d) are the coordinates of two points on a line, then the slope m of the line is given $m = \frac{d-b}{c-a}$. T

7) In a coordinate plane, two lines are perpendicular if and only if their slopes are reciprocals of each other. F

8) On a plane, if two lines are perpendicular to the same line, then they must be parallel to each other. T

9) In a coordinate plane, if s is the slope of the line and t is the y-intercept of the line, then the slope-intercept form of the equation of the line is $y = sx + t$. T

10) In a coordinate plane, if k is the slope of the line and (c,d) is a point on the line, then the point-slope form of the equation of the line is $y - c = k(x - d)$. F

11) If lines x, y, and z are in the same plane, and $x \parallel y$ and $y \parallel z$, then $x \perp z$. F

12) If lines x, y, and z are not all in the same plane, and $x \parallel y$ and $y \parallel z$, then $x \parallel z$. T

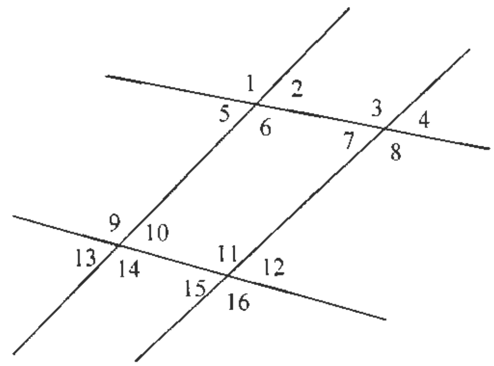
13) If lines x, y, and z are in the same plane, and $x \perp y$ and $y \perp z$, then $x \parallel z$. T

14) If lines x, y, and z are not in the same plane, and $x \perp y$ and $y \perp z$, then $x \parallel z$. F
Can be skew

15) If two angles are both congruent and a linear pair, then each angle must be a right angle. T

16) If point A is (0, 0), point B is (3, 2), point C is (6, 9), and point D is (10, 3), then $\overleftrightarrow{AB} \perp \overleftrightarrow{CD}$. T

For #17-20, classify each pair of angles as corresponding angles, alternate interior angles, same-side interior angles, alternate exterior angles or none of these. You may use CA, AIA, SSI, &AEA.



17) $\angle 6$ and $\angle 3$ AIA

18) $\angle 1$ and $\angle 14$ AEA

19) $\angle 11$ and $\angle 8$ AIA

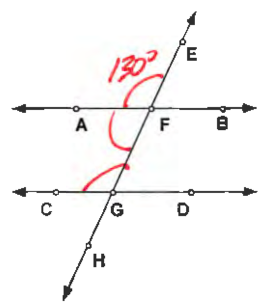
20) $\angle 10$ and $\angle 6$ SSI

If $\overrightarrow{AB} \parallel \overrightarrow{CD}$ and $m\angle AFE = 130°$, find the following angles:

21) $m\angle HGD =$ 130°

22) $m\angle EFB =$ 50°

23) $m\angle AFG + m\angle CGF =$ 180°



Find the slope of the line going through each pair of points.

24) $A(7, 8)$ & $B(-6, 10)$

$m = \frac{10-8}{-6-7} = \boxed{\frac{2}{-13}}$

25) $C(3,8)$ & $D(3,2)$

$m = \frac{2-8}{3-3} = \frac{-6}{0}$ $\boxed{\text{Undefined}}$

Determine the slope and y-intercept of the following line.

26) $-8y - 20x = 12$

$-8y = 20x + 12$

$y = -\frac{20}{8}x - \frac{12}{8}$

$\boxed{y = \frac{-5}{2}x - \frac{3}{2}}$

$\boxed{\begin{array}{l} \text{slope} = -\frac{5}{2} \\ y\text{-int} = (0, -\frac{3}{2}) \end{array}}$

27) $-12y + 30x = 18$

$-12y = -30x + 18$

$y = \frac{30}{12}x - \frac{18}{12}$

$\boxed{y = \frac{5}{2}x - \frac{3}{2}}$

$\boxed{\begin{array}{l} \text{slope} = \frac{5}{2} \\ y\text{-int} = (0, -\frac{3}{2}) \end{array}}$

28) Write the equations in both slope-intercept and point-slope forms for the line passing through the given point and having the given slope.

