Unit 3 Test Review Homework

Lines and Their Relationships

Name _Master E_

Date _____ Block ____

| Skill Set 1	Students will be able to determine the relationships between pairs of lines (parallel, perpendicular, skew or intersecting), and identify angles formed by pairs of lines cut by a transversal. For parallel lines, students will be able to determine if pairs of angles are congruent or supplementary.

1-4: Use the diagram to answer each question.

Plane TSR 1. Name a plane parallel to MNQ.

$\overline{SR}, \overline{QR}, \overline{OP}, \overline{TP}$ 2. Name all segments skew to $\overline{MN}$.

$\overline{ST}, \overline{RP}, \overline{QO}$ 3. Name all segments parallel to $\overline{MN}$

$\overline{RP}$ 4. State the intersection of planes RPO and RST.
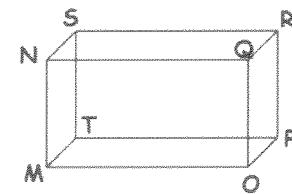
5-9: Name the transversal forming each angle pair. Then identify the type of angles shown.

5.	∠2 and ∠12	_a_	_alternate interior_
6.	∠6 and ∠18	_d_	_corresponding_
7.	∠13 and ∠19	_b_	_alternate exterior_
8.	∠11 and ∠7	_c_	_consecutive interior_
9.	∠1 and ∠20	_d_	_consecutive exterior_
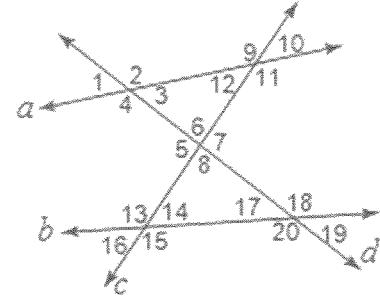
10-11: Mark on the given map the answer to each question.

10. Connor lives at the angle that forms an alternate interior angle with Georg's residence. Add Connor to the map.
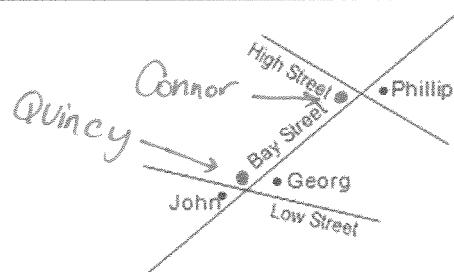
11. Quincy lives at the angle that forms a consecutive interior angle with Connors' residence. Add Quincy to the map.

Skill Set 2	Students will be able to apply the definitions and theorems for parallel and perpendicular lines by using algebra to find angle measures.

12-14: If a ∥ b, find the value of x. *Show your work and circle your final answer.*

12. m∠3 = 2x + 16 & m∠5 = 7x − 4   _consec. int. ∡s (+ up = 180)_

$$2x + 16 + 7x - 4 = 180$$
$$9x + 12 = 180$$
$$9x = 168 \Rightarrow \boxed{x = 18.7}$$

13. m∠4 = 8x - 80 & m∠5 = -2x + 16   _alt. int. ∡s (≅)_

$$8x - 80 = -2x + 16$$
$$10x - 80 = 16$$
$$10x = 96 \Rightarrow \boxed{x = 9.6}$$

14. m∠2 = 3x + 19 & m∠6 = 2(x + 10)   _corr. ∡s (≅)_

$$3x + 19 = 2(x + 10)$$
$$3x + 19 = 2x + 20$$
$$x + 19 = 20 \Rightarrow \boxed{x = 1}$$
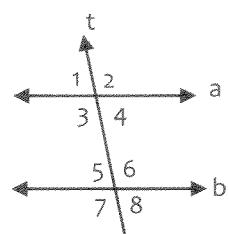
15a - r: If a ∥ b and s ∥ t, find all other angles.   *Fill in ALL angles first using the two given angles!*

