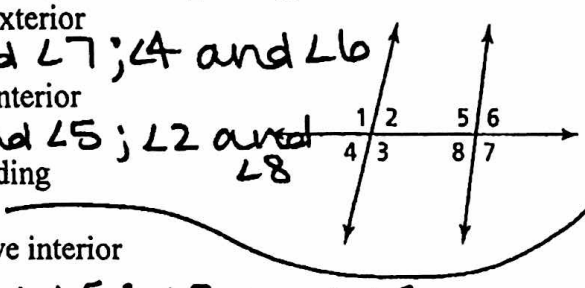
CHAPTER 3 PRACTICE TEST – OPTIONAL

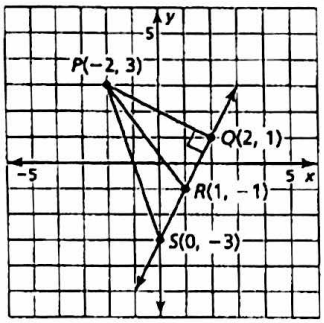
Key

1. Identify all pairs of angles of the given type.
   a. Alternate exterior
   ∠1 and ∠7; ∠4 and ∠6
   b. Alternate interior
   ∠3 and ∠5; ∠2 and ∠8
   c. Corresponding
   d. Consecutive interior
   ∠2 and ∠5; ∠3 and ∠8



∠1 and ∠5
∠2 and ∠6
∠3 and ∠7
∠4 and ∠8

2. Find the shortest distance from point P to line QS.



The ⊥ dist: PQ

$PQ = \sqrt{(-2-2)^2 + (3-1)^2}$

$= \sqrt{(-4)^2 + (2)^2}$

$= \sqrt{16+4} = \sqrt{20} = \boxed{2\sqrt{5}}$

3. Tell whether the lines through the given points are parallel, perpendicular, or neither. Justify your answer.
   a. **Line 1**: (2, 3), (4, 12) **Line 2**: (5, 10), (14, 8)

   Slope $= \frac{12-3}{4-2} = \frac{9}{2}$

   Slope $= \frac{8-10}{14-5} = \frac{-2}{9}$

   $\left(\frac{-2}{9}\right)\left(\frac{9}{2}\right) = -1$; product of slopes is −1, so the lines are ⊥

   b. **Line 1**: (-6, -10), (4, -2) **Line 2**: (-8, -6), (0, 4)

   Slope $= \frac{-2-(-10)}{4-(-6)} = \frac{8}{10} = \frac{4}{5}$

   $\frac{4-(-6)}{0-(-8)} = \frac{10}{8} = \frac{5}{4}$

   The slopes are not the same, nor are their products = −1. So, the lines are neither ∥ or ⊥.

4. Write the equation of the line passing through (2, -3) that is parallel to $y = -6x + 10$

∥ slope: $m = -6$

$y = mx + b$

$-3 = (-6)(2) + b$

$-3 = -12 + b$

$9 = b$

$\boxed{y = -6x + 9}$

5. Write the equation of the line passing through (-10, -4) perpendicular to $5x - y = 6$

⊥ slope: $-\frac{1}{5}$

$(5)(m) = -1$

$m = -\frac{1}{5}$

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

$y - (-4) = -\frac{1}{5}(x - (-10))$

$y + 4 = -\frac{1}{5}(x + 10) \rightarrow y + 4 = -\frac{1}{5}x - 2 \rightarrow \boxed{y = -\frac{1}{5}x - 6}$

$-y = -5x + 6$

$y = 5x - 6$

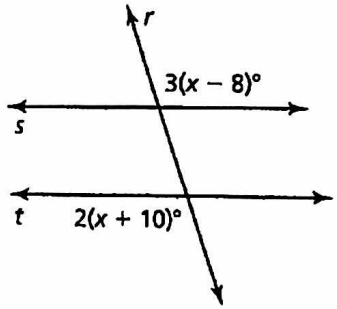
6. Write the equation of the line passing through (5, 7) perpendicular to x = 3

horiz. lines are ⊥ to vertical lines

vertical!

horiz: $\boxed{y = 7}$

7. Find the value of x that makes line s parallel to line t.



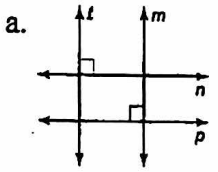
if alt. ext. ∠s ≅ → ||

$3(x-8) = 2(x+10)$

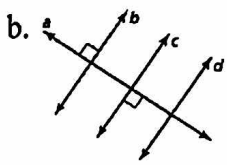
$3x - 24 = 2x + 20$

$\boxed{x = 44}$

8. Determine which lines, if any, must be parallel.

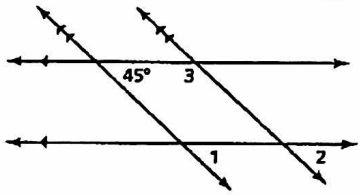
a. 

none...

b. 

