

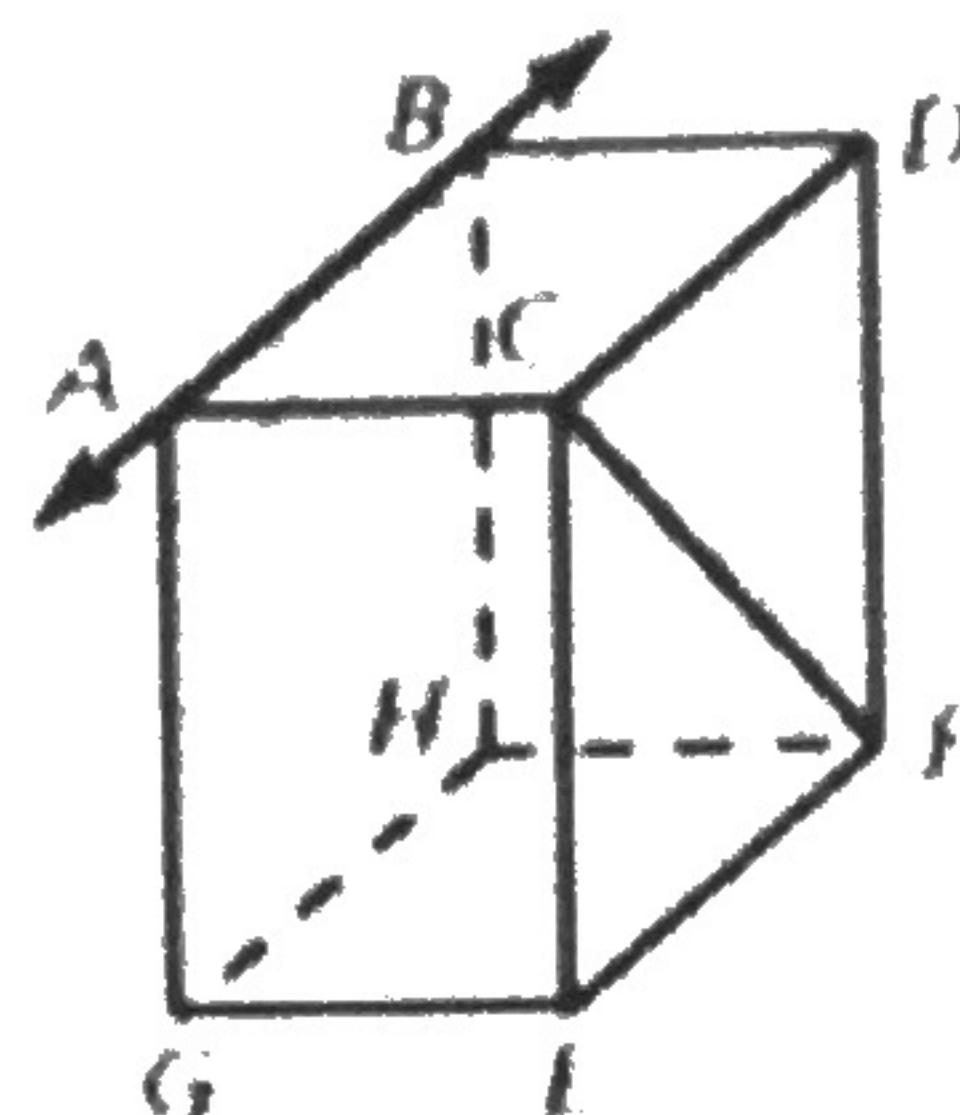
Unit 3: Parallel and Perpendicular Lines Study Guide

3.1 Pairs of Lines and Angles

Think of each segment in the figure as a line.

1. Which line(s) appear perpendicular to \overleftrightarrow{AB} ?

\overleftrightarrow{AG} , \overleftrightarrow{AC} , \overleftrightarrow{BD}



2. Which line(s) appear parallel to \overleftrightarrow{AB} ?

\overleftrightarrow{CD} , \overleftrightarrow{EF} , \overleftrightarrow{GH}

3. Which line(s) appear skew to \overleftrightarrow{AB} ?

\overleftrightarrow{CF} , \overleftrightarrow{DF} , \overleftrightarrow{CE} , \overleftrightarrow{FH} , \overleftrightarrow{GE}

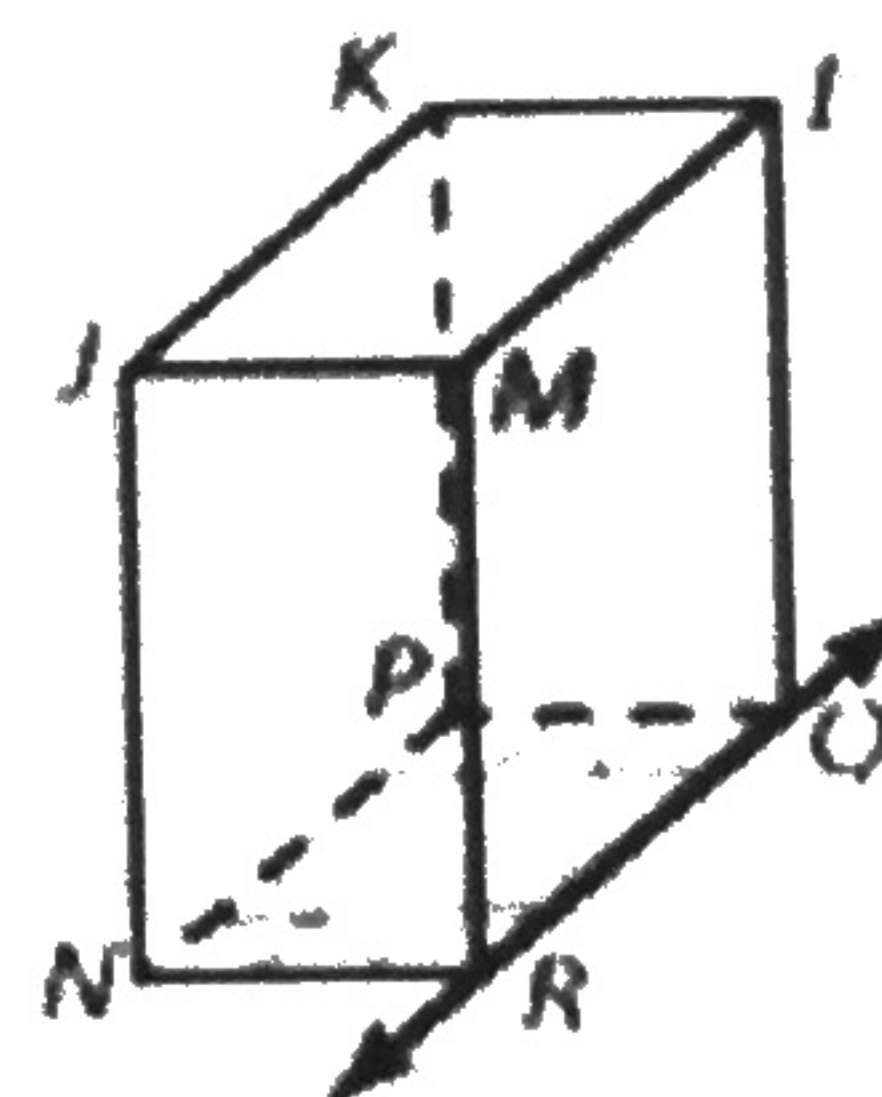
4. Which plane(s) appear parallel to plane ABC?

