SA (1) $\angle 1$ and $\angle 5$

NT (2) $\angle 2$ and $\angle 4$

NG (3) $\angle WVY = (5x+6)^\circ$ because of VAT

$\angle WYV = 180 - (16x-8)^\circ$ because of LPP

Since all angles in a Δ sum to 180°, $m\angle VWY + m\angle WYV + m\angle WVY = 180^\circ$

$$8x+7+180-(16x-8)+5x+6=180$$
$$8x+7+180-16x+8+5x+6=180$$
$$-3x+201=180$$
$$-3x=-21$$
$$\boxed{x=7}$$

IT (4) $m\angle 3 = m\angle 7$ by Corresponding Angles Postulate

$$4s-3t=9s+12t$$
$$-3t=5s+12t$$

$0=5s+15t$ ← 1^{st} equation

$m\angle 3 + m\angle 4 = 180$ by Linear Pair Postulate

$$4s-3t+5s+6t=180$$

$9s+3t=180$ ← 2^{nd} equation

System: $5s+15t=0$ ⇒ $5s+15t=0$

$-5[9s+3t=180]$ $\quad -45s-15t=-900$

$$-40s=-900$$
$$\boxed{s=22.5}$$

$$0=5(22.5)+15t$$
$$0=112.5+15t$$
$$-112.5=15t$$
$$\boxed{t=-7.5}$$

GH (5) $m\angle 8 = (3x+108)^\circ$ by VAT

$m\angle 3 + m\angle 8 = 180$ by Consecutive Interior Angles Theorem

$$x^2-2x+3x+108=180$$
$$x^2+x+108=180$$
$$x^2+x-72=0$$
$$(x+9)(x-8)=0$$

$\boxed{x=-9,\ x=8}$ ← Both solutions work

Check:

$x=-9$: $m\angle 3=(-9)^2-2(-9)=99^\circ$ ✓

$m\angle 8=3(-9)+108=81^\circ$

$x=8$: $m\angle 3=(8)^2-2(8)=48^\circ$ ✓

$m\angle 8=3(8)+108=132^\circ$

MO (6) Since $72+108=180$, a∥b by consecutive interior angles converse

WA (7) $6x+y=x+5y$ by Alternate Exterior Angles

$5x+y=5y$

$5x=4y$ ← 1st equation

$6x+y+4x=180$ by Linear Pair postulate

$10x+y=180$

$y=180-10x$ ← 2nd Equation

System: $5x=4y$, $y=180-10x$ substitute

$5x=4(180-10x)$

$5x=720-40x$

$45x=720$

$\boxed{x=16}$

$y=180-10(16)$

$y=180-160$

$\boxed{y=20}$

ME (8) new slope $=-3$ thru $(-2,7)$

$y=mx+b$

$7=-3(-2)+b$

$7=6+b$

$b=1$

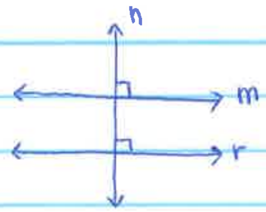
$\boxed{y=-3x+1}$

SI (9) $m_{\text{line } a}=\frac{-2-6}{7+5}=\frac{-8}{12}=\frac{-2}{3}$

$m_{\text{line } b}=\frac{-4+2}{-9+12}=\frac{-2}{3}$

The lines are parallel because they each have a slope of $-2/3$.

TI (10)



That would mean m//r so they have the same slope

$m_{\text{line } r} = 6$ $\quad m_{\text{line } m} = 6$ $\quad m_{\text{line } n} = -\frac{1}{6}$

line m: $m=6$ thru $(-2,7)$

$y = mx + b$

$7 = 6(-2) + b$

$7 = -12 + b$

$b = 19$

$\boxed{y = 6x + 19}$

NX (11) Line j: $y = -6x + 2$ $\quad m = -6$

line k: $6y = x + 12$

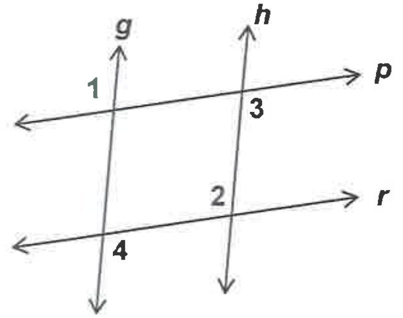
$y = \frac{x}{6} + \frac{12}{6}$

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

The lines are perpendicular since their slopes are opp. reciprocals

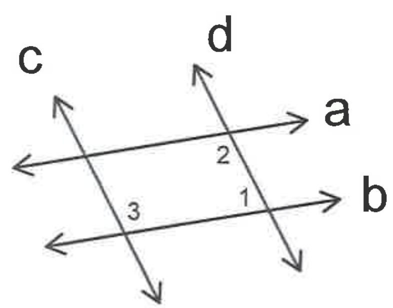
Proof Practice

1) **Given:** $\angle 1 \cong \angle 3$
Prove: $\angle 2 \cong \angle 4$



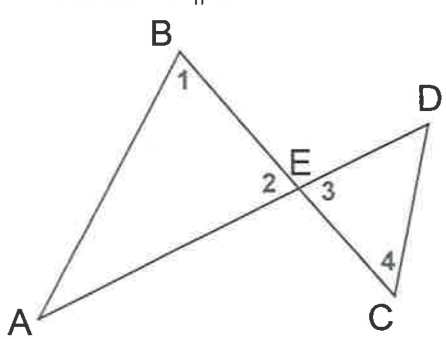
Statements	Reasons
1. $\angle 1 \cong \angle 3$	1. Given
2. $g \parallel h$	2. Alternate Exterior Angles Converse
3. $\angle 2 \cong \angle 4$	3. Alternate Interior Angles Theorem

2) **Given:** $a \parallel b$ and $\angle 2 \cong \angle 3$
Prove: $c \parallel d$



Statements	Reasons
1. $a \parallel b$	1. Given
2. $\angle 1$ and $\angle 2$ are supplementary	2. Consecutive Int. Ang. Theorem
3. $\angle 2 \cong \angle 3$	3. Given
4. $\angle 1$ and $\angle 3$ are supplementary	4. Substitution Property
5. $c \parallel d$	5. Consec. Int Ang. Converse

3) **Given:** $\angle 1 \cong \angle 2$ and $\angle 3 \cong \angle 4$
Prove: $\overleftrightarrow{AB} \parallel \overleftrightarrow{CD}$



Statements	Reasons
1. $\angle 1 \cong \angle 2$	1. Given
2. $\angle 2 \cong \angle 3$	2. Vertical Angles Theorem
3. $\angle 3 \cong \angle 4$	3. Given
4. $\angle 1 \cong \angle 4$	4. Transitive Property
5. $\overleftrightarrow{AB} \parallel \overleftrightarrow{CD}$	5. Alternate Interior Angles Converse