Unit 6: Distance & slope Name: SOLUTIONS
12 December 2019

6.12b Exam: Graphing, perpendicular and parallel slopes

1. Graph and label the two equations. Mark their intersection as an ordered pair.

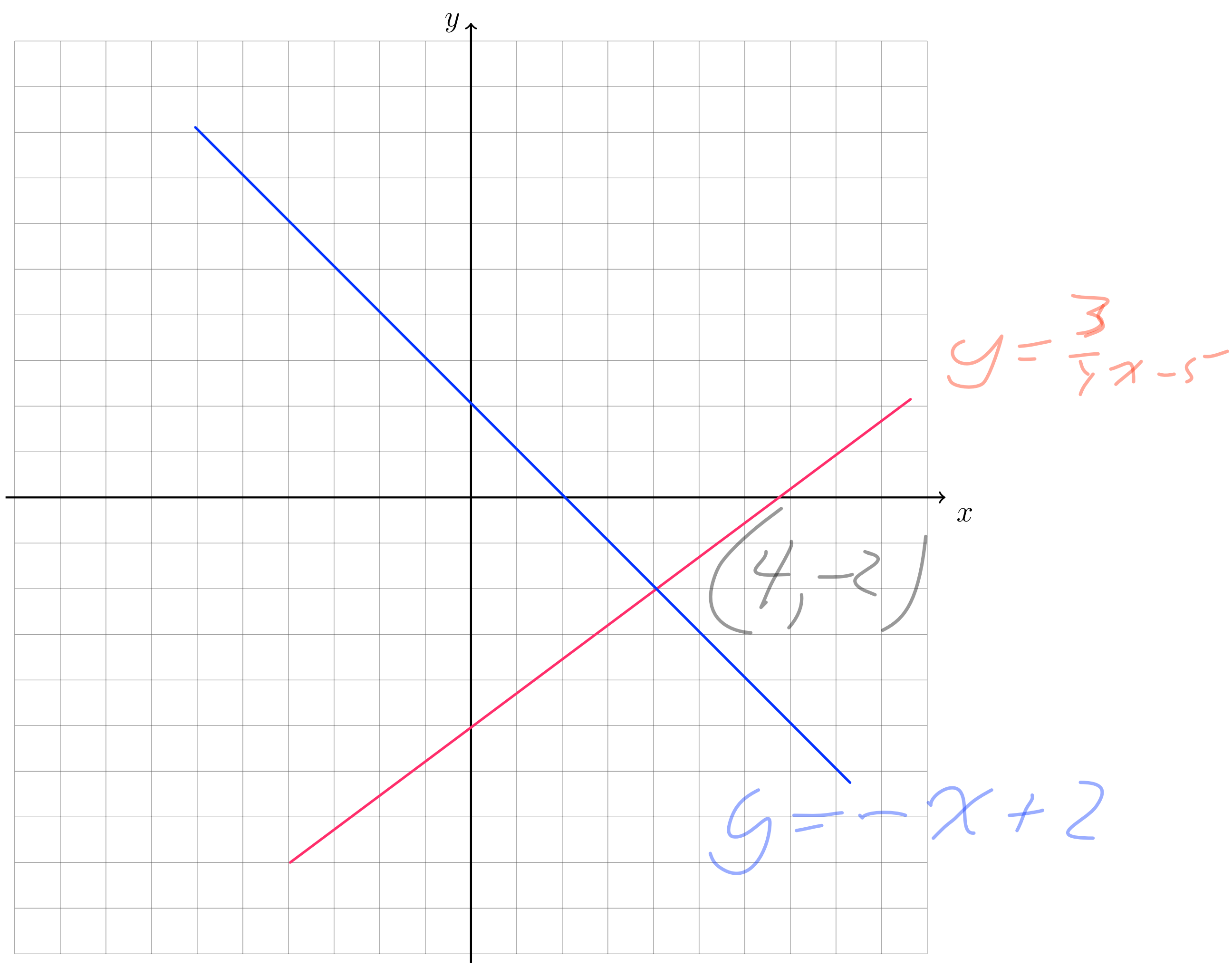
$y = \frac{3}{4}x - 5$ $\qquad\qquad$ $y = -x + 2$

Write down the slopes of the two lines.

$m_1 =$ 3/4 $\qquad\qquad$ $m_2 =$ −1

Are the lines parallel, perpendicular, or neither? Justify your answer using the slopes.