plane GHF

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

5. line(s) perpendicular to \overleftrightarrow{QR}

\overleftrightarrow{RN} , \overleftrightarrow{PQ}



6. line(s) parallel to \overleftrightarrow{QR}

\overleftrightarrow{LM} , \overleftrightarrow{JK} , \overleftrightarrow{PN}

7. line(s) skew to \overleftrightarrow{QR}

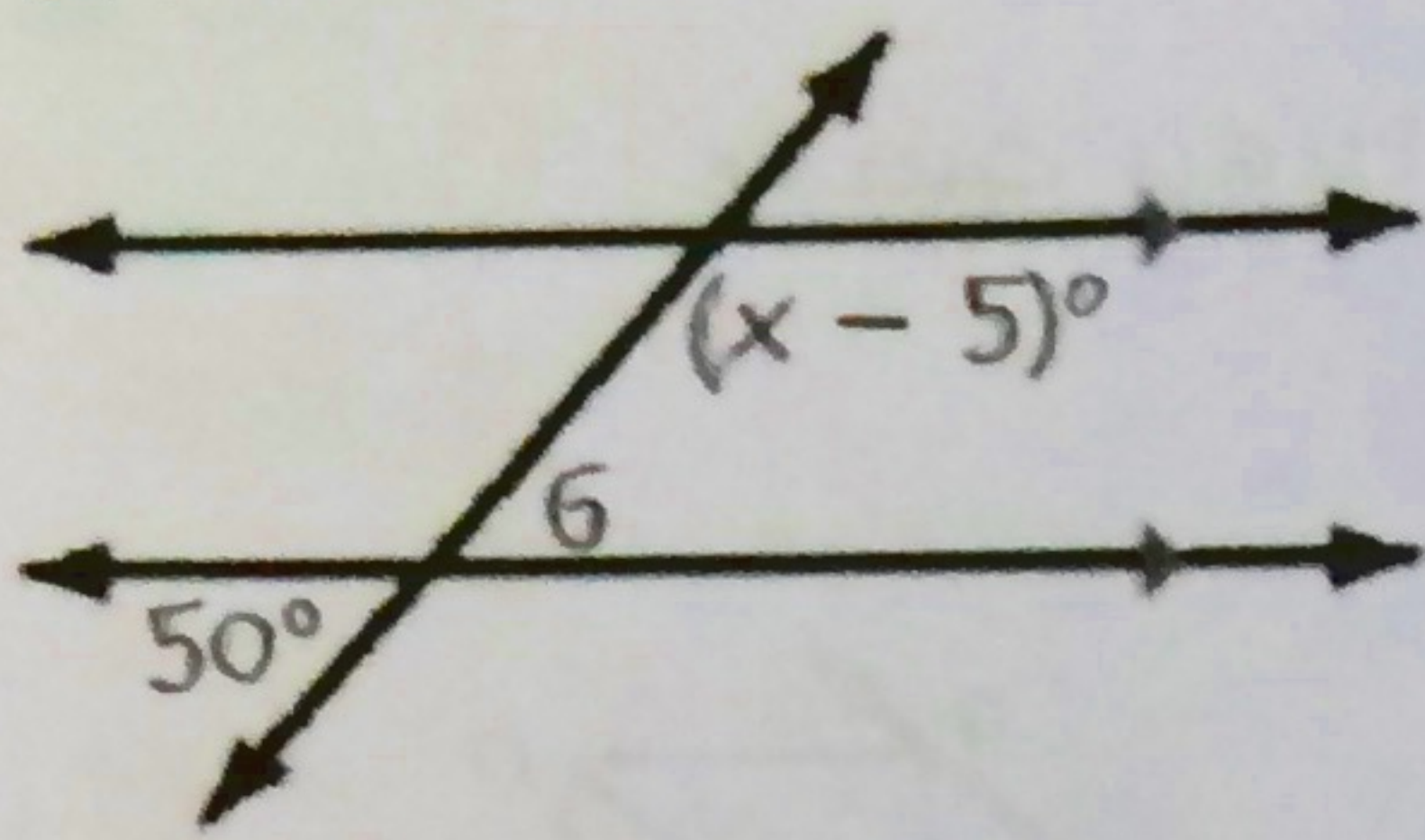
\overleftrightarrow{JN} , \overleftrightarrow{KP} , \overleftrightarrow{KL} , \overleftrightarrow{JM}

8. plane(s) parallel to plane LMQ

plane KJN

3.2 Parallel Lines and Transversals

9. Find the value of x .



$$m\angle b = 50^\circ$$

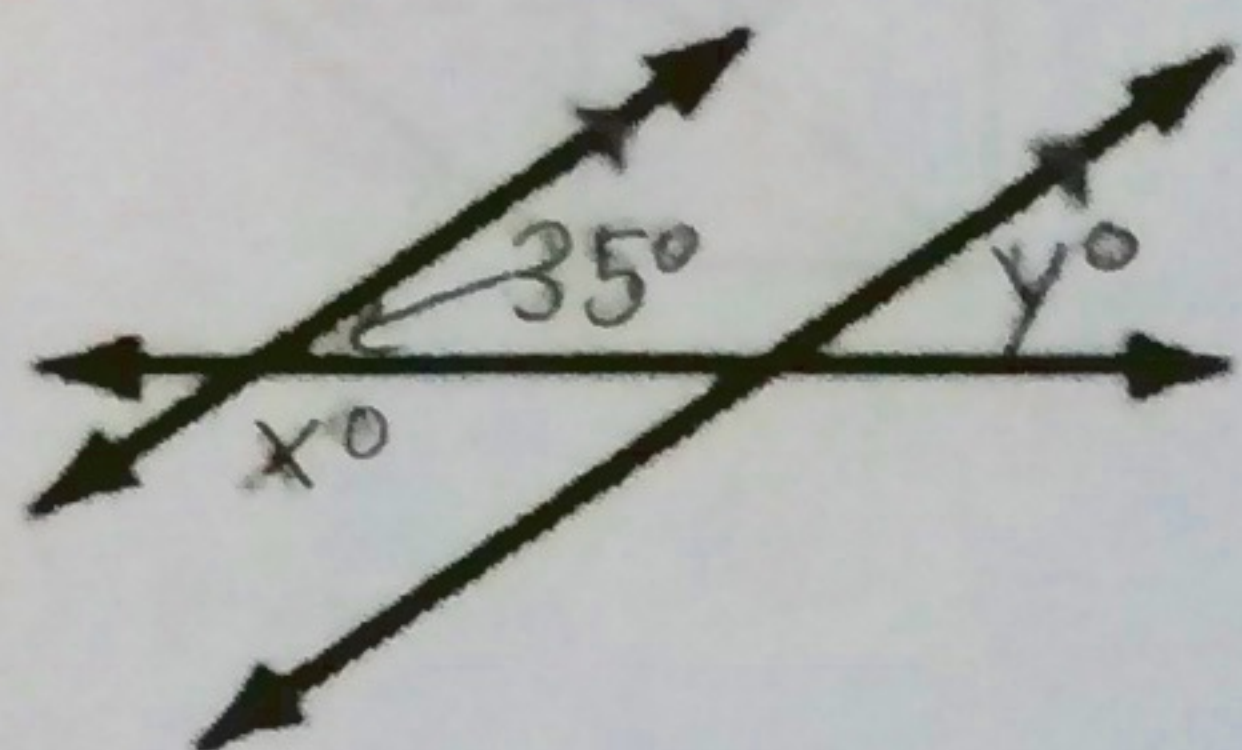
$$x - 5 + 50 = 180^\circ$$

$$x + 45 = 180^\circ$$

$$\boxed{x = 135^\circ}$$

Find the values of x and y .

10.