Diagram angle labels:
- 85 (∠1), 95 (∠2), 95 (m label)
- 85 (∠3), 45° (∠5), 50
- 95 (∠6), 785, 50 (∠8), 10
- 85 (∠9), 45
- 85 (∠11), 45, 50 (∠13)
- 85 (∠12), 85 (∠14), 95°
- 50 (∠16), 85 (∠17/18), 45
- 95 (∠19), 85 (∠20)
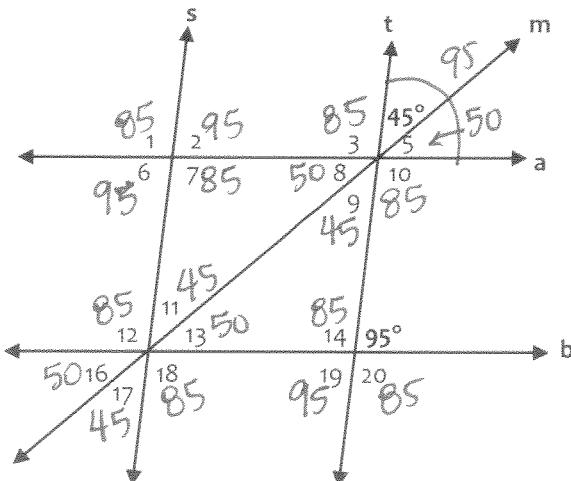
a. m∠1 = **85°**   b. m∠2 = **95°**   c. m∠3 = **85°**

d. m∠5 = **50°**   e. m∠6 = **95°**   f. m∠7 = **85°**

g. m∠8 = **50°**   h. m∠9 = **45°**   i. m∠10 = **85°**

j. m∠11 = **45°**   k. m∠12 = **85°**   l. m∠13 = **50°**

m. m∠14 = **85°**   n. m∠16 = **50°**   o. m∠17 = **45°**

p. m∠18 = **85°**   q. m∠19 = **95°**   r. m∠20 = **85°**

| Skill Set 3	Students will be able to prove lines are parallel or perpendicular using algebraic and coordinate methods, as well as deductive proofs.

16: Complete the proof below.

Given: p ∥ m, s ∥ t   **Prove:** ∠2 ≅ ∠4

a. p ∥ m, s ∥ t   a. ___Given___

b. ∠2 ≅ ∠3   b. ___If 2∥ lines are CBT, alt. int. ∠s R ≅.___

c. ∠3 ≅ ∠4   c. ___same as b ↑___

d. ∠2 ≅ ∠4   d. ___Transitive POC___
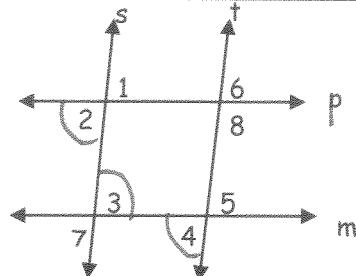
17-22: Using the diagram in #16, state whether each equation/congruency statement would make any lines parallel. If YES, fill in which lines are parallel and why. If NO, cross through the parallel statement and state why they're not parallel.

17. m∠6 + m∠8 = 180   ~~∥~~   because ___The angles of a linear pair are formed by int. lines___

18. m∠5 + m∠7 = 180   ~~∥~~   because ___Alt. ext. ∠s R ≅ when 2∥ lines R CBT!___

19. m∠1 = m∠7   p ∥ m   because ___same as above ↑___

20. ∠6 ≅ ∠4   s ∥ t   because ___Corr. ∠s R ≅ when 2∥ lines R CBT!___

21. m∠5 + m∠8 = 180   p ∥ m   because ___consec. int. ∠s R supp when 2∥ lines R CBT!___

22. ∠3 ≅ ∠4   s ∥ t   because ___Alt. int. ∠s R ≅ when 2∥ lines R CBT!___

23-25: Find the value of x and y in each picture. *Show your algebra below each problem.*

23. $(3x - 3)°$, $(4y + 4)°$, $60°$

$3x - 3 = 60$
$3x = 63$
$x = 21$

$4y + 4 + 60 = 100$
$4y + 64 = 180$
$4y = 116$
$y = 29$

x = **21**   y = **29**

24. $(9x + 21)°$, $(11x - 1)° = 120°$, $(5y - 5)°$

$9x + 21 = 11x - 1$
$21 = 2x - 1$
$22 = 2x$
$11 = x$

$5y - 5 + 120 = 180$
$5y + 115 = 180$
$5y = 65$
$y = 13$

x = **11**   y = **13**

25. $(5x)°$, $40°$, $(3y - 1)°$, 40

$5x + 40 = 180$
$5x = 140$
$x = 28$

$3y - 1 + 40 = 180$
$3y + 39 = 180$
$3y = 141$
$y = 47$

x = **28**   y = **47**

26-27: Determine whether $\overleftrightarrow{MN}$ and $\overleftrightarrow{RS}$ are parallel, perpendicular, or neither by finding their slopes.