$(-1, -3), \quad m = 4$

$\boxed{y+3 = 4(x+1)}$ Point-slope

$y+3 = 4x + 4$

$\boxed{y = 4x + 1}$ Slope-intercept

29) Write the equations in both slope-intercept and point-slope forms for the line passing through the given points.

$(-3, 1) \ (3, 2)$

$m = \frac{2-1}{3--3} = \frac{1}{6}$

$\boxed{y-2 = \frac{1}{6}(x-3) \text{ or } y-1 = \frac{1}{6}(x+3)}$ Point-slope

$y-1 = \frac{1}{6}x + \frac{1}{2}$

$\boxed{y = \frac{1}{6}x + \frac{3}{2}}$ Slope-Int.

30) Find the midpoint of $\overline{AB}$ if its endpoints are $A(3,4)$ and $B(7,12)$.

$\left(\frac{3+7}{2}, \frac{4+12}{2}\right)$

$= \boxed{(5, 8)}$

31) One endpoint of $\overline{AB}$ is $A(-3, 10)$ and the midpoint is $M(1,4)$. Find the coordinates of its other endpoint.

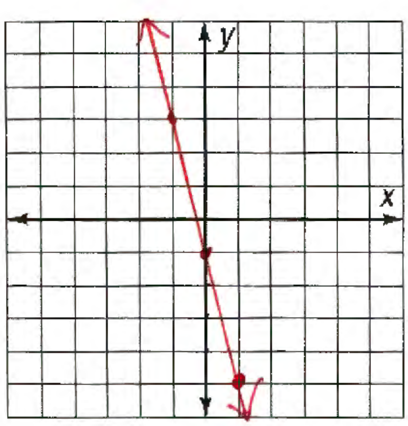
$M(1,4)$

$A(-3,10)$ $B(x, y)$

$\boxed{(5, -2)}$

Graph

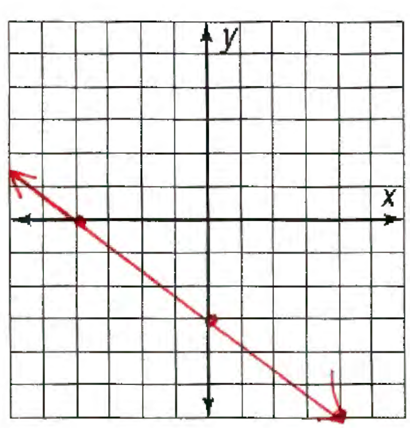
32) $y = -4x - 1$



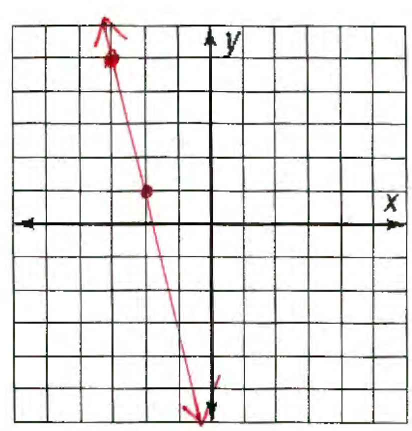
33) $-3x - 4y = 12$

$-4y = 3x + 12$

$y = \frac{-3}{4}x - 3$



34) $y - 5 = -4(x+3)$



35) Solve using any method.

$$\frac{y}{2} = 2 - x$$
$$6x + 3y = 12$$

$\longrightarrow y = 4 - 2x$

$6x + 3(4-2x) = 12$

$6x + 12 - 6x = 12$

$12 = 12$

$\boxed{\text{All real solutions}}$

36) Determine if $\overline{AB} \perp \overline{CD}$ or not? Show why (not).