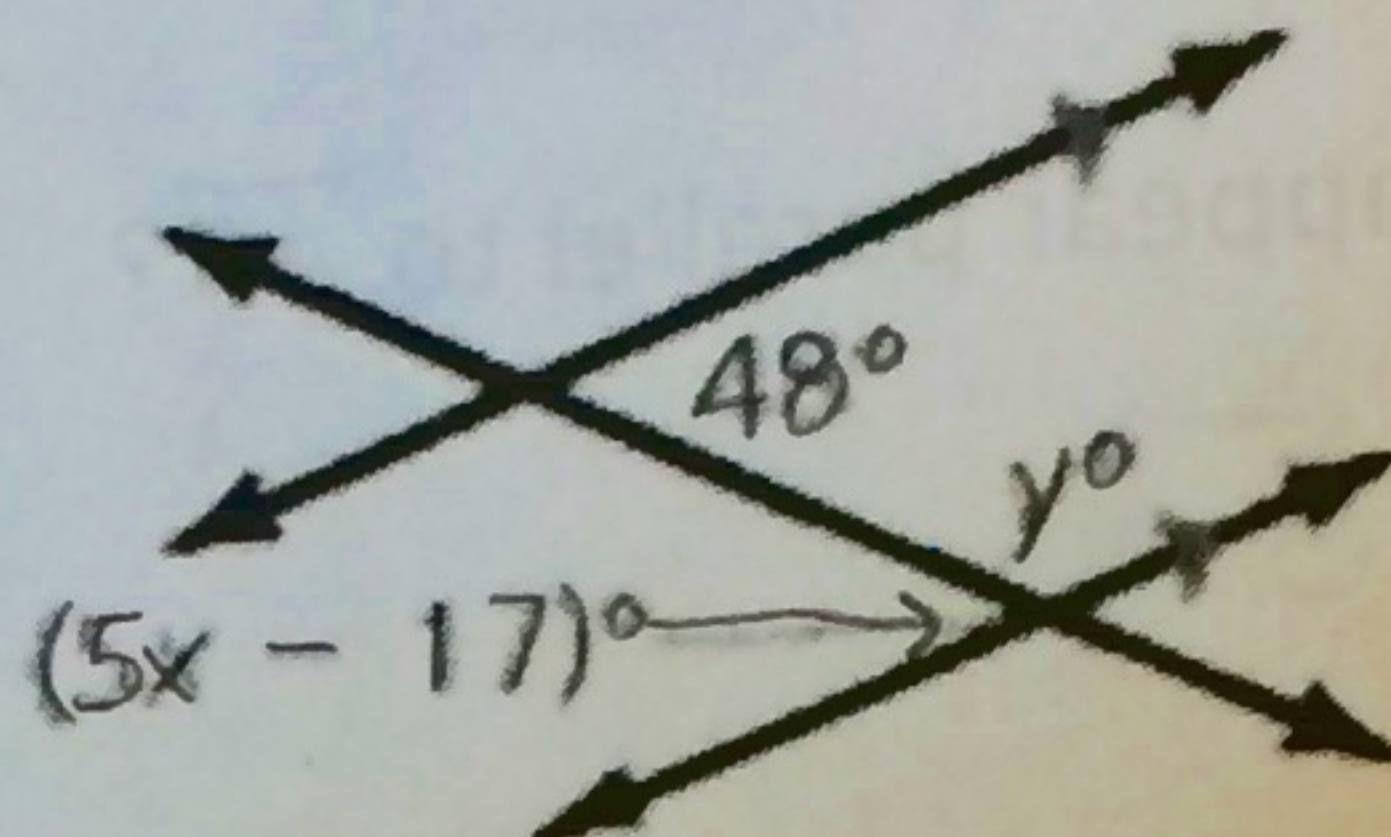


$$x + 35 = 180$$

$$\boxed{x = 145^\circ}$$

$$\boxed{y = 35^\circ}$$

11.



$$y + 48 = 180$$

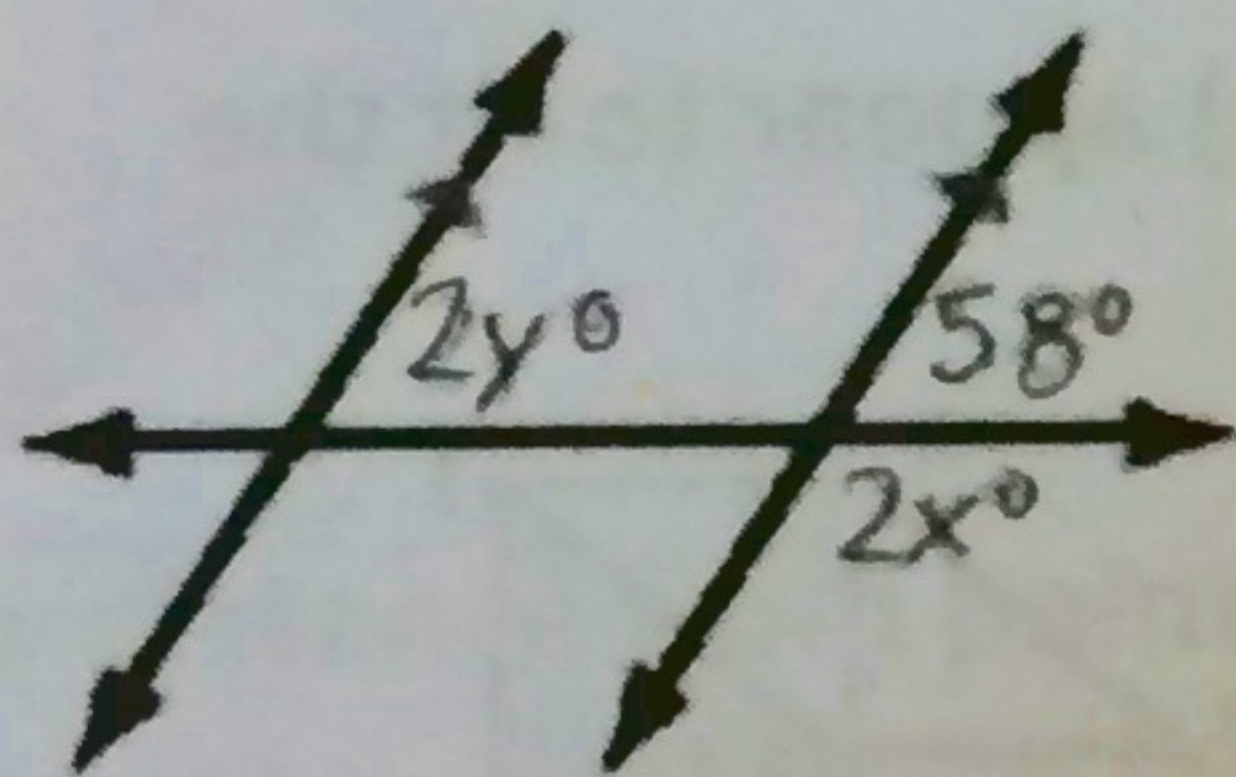
$$\boxed{y = 132^\circ}$$

$$5x - 17 = 48$$

$$5x = 65$$

$$\boxed{x = 13^\circ}$$

12.



