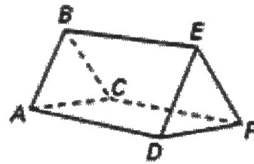


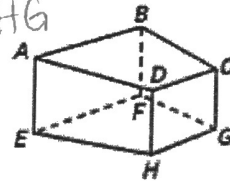
Think of each segment in the diagram as part of a line. Fill in the blank with *parallel*, *skew*, or *perpendicular*.

- 3-1
- \overline{DE} and \overline{CF} are skew.
 - \overline{AD} , \overline{BE} , and \overline{CF} are parallel.
 - Plane ABC and plane DEF are parallel.
 - \overline{BE} and \overline{AB} are perpendicular.



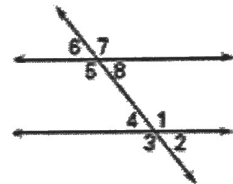
Think of each segment in the diagram as part of a line. There may be more than one right answer.

- 3-1
- Name a line perpendicular to \overline{HD} . \overline{DC} or \overline{DA} or \overline{HE} or \overline{HG}
 - Name a plane parallel to DCH . $\square ABFE$
 - Name a line parallel to \overline{BC} . \overline{DG}
 - Name a line skew to \overline{FG} . \overline{AE} or \overline{AB} or \overline{DH} or \overline{DC}



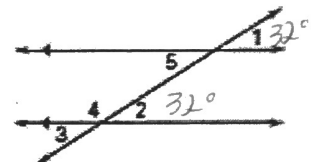
Complete the statement with *corresponding*, *alternate interior*, *alternate exterior*, or *consecutive interior*.

- 3-2
- $\angle 4$ and $\angle 8$ are alt. int. angles.
 - $\angle 2$ and $\angle 6$ are alt. ext. angles.
 - $\angle 1$ and $\angle 8$ are same-side int. angles.
 - $\angle 7$ and $\angle 2$ are none N/A angles.
 - $\angle 4$ and $\angle 5$ are same-side int. angles.
 - $\angle 5$ and $\angle 1$ are alt. int. angles.



16. Given that $m\angle 1 = 32^\circ$, find each measure. Tell which postulate or theorem you use.

- 3-2
- | | | |
|----------------|-------------------------------|---|
| a. $m\angle 2$ | <u>32°</u> | <u>corresponding with $\angle 1$</u> |
| b. $m\angle 3$ | <u>32°</u> | <u>vertical with $\angle 2$</u> |
| c. $m\angle 4$ | <u>148°</u> | <u>linear pair with $\angle 2$</u> |
| d. $m\angle 5$ | <u>32°</u> | <u>vertical with $\angle 1$</u> |

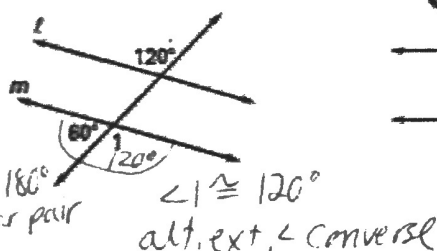


17. Use properties of parallel lines to find the value of x .

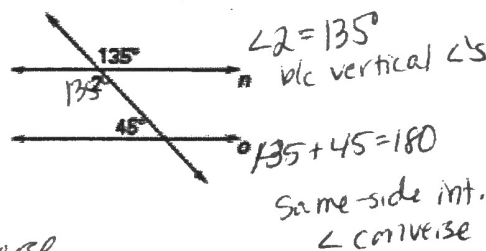
- 3-2
- a. $(9x + 7)^\circ$ and 115° are alternate exterior angles. $9x + 7 = 115$
 $9x = 108$
 $x = 12$
- b. $4x - 3 + 135 = 180$
 $4x + 132 = 180$
 $4x = 48$
 $x = 12$
- c. $(14x + 7)^\circ$ and 103° are alternate exterior angles. $14x + 7 = 103$
 $14x = 96$
 $x = 6.85$
- d. $14x + 7 + 103 = 180$
 $14x + 110 = 180$
 $14x = 70$
 $x = 5$
- $2x + 4 = 140$
 $2x = 136$
 $x = 68$