$A(8, 3)$

$B(4, 11)$

$C(3, 3)$

$D(5, 7)$

$\text{Slope}_{AB} = \frac{11-3}{4-8} = \frac{8}{-4} = -2$

$\text{Slope}_{CD} = \frac{7-3}{5-3} = \frac{4}{2} = 2$

No, their slopes are not opp. reciprocals of each other.

37) Find y if the line thru (2,8) and (7,y) has a slope of 2.

$\frac{y-8}{7-2} = \frac{2}{1}$

$\Rightarrow \frac{y-8}{5} = \frac{2}{1}$

$y - 8 = 10$

$\boxed{y = 18}$

38) Write the equation of the line through point $B(1,2)$ perpendicular to the line: $-2x + 4y = 8$.

$4y = 2x + 8$

$y = \frac{1}{2}x + 2$

$y = -2x + b$

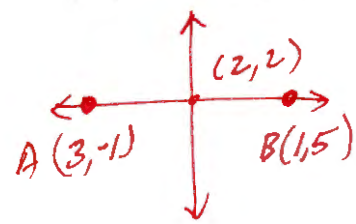
$2 = -2(1) + b$

$2 = -2 + b$

$4 = b$

$\boxed{y = -2x + 4}$

39) $\overline{AB}$'s two endpoints are $A(3,-1)$ and $B(1,5)$. Write the equation of the line that is the perpendicular bisector of $\overline{AB}$.



$m = \frac{5--1}{1-3} = \frac{6}{-2} = -3$

$m_{\perp} = \frac{1}{3}$

$y = \frac{1}{3}x + b$

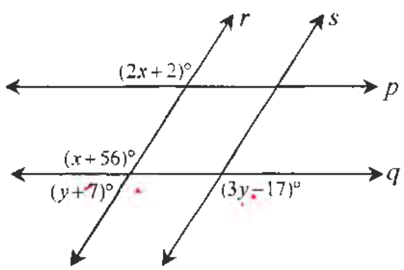
$2 = \frac{1}{3}(2) + b$

$2 = \frac{2}{3} + b$

$\frac{4}{3} = b$

$\boxed{y = \frac{1}{3}x + \frac{4}{3}}$

40) Use the diagram.



a) Find x so that $p \parallel q$.

$2x+2 = x+56$

$\boxed{x = 54°}$

b) Find y so that $r \parallel s$.

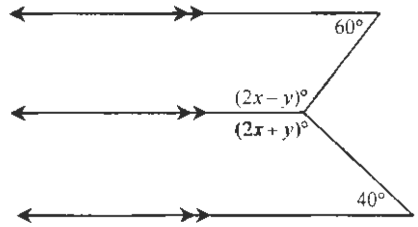
$(y+7)+(3y-17) = 180$

$4y-10 = 180$

$4y = 190$

$\boxed{y = 47.5°}$

41) Find the value of x and y.



$2x-y+60 = 180$

$2x+y+40 = 180$

$\Rightarrow 2x-y = 120$

$2x+y = 140$

$\frac{4x}{4} = \frac{260}{4}$

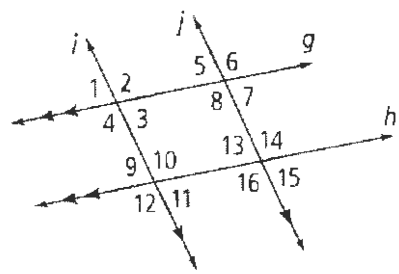
$\boxed{x = 65°}$

$\boxed{y = 10°}$

Complete the following proof.

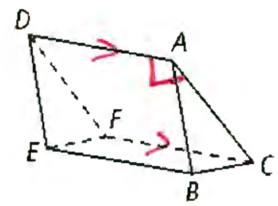
42) Given: $g \parallel h$ *and* $i \parallel j$

Prove: $\angle 1$ is supplementary to $\angle 16$.