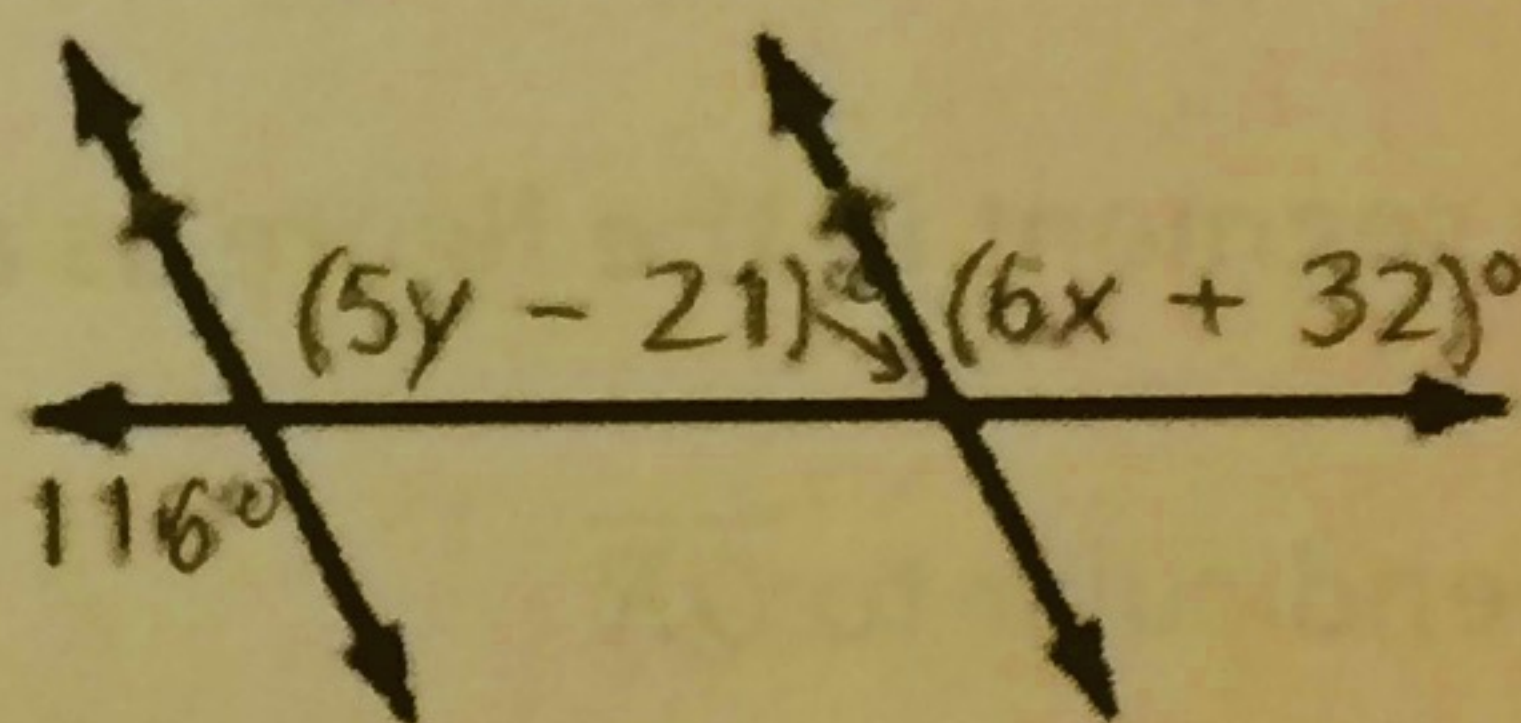
$$2x + 58 = 180$$

$$2y = 58$$

$$2x = 122$$

$$\boxed{x = 61^\circ}$$

13.



