Constructing a parallel line through a point

1. Draw a line through the point that crosses the line at an angle (make sure to extend it well above the point)
2. Place the compass at the intersection point, and set its width to about half the distance between this point and the initial point
3. Draw an arc across both lines
4. Without adjusting the width, move the compass to the initial point and draw another arc in a similar location relative to the point
5. On the lower arc, set the width of the compass to the distance between it's two points of intersection
6. Place the compass at the upper point of intersection, and draw an arc that crosses the other arc
7. Draw a straight line through the initial point and this point of intersection
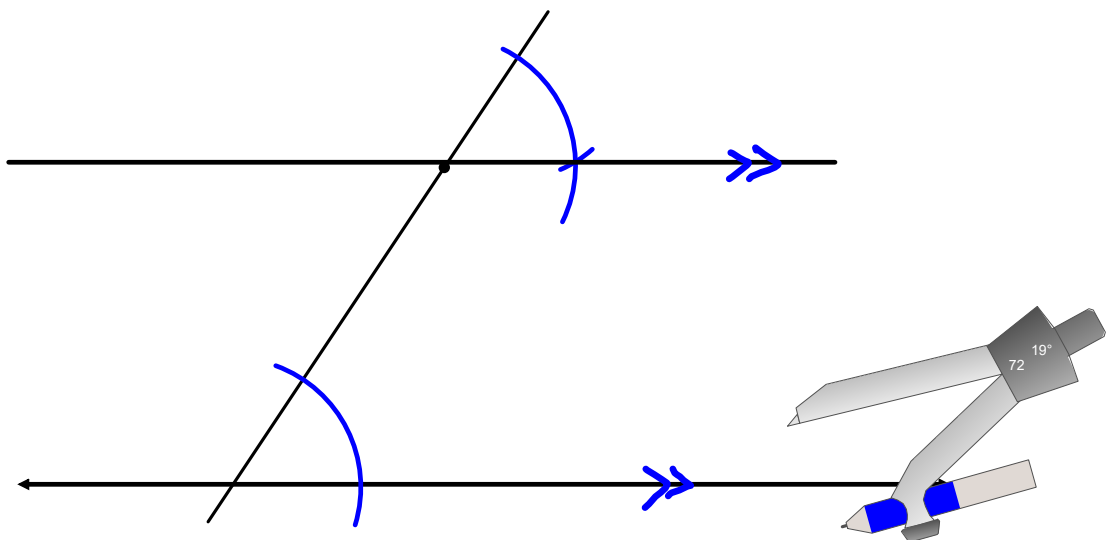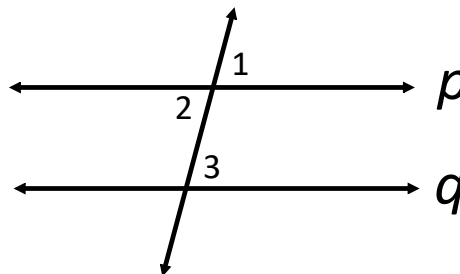
Parallel Lines Postulate

If two lines are parallel and are cut by a transversal, then *corresponding* angles have the same measure