26.   M(0, 3), N(2, 4), R(2, 1), S(8, 4)

$m\overleftrightarrow{MN} = \frac{4-3}{2-0} = \frac{1}{2}$

$m\overleftrightarrow{RS} = \frac{4-1}{8-2} = \frac{3}{6} = \frac{1}{2}$

$\overleftrightarrow{MN} \parallel \overleftrightarrow{RS}$ blc they have the same slope.

27.   M(−1, 3), N(0, 5), R(2, 1), S(6, −1)

$m\overleftrightarrow{MN} = \frac{5-3}{0-(-1)} = \frac{2}{1} = 2$

$m\overleftrightarrow{RS} = \frac{-1-1}{6-2} = \frac{-2}{4} = -\frac{1}{2}$

$\overleftrightarrow{MN} \perp \overleftrightarrow{RS}$ blc their slopes are opposite reciprocals

Skill Set 4	Students will be able to use coordinate and algebraic methods to write the equation or draw the graph of a line parallel or perpendicular to a given line.

28-33: Find the slope of each line.

28. $\overleftrightarrow{AB}$ $\frac{6}{2} = 3$

29. $\overleftrightarrow{AE}$ 0

30. $\overleftrightarrow{CD}$ $\frac{-4}{2} = -2$

31. $\overleftrightarrow{EH}$ $\frac{2}{5}$

32. $\overleftrightarrow{EM}$ $\emptyset$

33. $\overleftrightarrow{BM}$ $\frac{-2}{4} = -\frac{1}{2}$

Graph with points B(0, 4), C(−2, 2), M(4, 2), A(−2, −2), D(0, −2), E(4, −2), H(−1, −4)
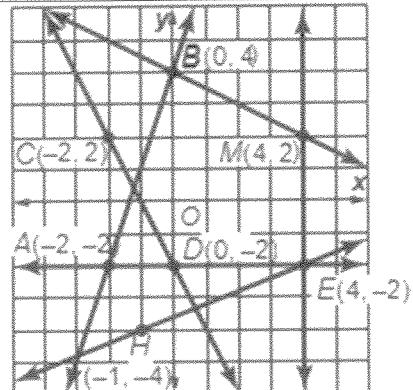
34-37: Graph the line that satisfies each condition.

34. ... has a slope of 3, passes through A (0, 1)
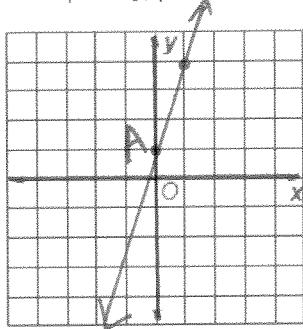
35. ... has a slope of $-\frac{3}{2}$, passes through R (−4, 5)
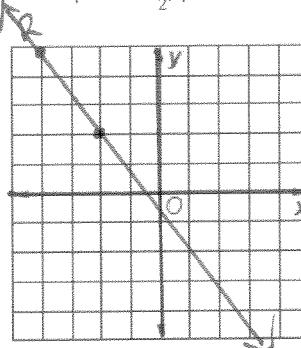
36. ... passes through Y (3, 0), parallel to $\overleftrightarrow{DJ}$ with D(−3, 1) and J(3, 3)

$m\overleftrightarrow{DJ} = \frac{2}{6} = \frac{1}{3}$
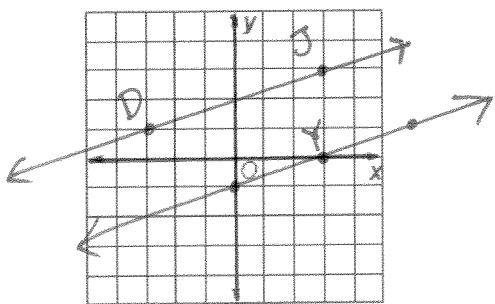
37. ... passes through T (0, −2), perpendicular to $\overleftrightarrow{CX}$ with C(0, 3) and X(2, −1)