$$6x + 32 = 116$$

$$6x = 84$$

$$\boxed{x = 14^\circ}$$

$$5y - 21 + 116 = 180$$

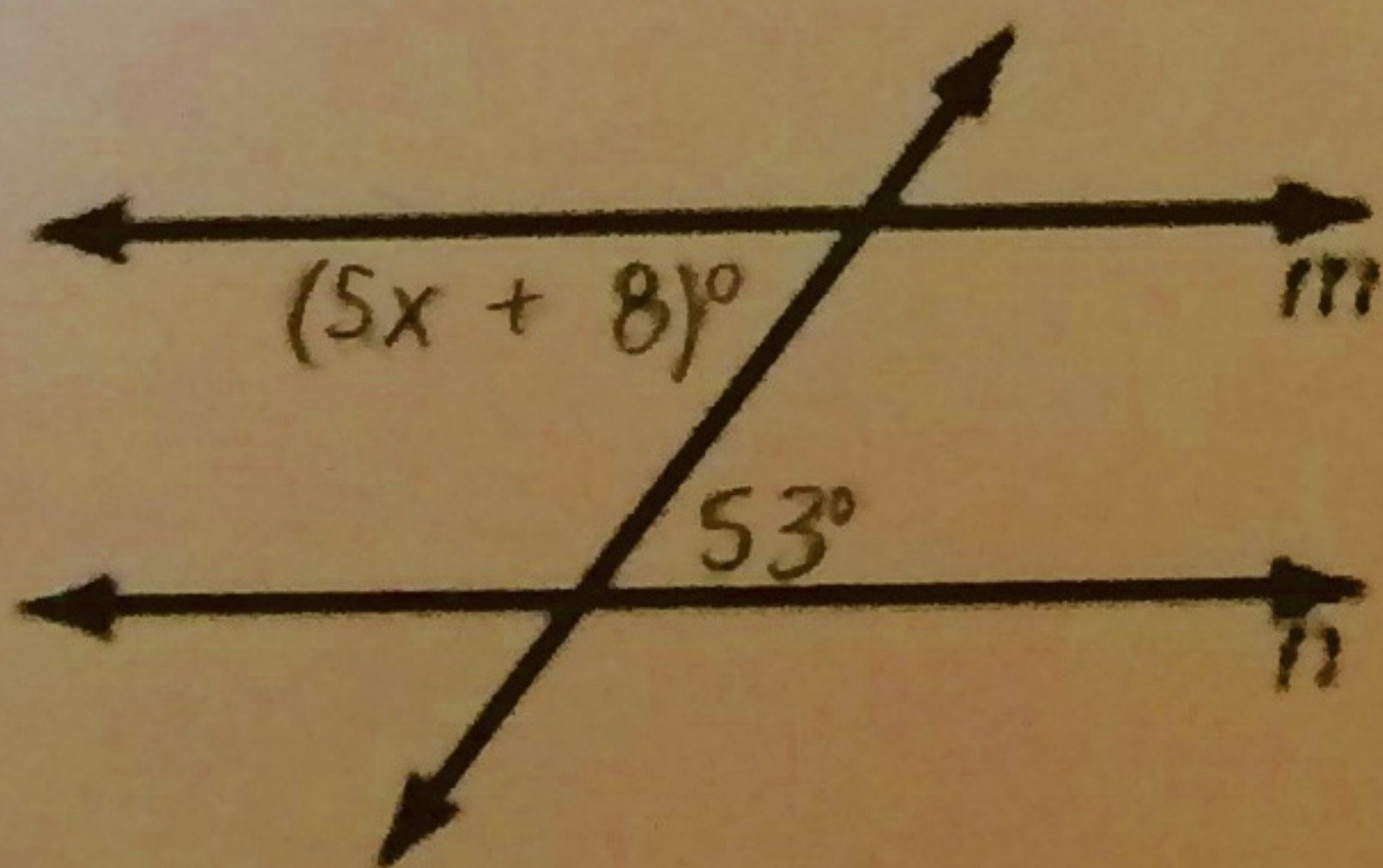
$$5y + 95 = 180$$

$$5y = 85$$

$$\boxed{y = 17^\circ}$$

3.3 Proofs with Parallel Lines

14. Find the value of x that makes $m \parallel n$.



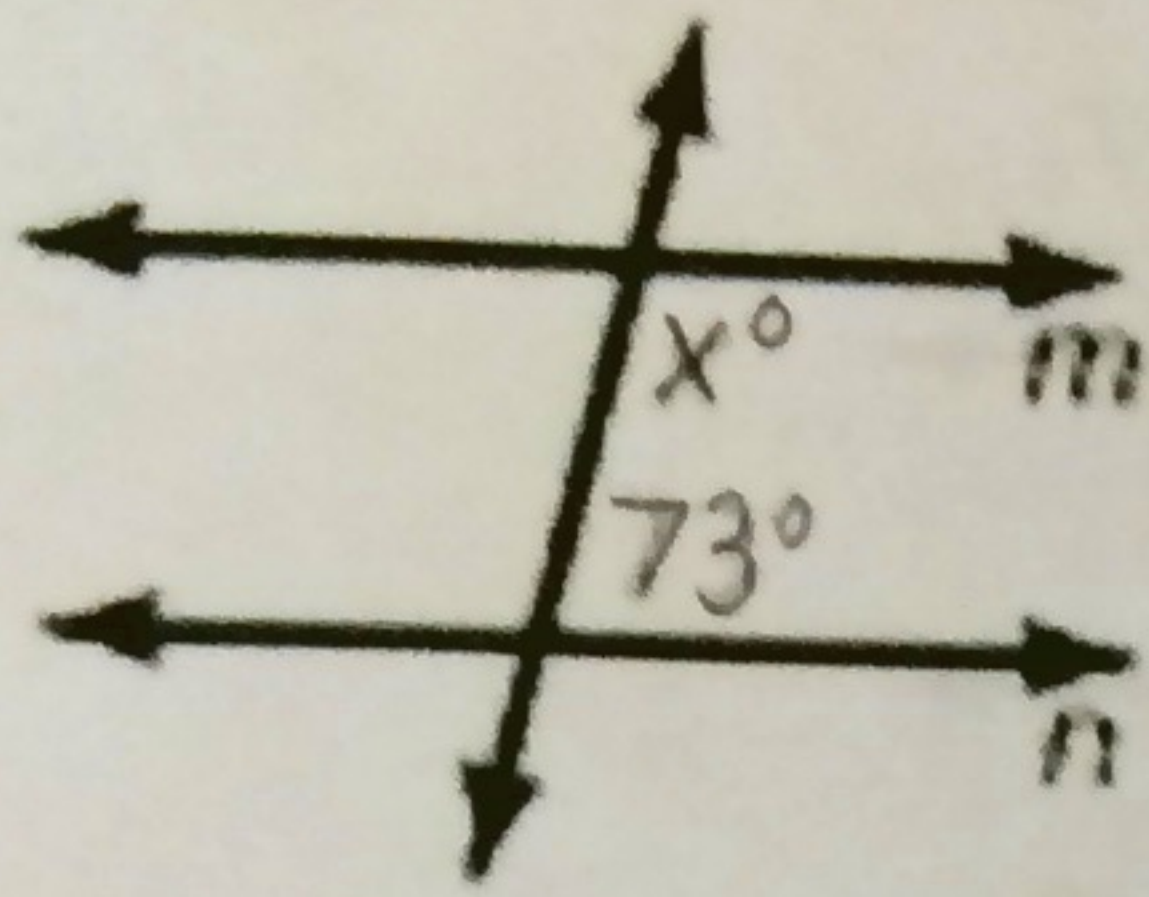
$$5x + 8 = 53$$

$$5x = 45$$

$$\boxed{x = 9^\circ}$$

Find the value of x that makes $m \parallel n$.

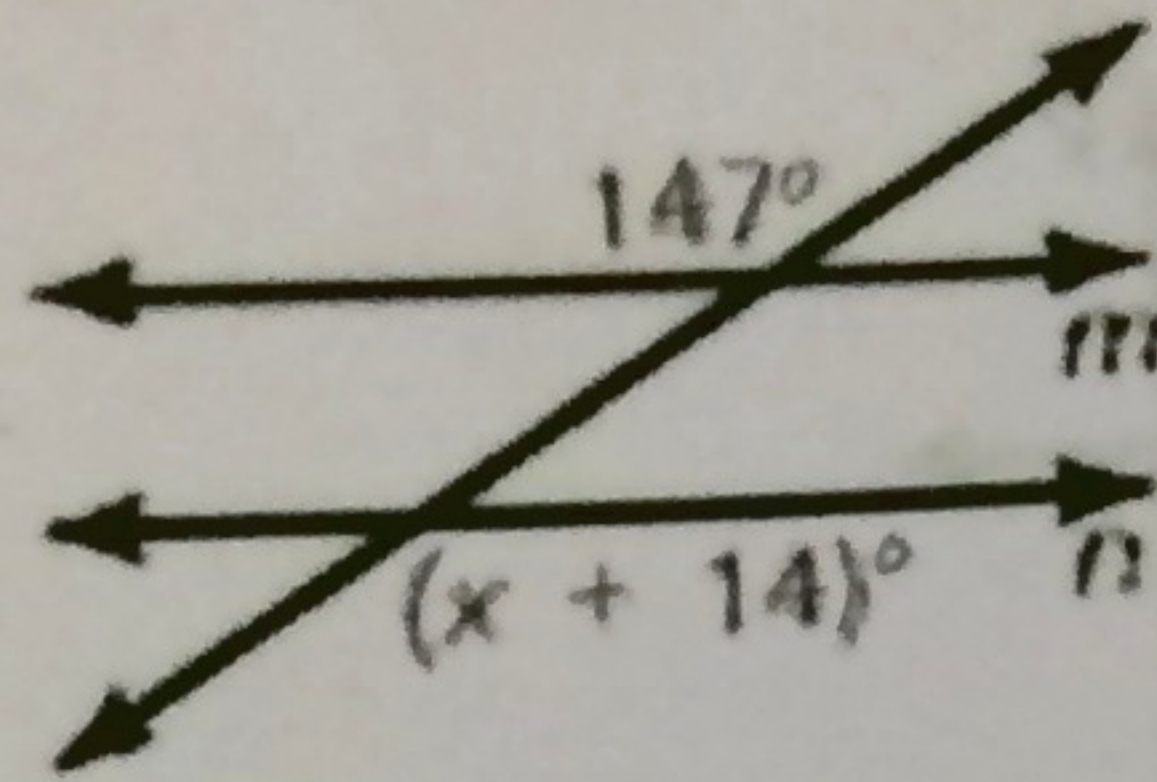
15.



$$x + 73 = 180$$

$$x = 107^\circ$$

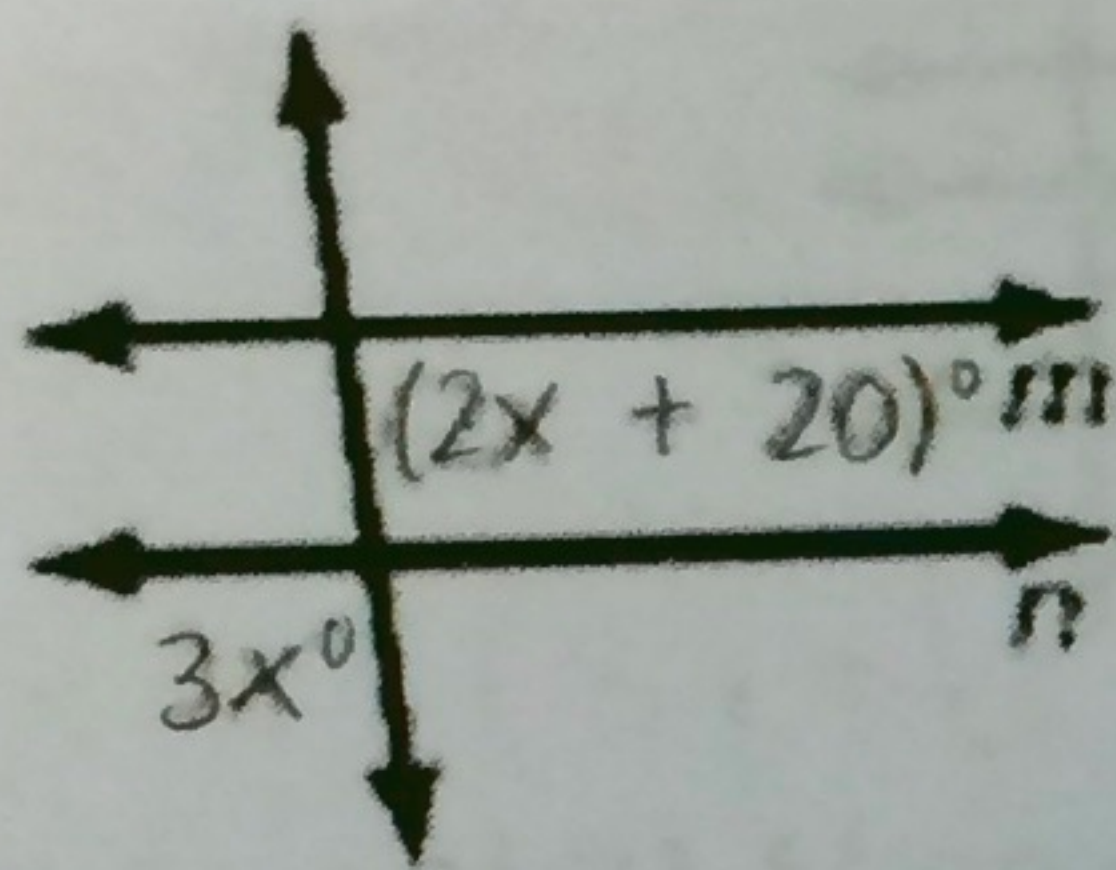
16.



$$x + 14 = 147$$

$$x = 133^\circ$$

17.