Transversal

$x + 30$

$2x$

$x + 30 = 2x$

$\boxed{x = 30}$

Given: $p // q$

Prove: $\angle 2 \cong \angle 3$

1

2

3

p

q
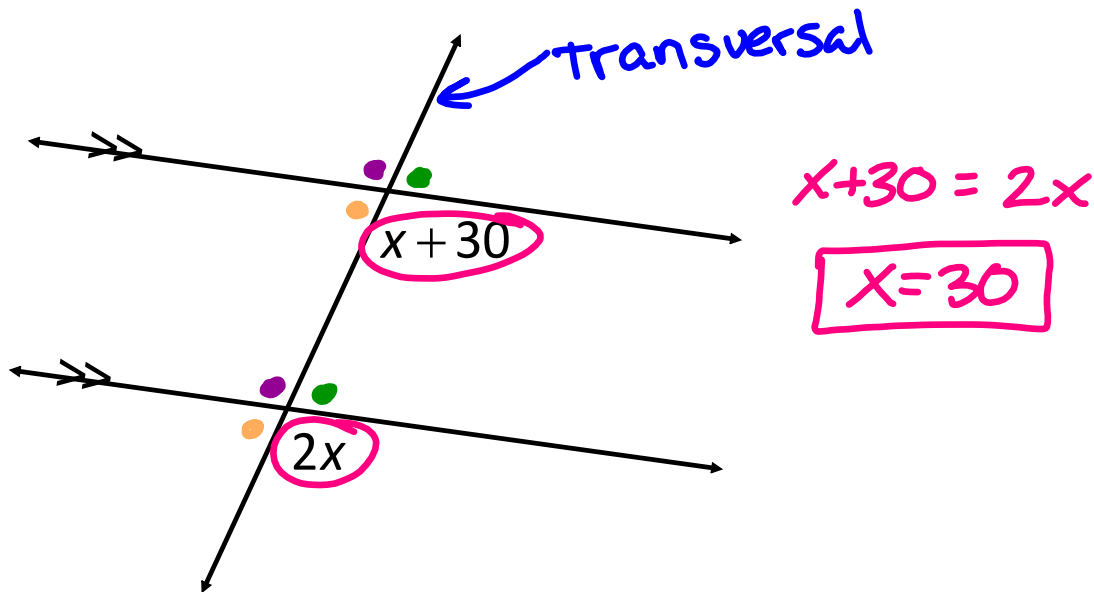
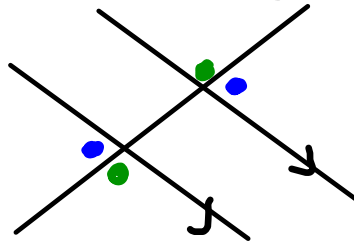| Statements	Reasons
1. $p // q$	1. Given
2. $\angle 1 \cong \angle 3$	2. Parallel lines Post.
3. $\angle 1 \cong \angle 2$	3. Vert. $\angle$s theo.
4. $\angle 2 \cong \angle 3$	4. Transitive Prop. of $\cong$.

Parallel Lines and Angles

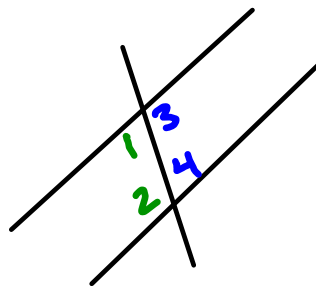Iff two lines are // , then the following are true:

$\implies$ Alternate Interior Angles are Congruent
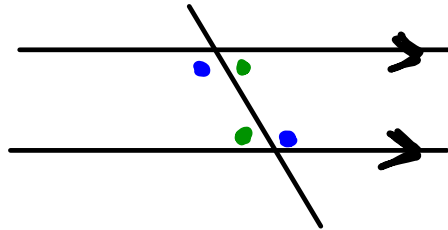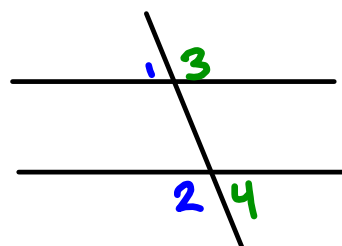
$\implies$ Alternate Exterior Angles are Congruent

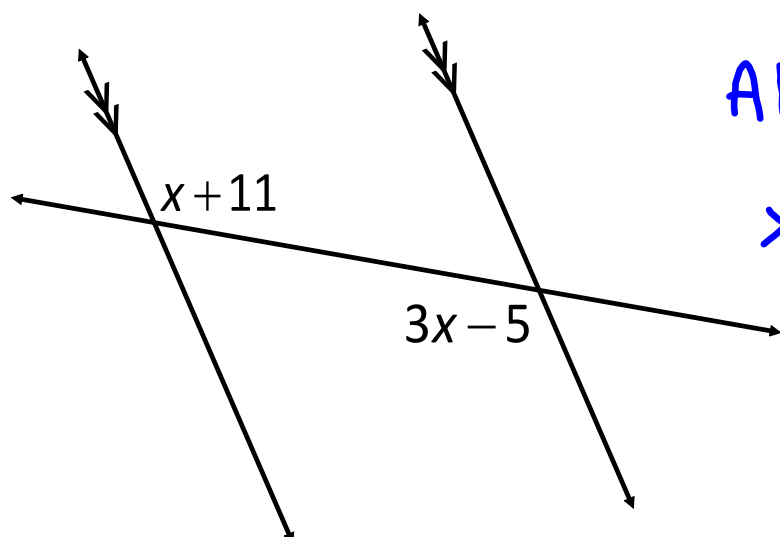$\implies$ Consecutive Interior Angles are Supp

