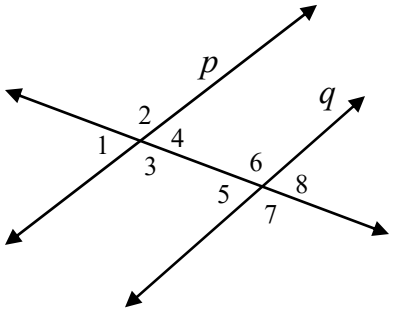
Chapter 3 Practice

1) Name each pair of angles



a) ∠1 and ∠2 Adjacent/Supplementary/Linear Pair

b) ∠4 and ∠5 Alternate Interior Angles

c) ∠4 and ∠6 Same Side Interior (Consecutive)

d) ∠3 and ∠7 Corresponding Angles

e) ∠2 and ∠3 Vertical Angles

f) ∠1 and ∠8 Alternate Exterior Angles

g) Which of these pairs of angles are congruent?

e) $\angle 2 \cong \angle 3$ plus all other pairs of vertical angles

No other angles here can be presumed congruent because we don't know that p||q

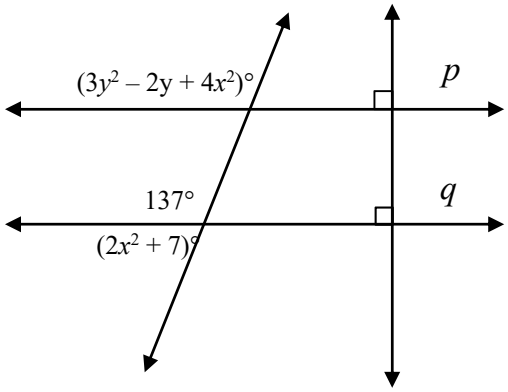
2) Set up equations and solve for x and y
Justify each equation with a theorem or postulate

$2x^2 + 7 + 137 = 180$ (Linear Pair)

$2x^2 = 36$

$x^2 = 18$

$x = \pm\sqrt{18}$



Converse of Perpendicular Transversal says that p||q

$3y^2 - 2y + 4(\pm\sqrt{18})^2 = 137$

$3y^2 - 2y + 4(18) = 137$

$3y^2 - 2y + 72 = 137$

Corresponding Angles

$3\left(-\frac{13}{3}\right)^2 - 2\left(-\frac{13}{3}\right) + 72 = 137$

$3\frac{169}{9 3} + \frac{26}{3} + 72 = 137$

$\frac{169}{3} + \frac{26}{3} + 72 = \frac{195}{3} + 72 = 65 + 72 = 137$ ✓

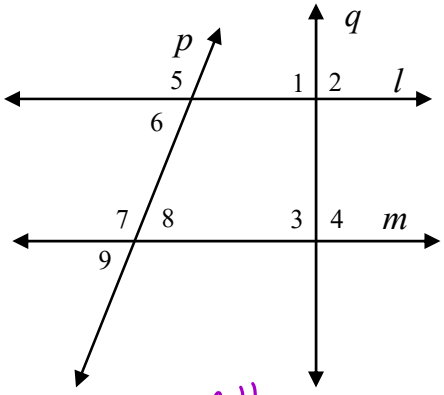
$3(5)^2 - 2(5) + 72 = 137$

$75 - 10 + 72 = 137$

$137 = 137$ ✓

$3y^2 - 2y - 65 = 0 \Rightarrow (3y + 13)(y - 5) = 0 \Rightarrow y = -\frac{13}{3}, 5$ ⇐ Both work

3) Given $\angle 6$ is supplementary to $\angle 7$
what can you conclude about the given lines?
What theorem/postulate justifies your answer?



By the Converse of Same Side Interiors Theorem, $l \parallel m$

4) Given $m\angle 1 = m\angle 4 = 90°$ what can you conclude about the given lines? What theorems/postulates justify your answer?

By the Converse of Perpendicular Transversals Thm, $l \parallel m$

5) Find the equation of the line passing through the points (4, 0) and (–2, –3) in point-slope form.