18. Prove the statement from the given information.

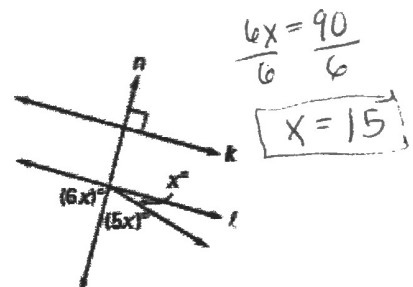
3-3 a. Prove: $l \parallel m$



b. Prove: $n \parallel o$



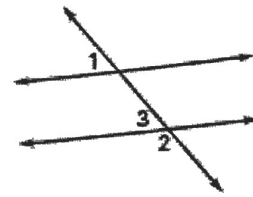
19. Explain how you would show that $k \parallel l$



20 Complete the following proof by providing the reasons.

Given: $m\angle 1 = 53^\circ$
 $m\angle 2 = 127^\circ$

Prove: $j \parallel k$



Statements

Reasons

1. $m\angle 1 = 53^\circ$
 $m\angle 2 = 127^\circ$

1. Given

2. $m\angle 3 + m\angle 2 = 180$

2. Linear pair postulate

3. $m\angle 3 + 127 = 180$
 $-127 \quad -127$

3. Substitution prop.

4. $m\angle 3 = 53$

4. Subtraction prop.

5. $m\angle 3 = m\angle 1$

5. Substitution prop.

6. $\angle 3 \cong \angle 1$

6. def. of congruent

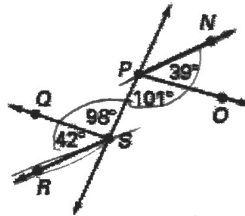
7. $j \parallel k$

7. corresponding \angle converse

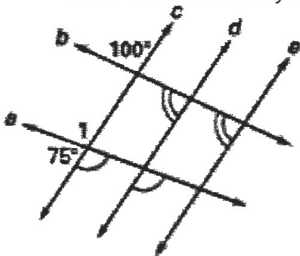
21. Determine which rays are parallel.

a. Is \overline{PN} parallel to \overline{SR} ? yes $140^\circ = 140^\circ \checkmark$

b. Is \overline{PO} parallel to \overline{SQ} ? no! $98^\circ \neq 101^\circ \times$

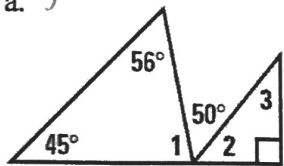


22. Determine which lines, if any must be parallel.

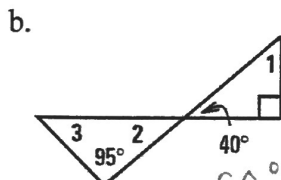


$d \parallel e$
 $c \parallel d$
 $e \parallel c$

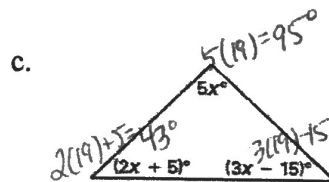
23. In the triangles below, find the missing angles.



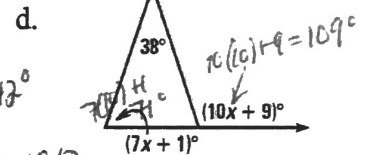
$\angle 1 = 79^\circ$
 $\angle 2 = 51^\circ$
 $\angle 3 = 39^\circ$



$\angle 1 = 60^\circ$
 $\angle 2 = 40^\circ$
 $\angle 3 = 45^\circ$

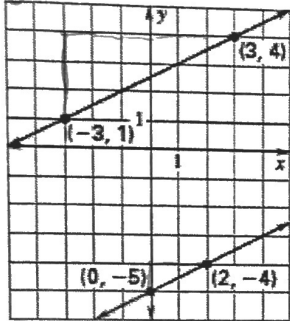


$5x + 2x + 5 + 3x - 15 = 180$
 $10x - 10 = 180$
 $+10 \quad +10$
 $10x = 190$
 $\frac{10}{10} \quad \frac{190}{10}$
 $x = 19$



$10x + 9 = 7x + 1 + 38$
 $10x + 9 = 7x + 39$
 $-7x \quad -7x$
 $3x + 9 = 39$
 $-9 \quad -9$
 $3x = 30$
 $\frac{3}{3} \quad \frac{30}{3}$
 $x = 10$

- 24 Find the slope of each line. Are the lines parallel?



$$\rightarrow m = \frac{3}{6} = \frac{1}{2}$$

$$\rightarrow m = \frac{1}{2}$$

yes ; the slopes are the same!