$\boxed{b \parallel c}$

9. Find the measures of angles 1, 2, and 3.

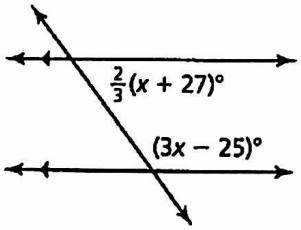


$m\angle 1 = 45°$

$m\angle 2 = 45°$

$m\angle 3 = 135°$

10. Find the value of x.



$\frac{2}{3}(x+27) + 3x - 25 = 180$

$\frac{2}{3}x + 18 + 3x - 25 = 180$

$\frac{2}{3}x + 3x = 187$

$\frac{2}{3}x + \frac{9}{3}x = 187$

$\frac{11}{3}x = 187$

$11x = 561$

$\boxed{x = 51}$

11. Think of each segment as part of a line. Which line(s) or plane(s) appear to fit the description?

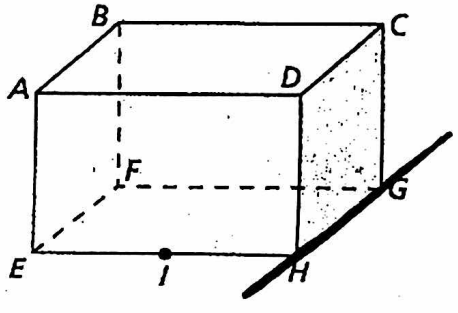
a. Line(s) parallel to line GH and containing point F $\overleftrightarrow{FE}$

b. Line(s) skew to line GH and containing point F $\overleftrightarrow{FB}$

c. Line(s) perpendicular to line GH and containing point F $\overleftrightarrow{FG}$

d. Plane(s) parallel to plane GHD and containing point F

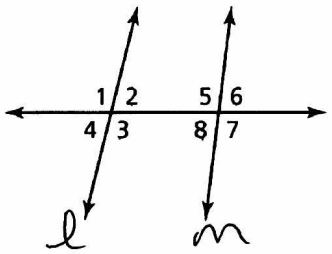
plane ABF



12. Write a two-column proof. (There are two different proofs for this one! Try doing both ☺)

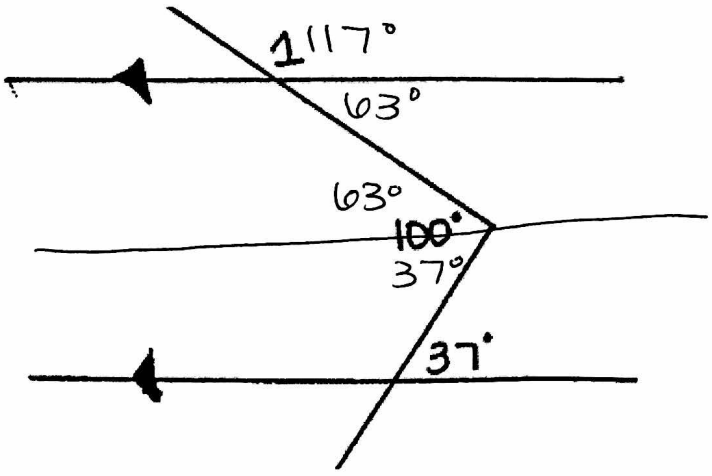
Given: ∠2 is supplementary to ∠5

Prove: ∠5 ≅ ∠3



S	R
① ∠2 supp ∠5	① given
② l ∥ m	② consec. int ∠s supp → ∥
③ ∠3 ≅ ∠5	③ ∥ → alt. int. ∠s ≅

13. Find the measure of angle 1.



$m\angle 1 = 117°$