$m\angle 1 + m\angle 2 = 180°$

$m\angle 3 + m\angle 4 = 180°$

3
1   4
2

$\implies$ Consecutive Exterior Angles are Supp

$m\angle 1 + m\angle 2 = 180$

$m\angle 3 + m\angle 4 = 180°$

1 3

2 4

$x+11$

$3x-5$

Alt. int. $\angle$'s

$x+11 = 3x-5$

$16 = 2x$

$\boxed{X=8}$
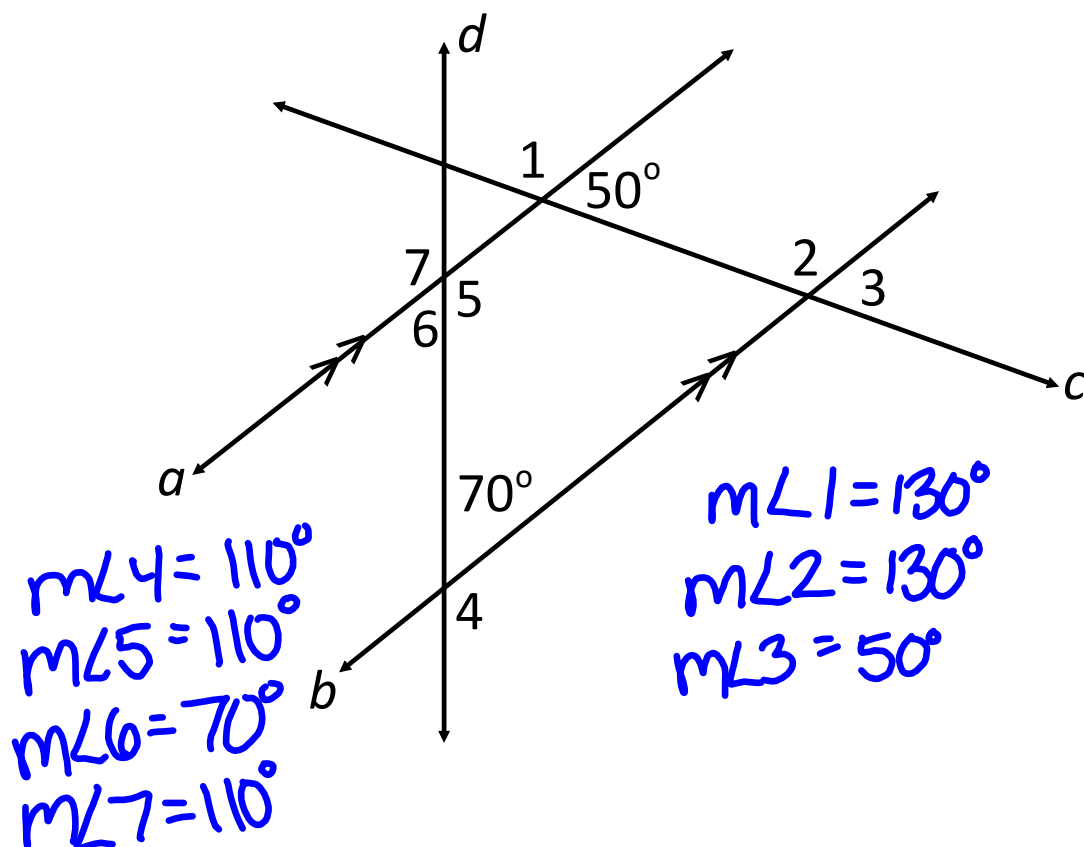
d

1 $50°$

7

5

6

2

3

a

$70°$

c

4

b

$m\angle 4 = 110°$
$m\angle 5 = 110°$
$m\angle 6 = 70°$
$m\angle 7 = 110°$