Neither. The slopes are not equal. Nor are they negative reciprocals.
3/4 not equal -1 and 3/4 * (-1) not equal -1



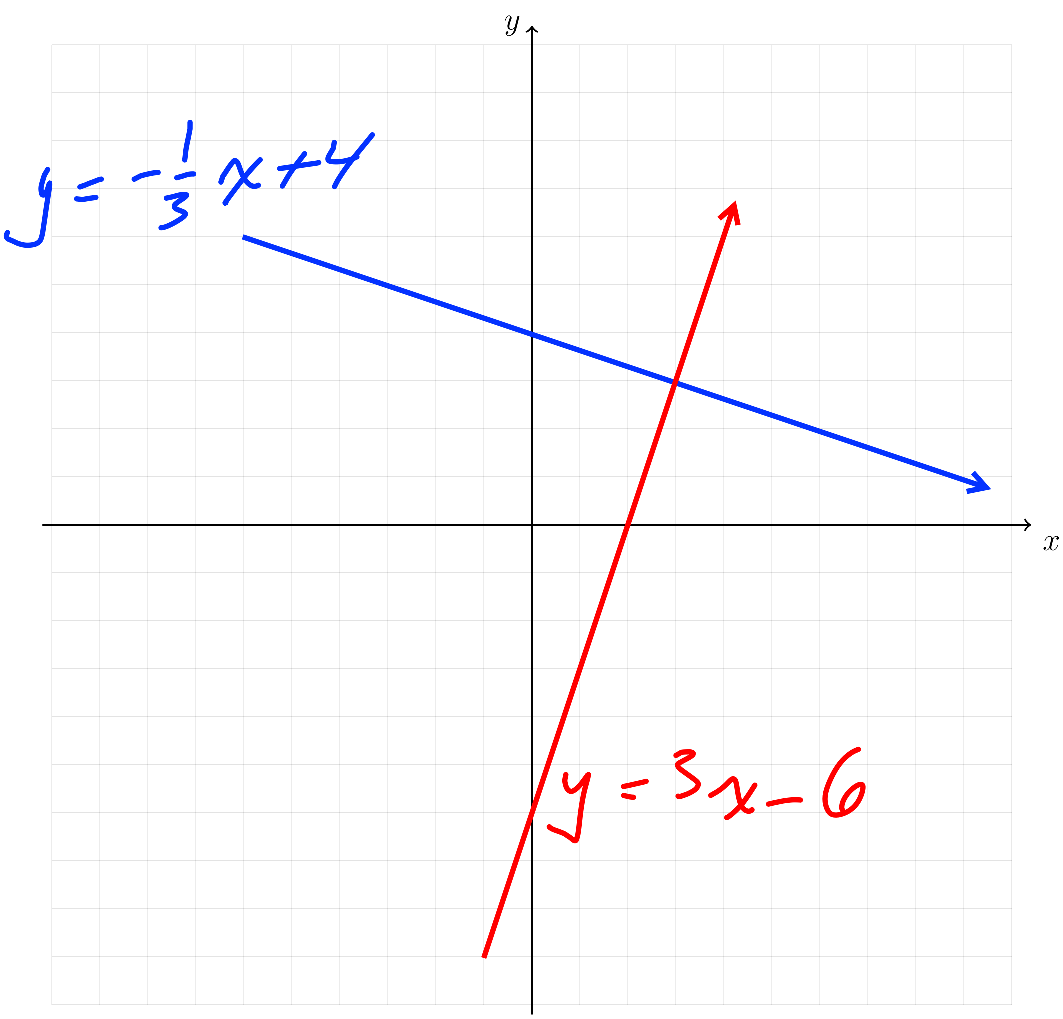
2. Graph and label the two equations. Mark their intersection as an ordered pair.

$y = -\frac{1}{3}x + 4$

$y = 3x - 6$

Are the lines parallel, perpendicular, or neither? Justify your answer using the slopes.

Perpendicular. Slopes are negative reciprocals. $-\frac{1}{3} \times 3 = -1$



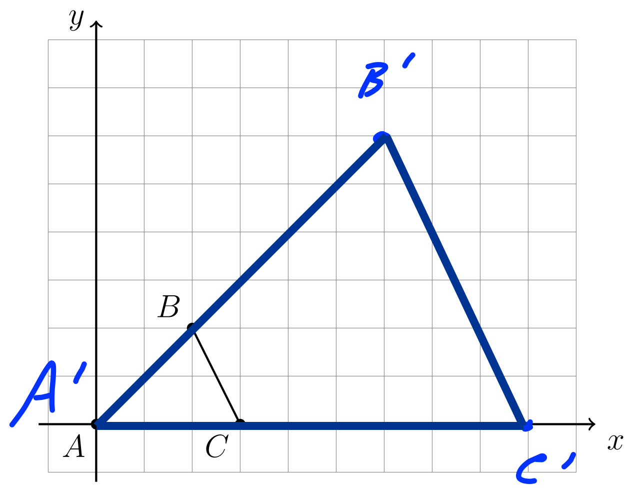
3. The line l has the equation $y = -\frac{3}{5}x + 3$.