$m = \frac{-3-0}{-2-4} = \frac{-3}{-6} = \frac{1}{2}$

$y - 0 = \frac{1}{2}(x-4)$

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

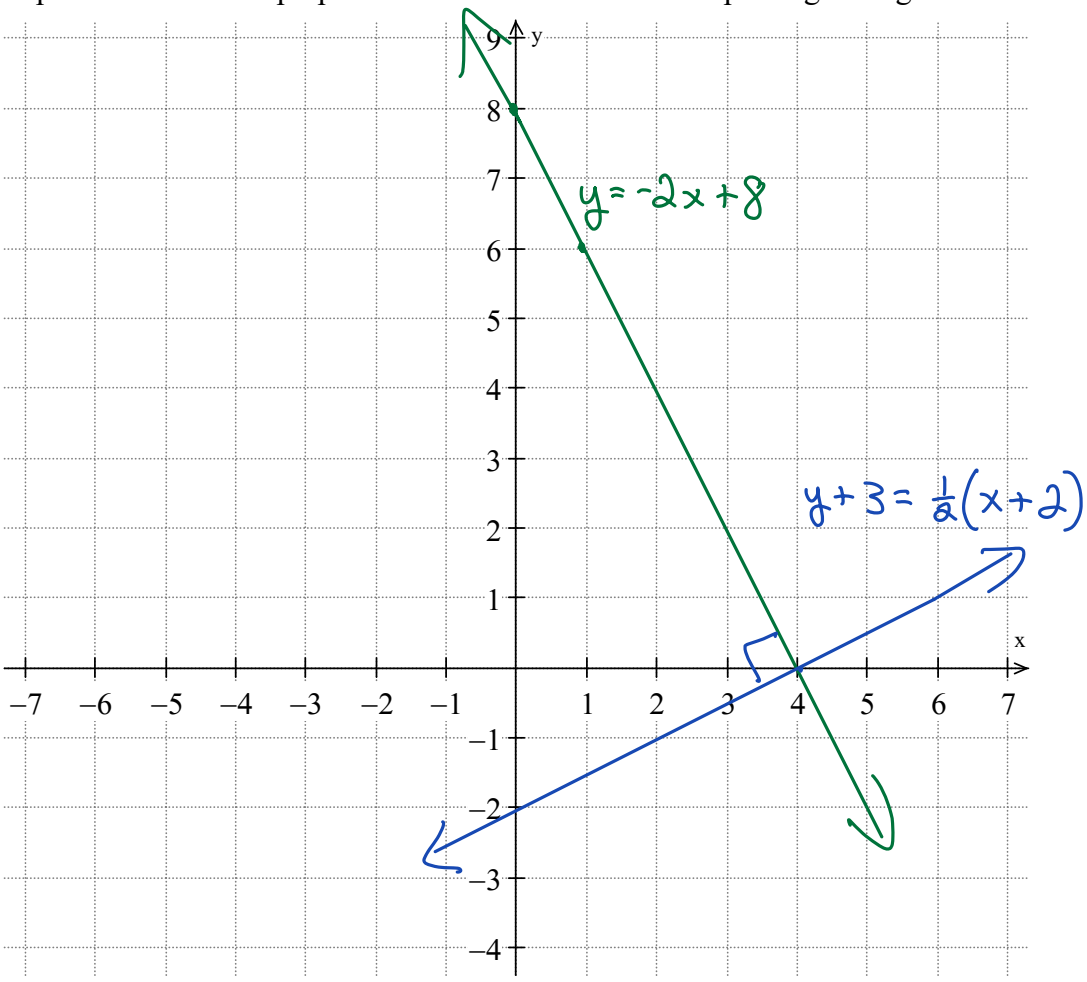
6) Find the equation in slope intercept form of the line perpendicular to the line in #5 and passing through the point (2, 4)

$m_\perp = -2$ $\quad y = -2x + 8$

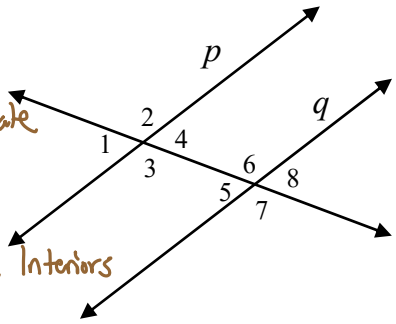
$4 = -2(2) + b$

$b = 8$

7) Graph both lines on the grid to the right.



8) Write the theorem/postulate that matches the given statement.



a) If $\angle 1 \cong \angle 5$ then $p \parallel q$ Converse of Corresponding Angles Postulate

b) If $p \parallel q$ then $\angle 4 \cong \angle 5$ Alternate Interior Angles Thm

c) If $\angle 4$ is supplementary to $\angle 6$ then $p \parallel q$ Converse of Same Side Interiors Thm