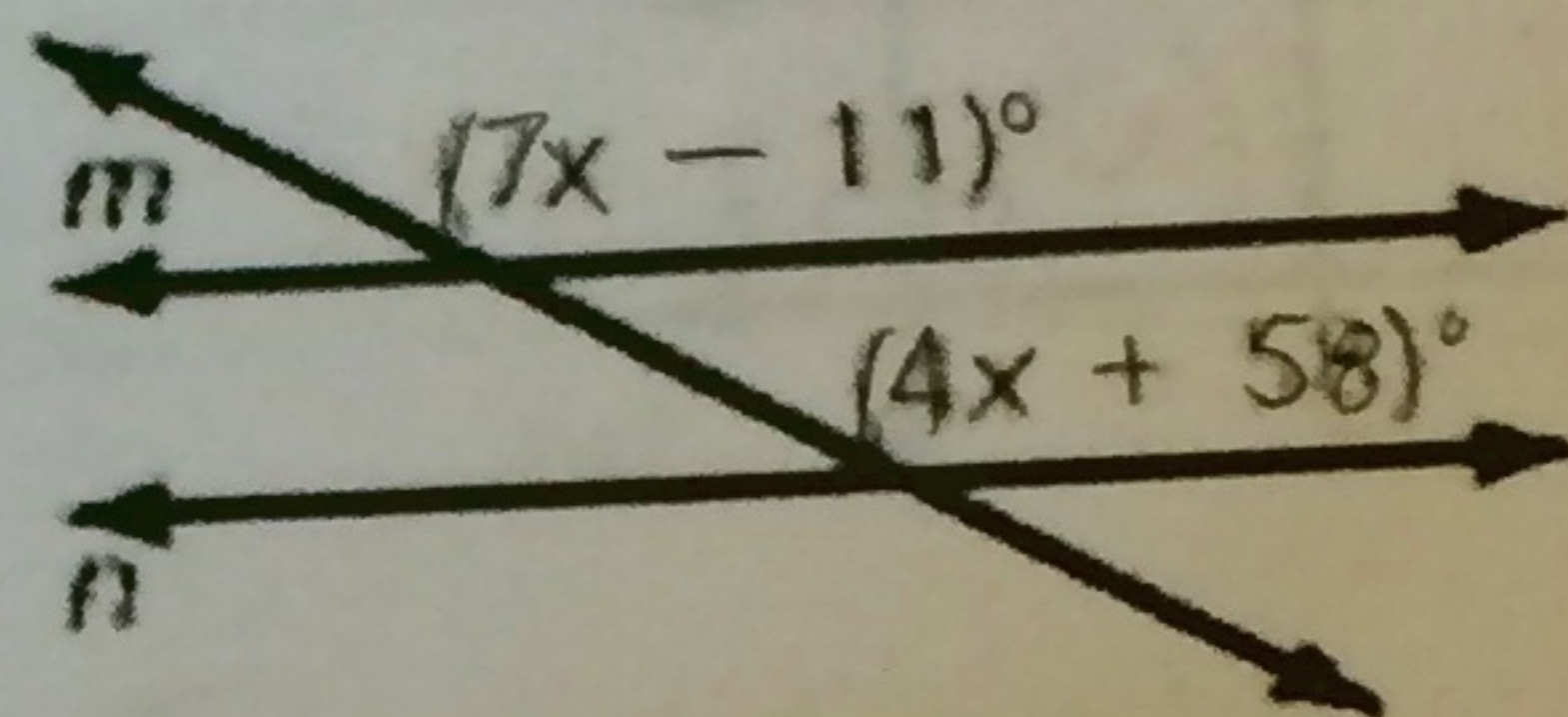
$$2x + 20 + 3x = 180$$

$$5x + 20 = 180$$

$$5x = 160$$

$$x = 22^\circ$$

18.