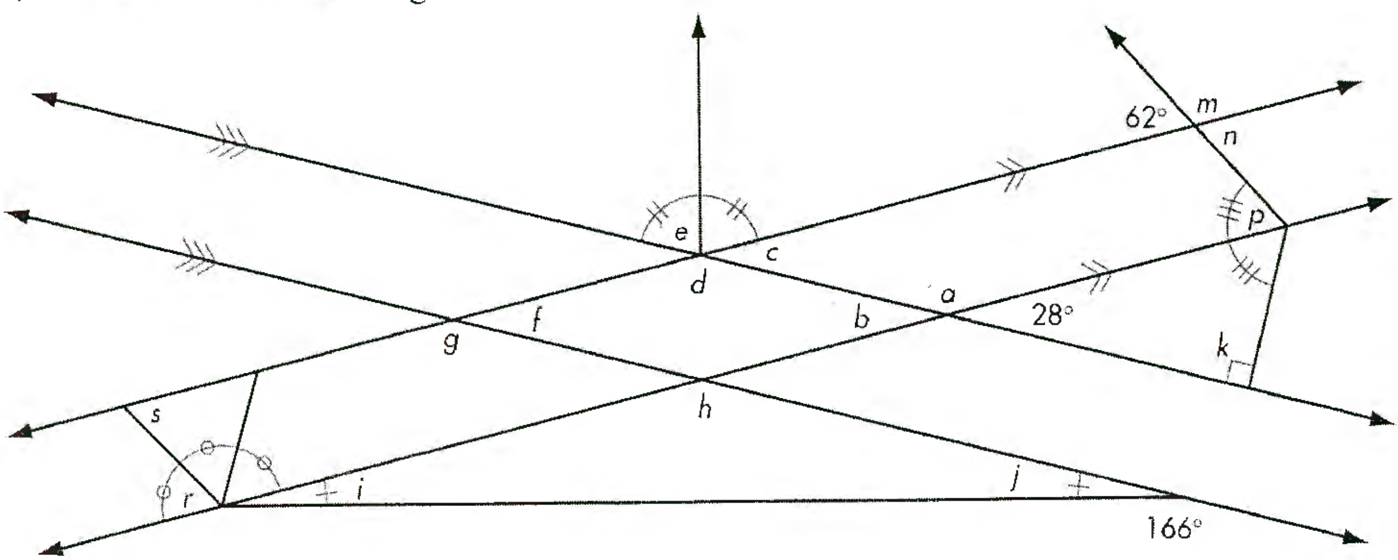
Statement	Reasons
1. $g \parallel h$ *and* $i \parallel j$	Given
2. $\angle 1 \cong \angle 3$	VA
3. $\angle 3 \cong \angle 11$	CA
4. $\angle 1 \cong \angle 11$	Trans. Prop / Subst. Prop
5. $\angle 11$ and $\angle 16$ are supplementary.	SSI
6. $\angle 1$ and $\angle 16$ are supplementary.	Subst. Prop.

43) Using the figure to the right, a student says that according to Perpendicular Transversal Theorem that $\overleftrightarrow{AD} \parallel \overleftrightarrow{CF}$ and $\overleftrightarrow{AD} \perp \overleftrightarrow{AB}$, then $\overleftrightarrow{CF} \perp \overleftrightarrow{AB}$. Explain the student's error.



You can't use any substitution or transitive property here. $\overleftrightarrow{CF}$ and $\overleftrightarrow{AB}$ don't even intersect. They are skew. Thus, they can't be perpendicular.

44) Calculate each lettered angle below.



a = 152° d = 152° g = 152° j = 14° n = 62° s = 60°

b = 28° e = 76° h = 152° k = 90° p = 62°

c = 28° f = 28° i = 14° m = 118° r = 60°