$m\angle 1 = 130°$
$m\angle 2 = 130°$
$m\angle 3 = 50°$

Find m∠1

53°   57°

53°   70°

110°   57°

57°

m∠1=57°

1

Find m∠3

100°

80°

3

40°

40°

m∠3=120°

Find $m\angle 4$

$110°$

$110°$

$m\angle 4 = 100°$

4 $\frac{70°}{30°}$

$\frac{30°}{80°}$ $\frac{}{50°}$

$130°$

$130°$
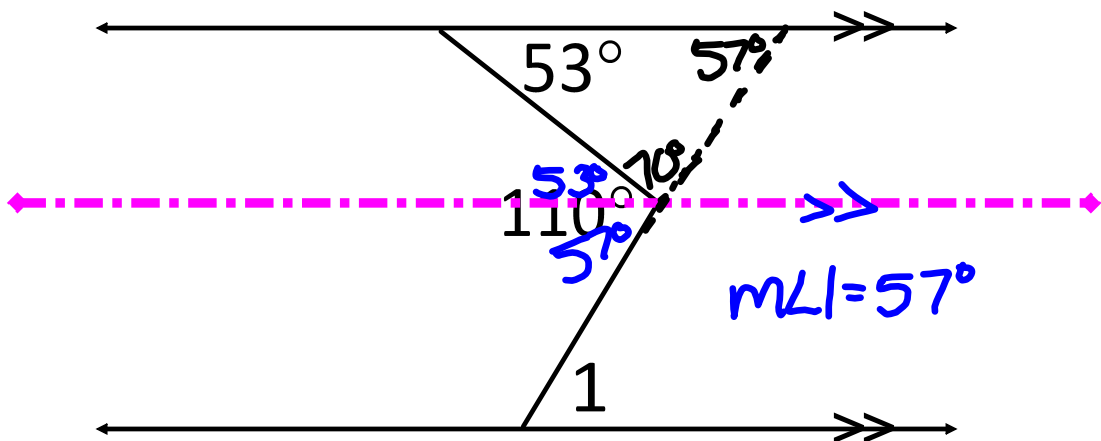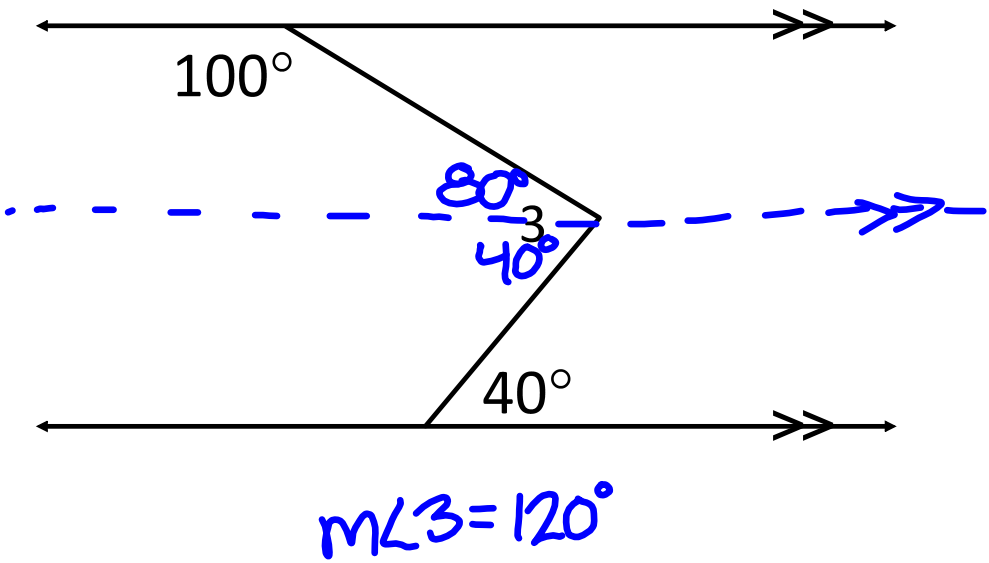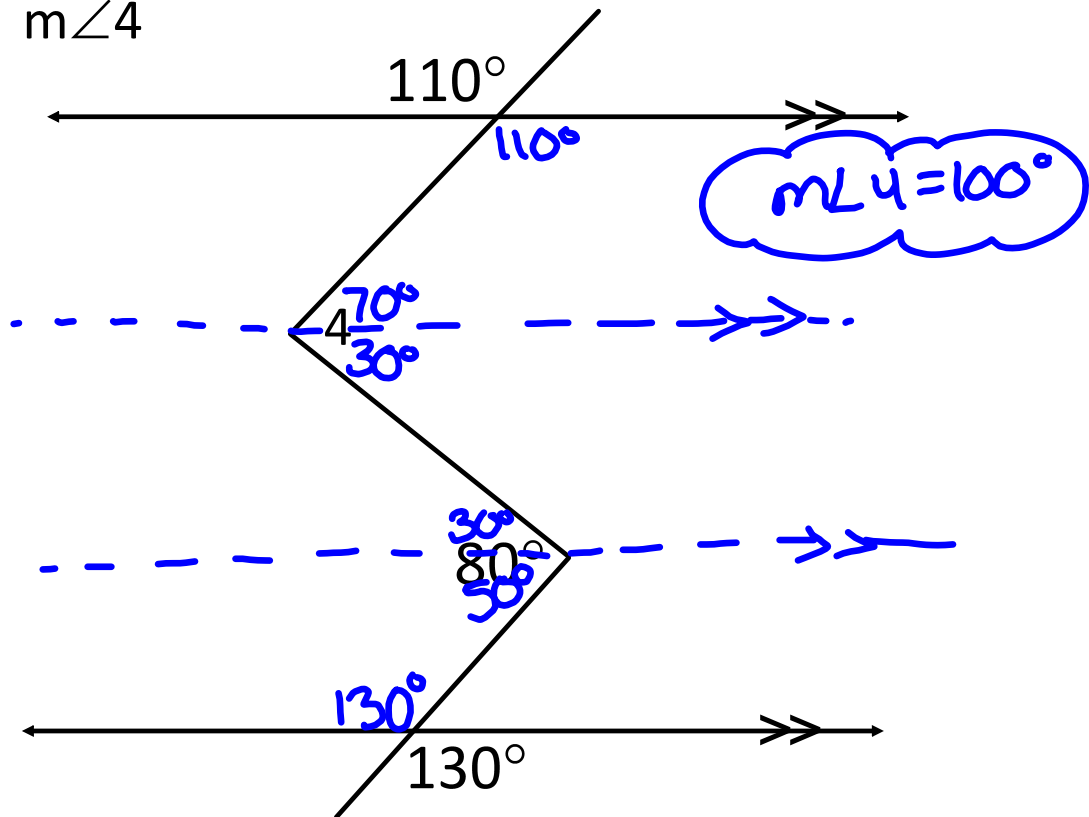
Is line e parallel to line f?