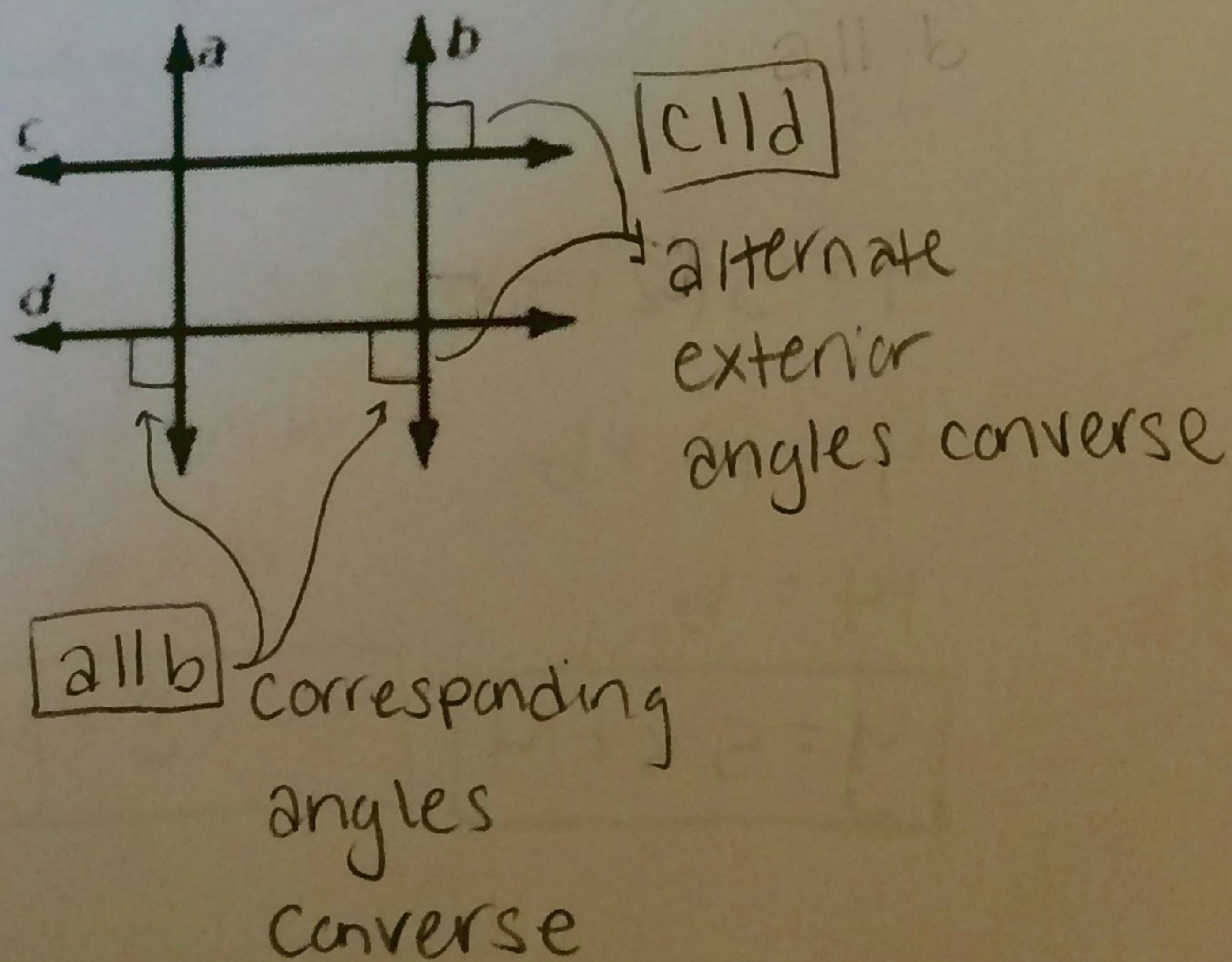
$$7x - 11 = 4x + 58$$

$$3x = 69$$

$$x = 23^\circ$$

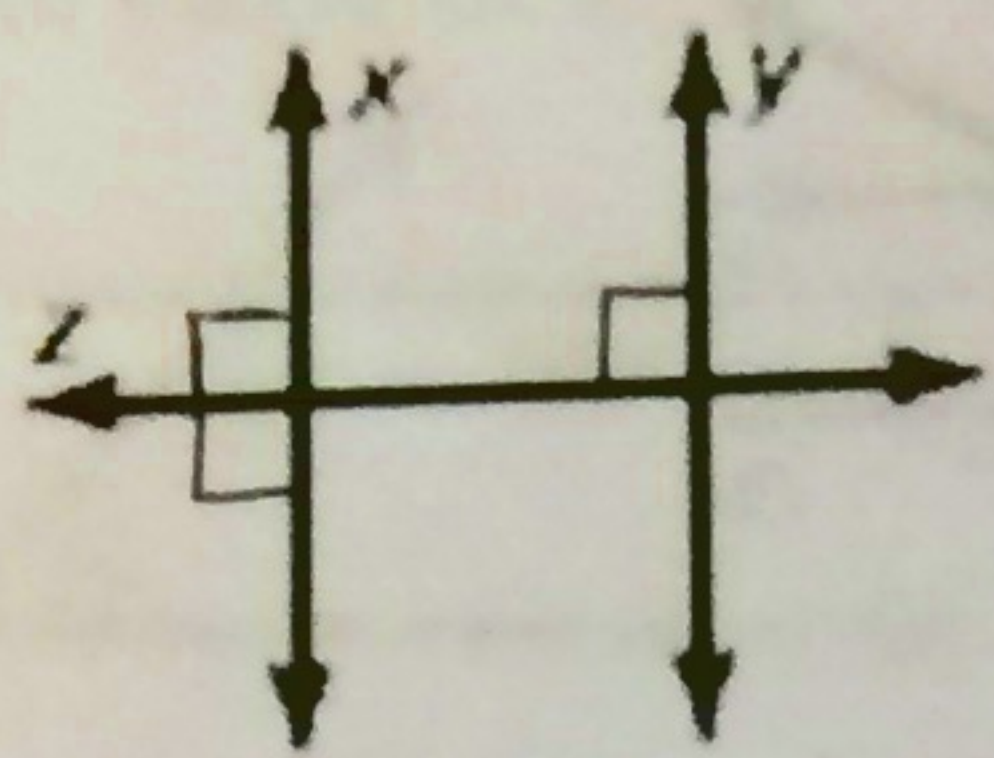
3.4 Proofs with Perpendicular Lines

19. Determine which lines, if any, must be parallel. Explain your reasoning.



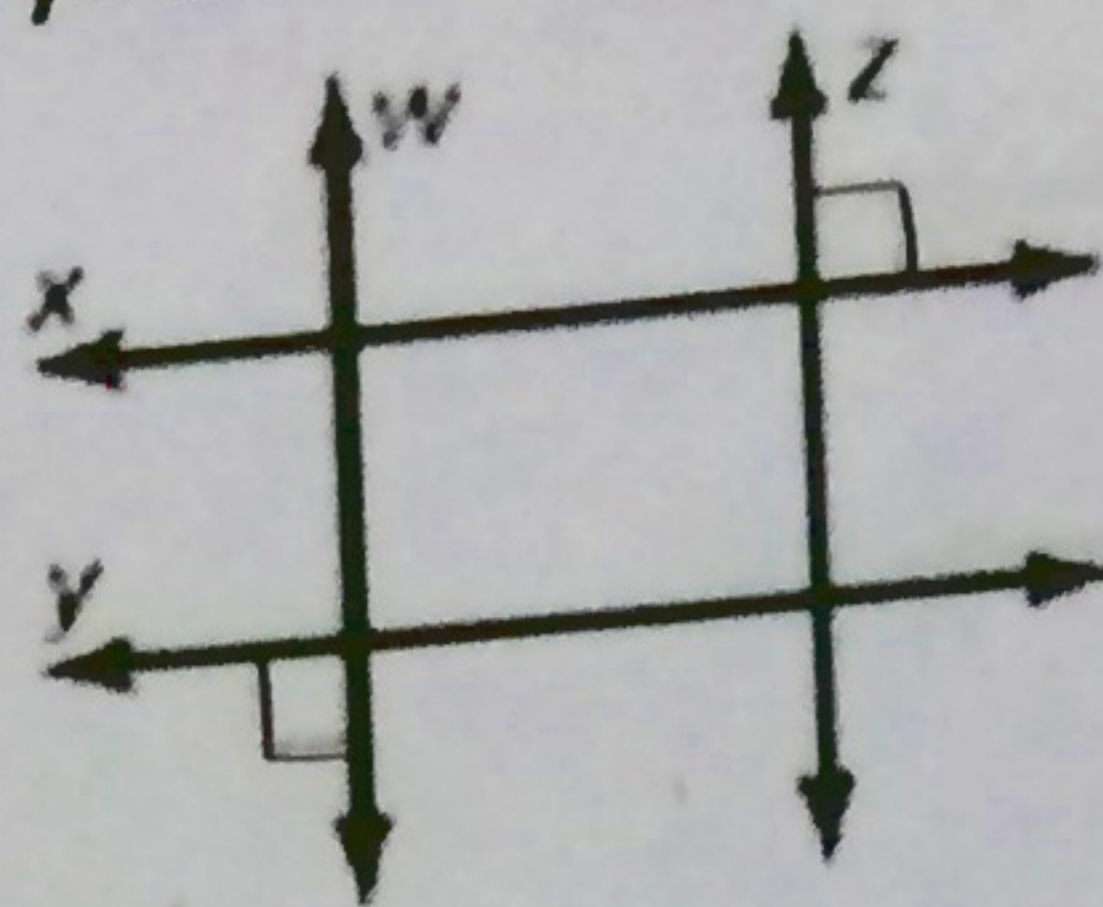
Determine which lines, if any, must be parallel. Explain your reasoning.

20.



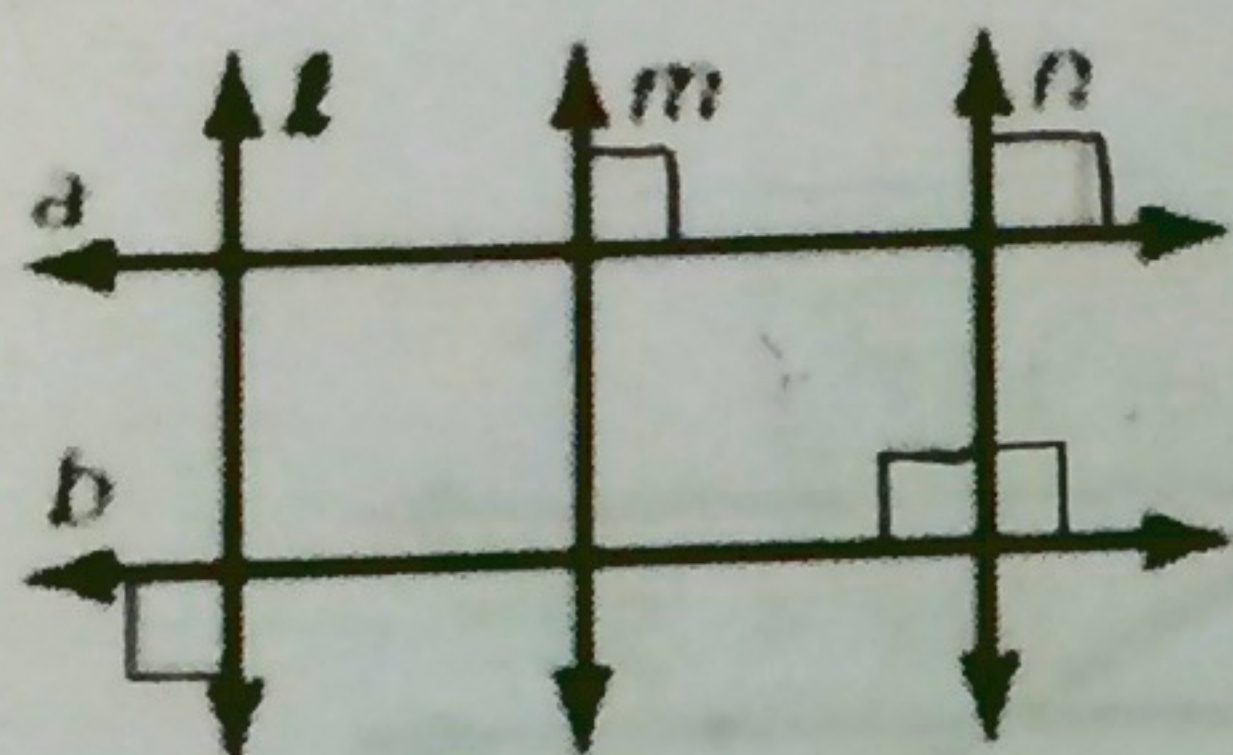
$x \parallel y$ corresponding angles converse