- 25 Write an equation of the line that passes through the given point P and is parallel to the line with the given equation.

a. $P(10, 3)$, $y = x - 12$

$$m = 1 \parallel \leftarrow m = 1$$

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

$$y - 3 = 1(x - 10)$$

$$y - 3 = x - 10$$

$$y = x - 7$$

b. $P(-1, 2)$, $y = \frac{2}{3}x - 2$

$$m = \frac{2}{3} \parallel \leftarrow m = \frac{2}{3}$$

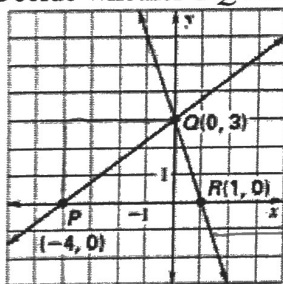
$$y - y_1 = m(x - x_1)$$

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

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

$$y = \frac{2}{3}x + \frac{8}{3}$$

- 26 Decide whether \overline{PQ} and \overline{QR} are perpendicular.



$$\rightarrow m = \frac{3}{4}$$

$$\rightarrow m = \frac{-3}{1}$$

no

- 27 Decide whether the lines are perpendicular

Line l: $2x - 3y = -4$

Line k: $3x + 2y = 3$

$$\begin{aligned} -3y &= -2x - 4 \\ \frac{-3y}{-3} &= \frac{-2x}{-3} - \frac{4}{-3} \end{aligned}$$

$$\begin{aligned} 2y &= -3x + 3 \\ \frac{2y}{2} &= \frac{-3x}{2} + \frac{3}{2} \end{aligned}$$

$$y = \frac{2}{3}x + \frac{4}{3}$$

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

$$m = \frac{2}{3}$$

$$m = -\frac{3}{2}$$

yes! slopes are opp. reciprocals!

- 28 Line j is perpendicular to the line with the given equation and line j passes through P . Write an equation of line j .

a. $7y = -4x + 13$, $P(-2, 6)$

$$m = -\frac{4}{7} \rightarrow \perp \quad m = \frac{7}{4}$$

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

$$y - 6 = \frac{7}{4}(x + 2)$$

$$y - 6 = \frac{7}{4}x + \frac{14}{4}$$

$$y - 6 = \frac{7}{4}x + \frac{14}{4}$$

$$y = \frac{7}{4}x + \frac{38}{4} \text{ or } y = \frac{7}{4}x + \frac{17}{2}$$

b. $y = -\frac{1}{5}x + \frac{6}{5}$, $P(-1, 2)$

$$m = -\frac{1}{5} \rightarrow \perp \quad m = \frac{5}{1}$$

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

$$y - 2 = 5(x + 1)$$

$$y - 2 = 5x + 5$$

$$y = 5x + 7$$

- 29 In the figure, $\angle 5$ is complementary to $\angle 12$, and $m\angle 9 = 148^\circ$. Find the measure of each numbered angle in the figure.

$$m\angle 5 = 58^\circ$$

$$m\angle 6 = 122^\circ$$

$$m\angle 7 = 58^\circ$$

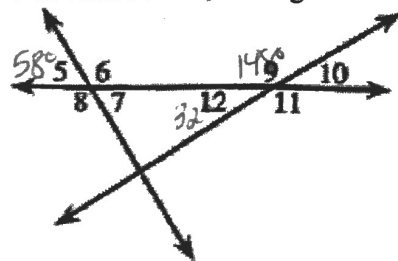
$$m\angle 8 = 122^\circ$$

$$m\angle 9 = 148^\circ$$

$$m\angle 10 = 32^\circ$$

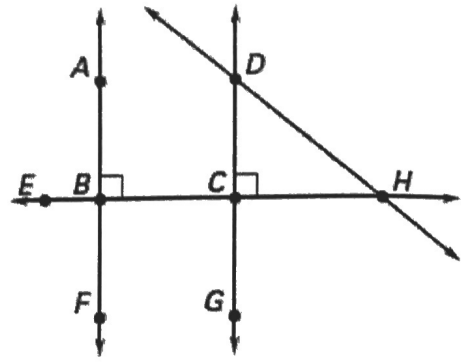
$$m\angle 11 = 148^\circ$$

$$m\angle 12 = 32^\circ$$



Use the figure to determine whether each statement is true or false.