d) If $p \parallel q$ then $\angle 3 \cong \angle 7$ Corresponding Angles

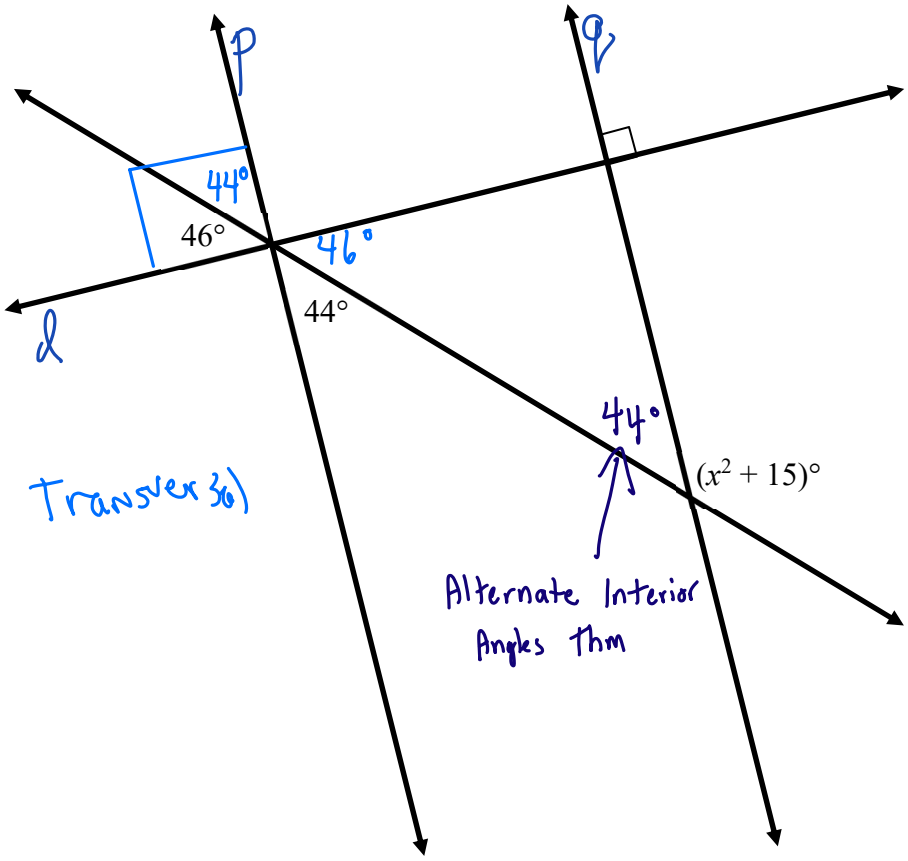
e) If $\angle 2 \cong \angle 6$ then $p \parallel q$ Converse of Corresponding Angles Postulate

f) If $p \parallel q$ then $\angle 1 \cong \angle 8$ Alternate Exterior Angles Thm

9) Solve for x and justify any equation you use with a theorem/postulate.

$44^\circ + 46^\circ = 90^\circ$

Since both p and q are perpendicular to l, p || q but the Converse of the Perpendicular Transversal Thm



$x^2 + 15 + 44 = 180$ (Linear Pair)

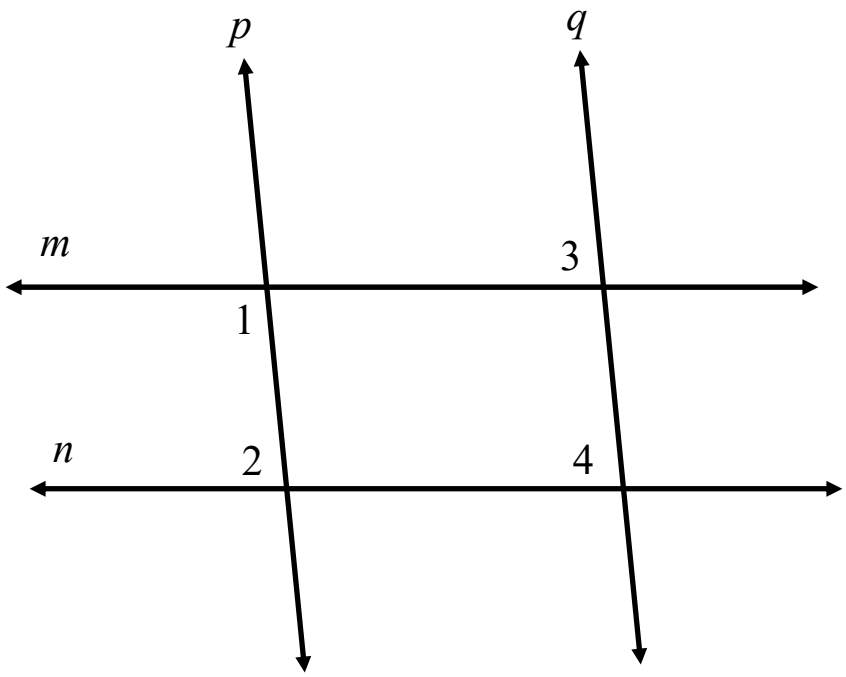
$x^2 = 121$

$x = \pm 11$ ⇐ both work as solutions

$(\pm 11)^2 + 15 + 44 = 180$

$121 + 15 + 44 = 180$ ✓

10) Given: $\angle 1$ is supplementary to $\angle 2$
$\angle 2 \cong \angle 3$
Prove: $p \parallel q$



Statement	Reason
$\angle 1$ is supp. $\angle 2$, $\angle 2 \cong \angle 3$	Given
$m \parallel n$	Converse of Consecutive Interior Angles thm
$\angle 3 \cong \angle 4$	Corresponding Angles Postulate (now that we know that $m \parallel n$)
$\angle 2 \cong \angle 4$	Transitive Property of Congruence
$p \parallel q$	Converse of Corresponding Angles Postulate