e

$(2x+10)°$

f
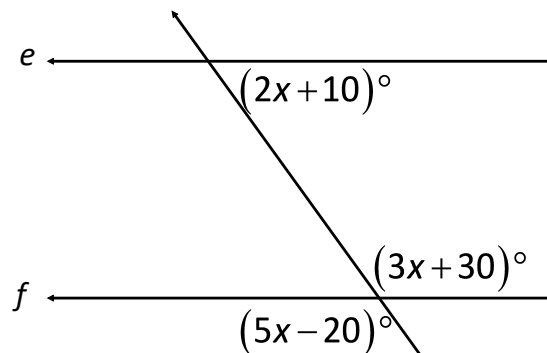
$(3x+30)°$

$(5x-20)°$

$3x+30 = 5x-20$

$50 = 2x$

$\boxed{x=25}$

Does $2x+10 + 3x+30 \stackrel{?}{=} 180°$?

$2(25)+10 + 3(25)+30 \stackrel{?}{=} 180$

$60 + 105 \neq 180$

∴ lines e and f are <u>not</u> ∥

Given: $a \parallel b$ $\qquad$ $m\angle 1 = (x + 3y)^\circ$

$\qquad$ $m\angle 3 = (5y + 20)^\circ$ $\quad$ $m\angle 2 = (2x + 30)^\circ$

$$x + 3y = 5y + 20$$

$$2x + 30 + 5y + 20 = 180$$

$$x + 3y + 2x + 30 = 180$$

$$x = 2y + 20$$

$$2y + 20 + 3y + 2(2y+20) + 30 = 180$$

$$9y = 90$$

$$\boxed{y = 10} \quad \boxed{x = 40}$$