- 30) $\angle DCB$ and $\angle DCH$ are supplementary. True
 31) $\overline{DH} \perp \overline{EH}$ False
 32) $\overline{HE} \perp \overline{AF}$ True
 33) $\angle DCB$ and $\angle ABC$ are complementary. False



34) Given: $a \parallel b, c \parallel d$

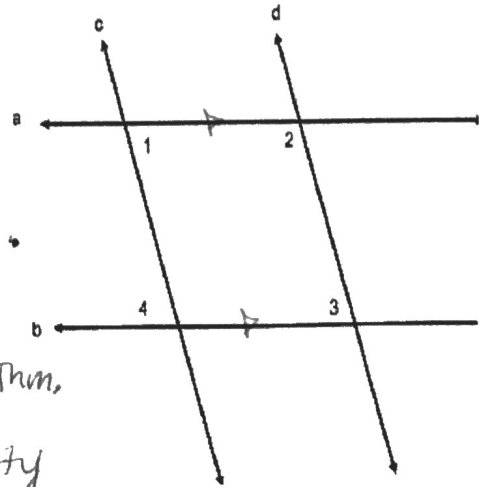
Prove: $\angle 1 \cong \angle 3$

Statements

1. $a \parallel b$
2. $\angle 1 \cong \angle 4$
3. $c \parallel d$
4. $\angle 4 \cong \angle 3$
5. $\angle 1 \cong \angle 3$

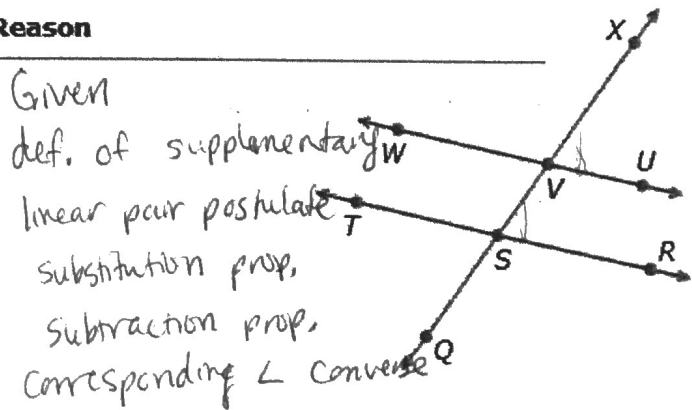
Reasons

1. given
2. alt. int. \angle Thm.
3. given
4. corresponding \angle Thm.
5. transitive property



35) $\angle QSR$ and $\angle UVX$ are supplementary. Complete the proof that $\overline{RT} \parallel \overline{UW}$.

Statement	Reason
1 $\angle QSR$ and $\angle UVX$ are supplementary	Given
2 $m\angle QSR + m\angle UVX = 180^\circ$	def. of supplementary
3 $m\angle QSR + m\angle RSV = 180^\circ$	linear pair postulate
4 $m\angle QSR + m\angle UVX = m\angle QSR + m\angle RSV$	substitution prop.
5 $m\angle UVX = m\angle RSV$	subtraction prop.
6 $\overline{RT} \parallel \overline{UW}$	Corresponding \angle converse



36) . GIVEN: $g \parallel h, \angle 1$ and $\angle 4$ are supplementary
 PROVE: $p \parallel r$

Statements

- $g \parallel h$
 $\angle 1 + \angle 4$ are supplementary
 $\angle 1 \cong \angle 2$
 $m\angle 2 + m\angle 3 = 180$
 $m\angle 1 + m\angle 3 = 180$
 $m\angle 1 + m\angle 4 = 180$
 $m\angle 3 \cong m\angle 4$
 $p \parallel r$

Reasons

- Given
 Given
 alt. int. \angle Thm.
 linear pair postulate
 substitution prop.
 def. of supplementary
 congruent supplements
 alt. int. \angle converse