21.



none

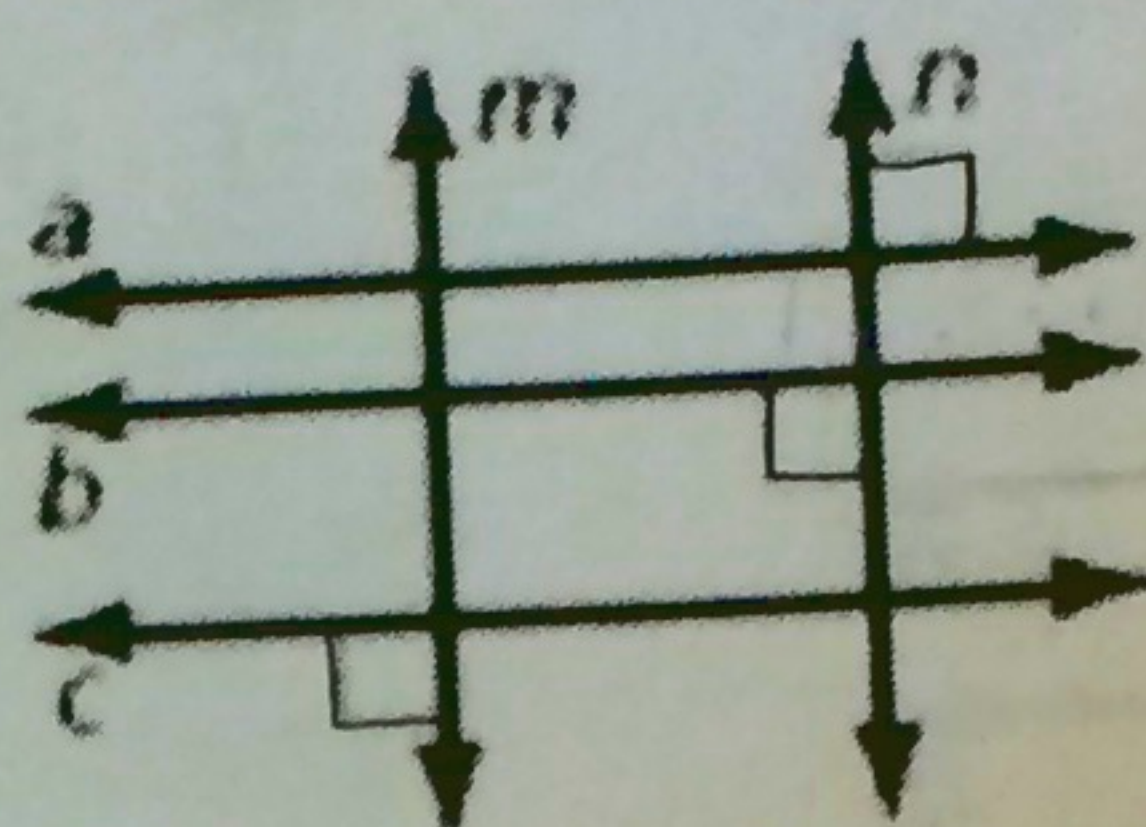
22.



$m \parallel n$ corresponding angles converse

$a \parallel b$ corresponding angles converse

23.



$a \parallel b$ alternate exterior converse

3.5 Equations of Parallel and Perpendicular Lines (not on test)

24. Write an equation of the line passing through the point $(-2, 4)$ that is parallel to the line $y = 5x - 7$.
Same slope

Slope of parallel line: $m = 5$

equation: $y - 4 = 5(x + 2)$

OR

$$4 = 5(-2) + b$$

$$4 = -10 + b$$

$$14 = b$$

$$y = 5x + 14$$

25. Write an equation of the line passing through the point (6,1) that is perpendicular to the line $3x + y = 9$. $y = -3x + 9$ ↳ negative reciprocal slope

Slope of perpendicular line: $m = \frac{1}{3}$

Equation: $y - 1 = \frac{1}{3}(x - 6)$ OR

$1 = \frac{1}{3}(6) + b$

$1 = 2 + b$

$-1 = b$

$y = \frac{1}{3}x - 1$

Write an equation of the line passing through the given point that is parallel to the given line.

26. A(3, -4), $y = -x + 8$

$m = -1$

$y + 4 = -(x - 3)$

OR

$-4 = -(3) + b$

$-4 = -3 + b$

$-1 = b$

$y = -x - 1$

28. A(2,0), $y = 3x - 5$

$m = 3$

$y - 0 = 3(x - 2)$

OR

$0 = 3(2) + b$

$0 = 6 + b$

$-6 = b$

$y = 3x - 6$

27. A(-6,5), $y = \frac{1}{2}x - 7$ ↳ same slope

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

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

OR

$5 = \frac{1}{2}(-6) + b$

$5 = -3 + b$

$8 = b$

$y = \frac{1}{2}x + 8$

29. A(3, -1), $y = \frac{1}{7}x + 4$

$m = \frac{1}{7}$

$y + 1 = \frac{1}{7}(x - 3)$

OR

$-1 = \frac{1}{7}(3) + b$

$-1 = \frac{3}{7} + b$

$-1\frac{3}{7} = b$

$y = \frac{1}{7}x - 1\frac{3}{7}$

Write an equation of the line passing through the given point that is perpendicular to the given line. negative reciprocal slope

30. $A(6, -1), y = -2x + 8$

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

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

OR

$$-1 = \frac{1}{2}(6) + b$$

$$-1 = 3 + b$$

$$-4 = b$$

$$\boxed{y = \frac{1}{2}x - 4}$$

32. $A(8, 2), y = 4x - 7$

$$m = -\frac{1}{4}$$

$$\boxed{y - 2 = -\frac{1}{4}(x - 8)}$$

OR

$$2 = -\frac{1}{4}(8) + b$$

$$2 = -2 + b$$

$$4 = b$$

$$\boxed{y = -\frac{1}{4}x + 4}$$

Find the distance from point A to the given line.

34. $A(2, -1), y = -x + 4$

31. $A(0, 3), y = -\frac{1}{2}x - 6$

$$m = 2$$

$$\boxed{y - 3 = 2(x - 0)}$$

OR

$$3 = 2(0) + b$$

$$3 = b$$

$$\boxed{y = 2x + 3}$$

33. $A(-1, 5), y = \frac{1}{7}x + 4$

$$m = -7$$

$$\boxed{y - 5 = -7(x + 1)}$$

OR

$$5 = -7(-1) + b$$

$$5 = 7 + b$$

$$-2 = b$$

$$\boxed{y = -7x - 2}$$

35. $A(-2, 3), y = \frac{1}{2}x + 1$