$m\overleftrightarrow{CX} = \frac{-4}{2} = -2$

m of new line = $\frac{1}{2}$
$\overleftrightarrow{TX}$ is the new line!
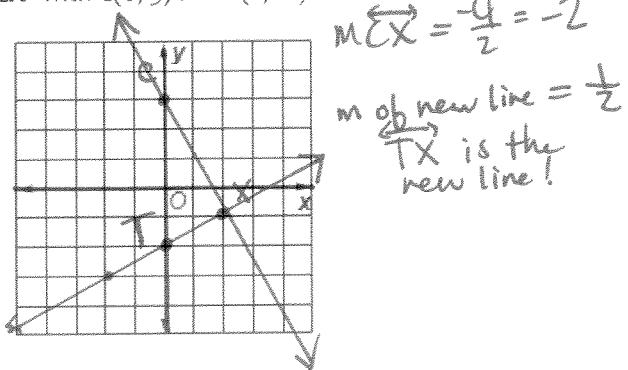
38-41: Write the equation of the line with the given characteristics in slope-intercept form.

38. ... has a slope of $\frac{2}{3}$ and a y-intercept of –10

$y = mx + b$

$y = \frac{2}{3}x - 10$

39. ... has a slope of $\frac{-3}{2}$ and contains $(4, 6)$

$y - y_1 = m(x - x_1)$

$y - 6 = \frac{3}{2}(x - 4)$

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

$y = \frac{3}{2}x$

40. ... whose x-intercept is –6 and y-intercept is 2

$(-6, 0) \qquad (0, 2)$

$m = \frac{2 - 0}{0 - (-6)} = \frac{2}{6} = \frac{1}{3}$

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

41. ... contains $(-4, 2)$ and $(8, -1)$

$m = \frac{-1-2}{8-(-4)} = \frac{-3}{12} = -\frac{1}{4}$

$y - 2 = -\frac{1}{4}(x + 4)$

$y - 2 = -\frac{1}{4}x - 1$

$\underset{+2}{y - 2} = -\frac{1}{4}x - 1 \underset{+2}{}$

$\Rightarrow y = -\frac{1}{4}x + 1$

| Skill Set 5	Students will be able to construct a line perpendicular to a given line (a) through a point not on the line, (b) through a point on the line, and (c) construct a line parallel to a given line through a given point.

42-45: Do the following constructions.

42. Construct $\overrightarrow{AD}$ perpendicular to $\overleftrightarrow{RM}$.

43. Construct the perpendicular bisector of $\overline{XY}$
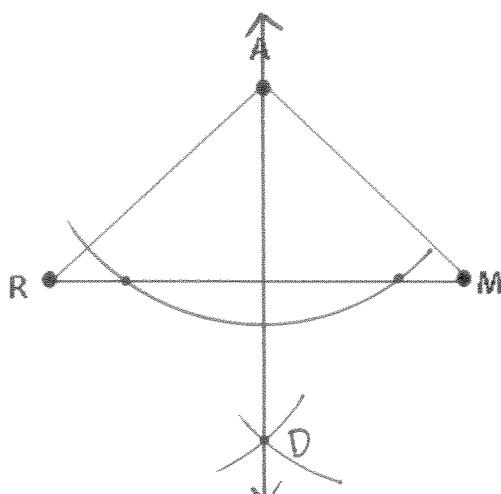
44. Construct $\overleftrightarrow{SP}$ parallel to line w
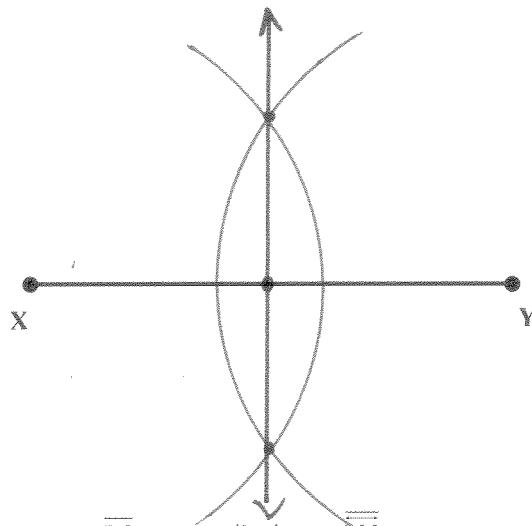
45. Construct $\overline{BC}$ perpendicular to $\overleftrightarrow{LM}$