(a) What is the slope of the line k, given $k \parallel l$? $-\frac{3}{5}$

(b) What is the slope of the line j, given $j \perp l$? $+\frac{5}{3}$

4. Apply a dilation mapping $\triangle ABC \rightarrow \triangle A'B'C'$ with a factor of $k = 3$ centered at the origin. Draw and label the image on the grid and make a table of the coordinates.

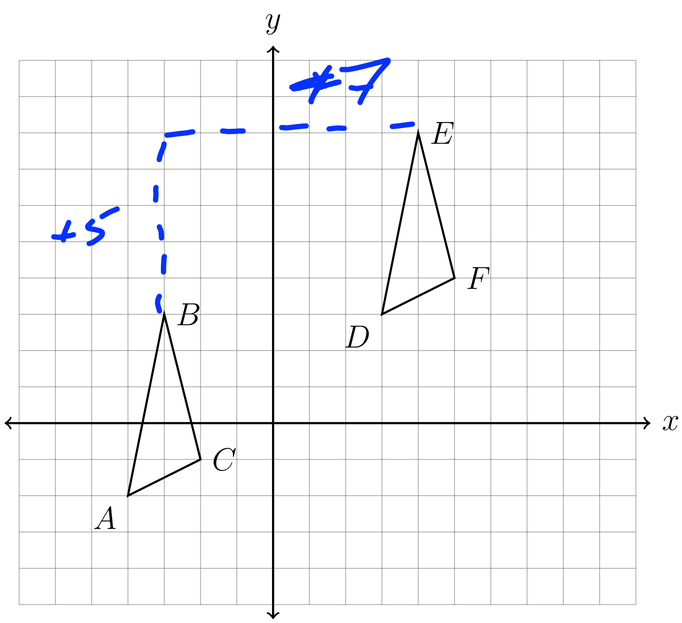
$A(0,0) \rightarrow A'(0,0)$
$B(2,2) \rightarrow B'(6,6)$
$C(3,0) \rightarrow C'(9,0)$



5. Find the image of $P(-2, 7)$ after the translation $(x, y) \rightarrow (x + 5, y - 2)$.

$P'(3,5)$

6. What transformation maps $\triangle ABC$ onto $\triangle DEF$, shown below? Fully specify the transformation.



$T_{+7,+5}$

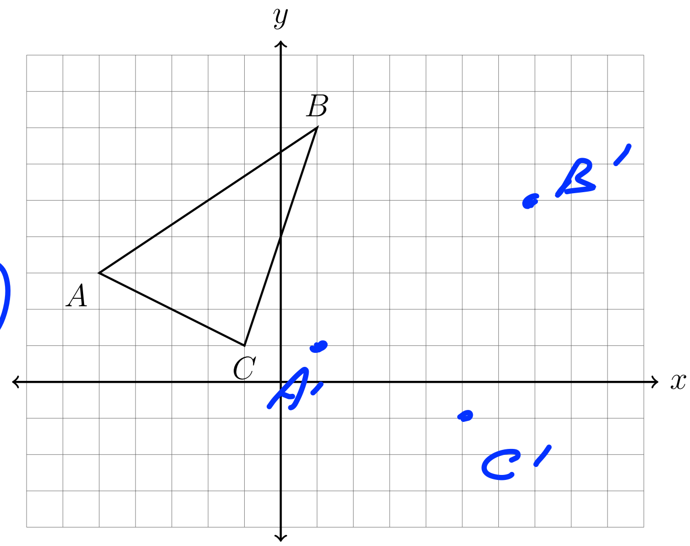
slide
right 7
up 5

7. Translate $\triangle ABC$ to the right six units and down two units. Make a table of the coordinates and plot and label the image on the axes.

$A(-5,3) \to A'(1,1)$

$B(1,7) \to B'(7,5)$

$C(-1,1) \to C'(5,-1)$

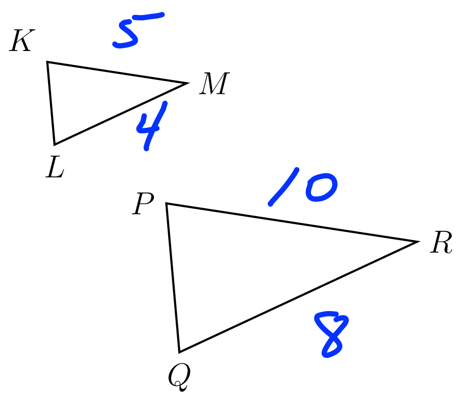


8. A translation maps $P(-5,3) \to P'(6,1)$. What is the image of $Q(1,9)$ under the same translation?

$T_{+11,-2}$

$Q'(12,7)$

9. A dilation maps triangle KLM onto triangle PQR, with $KM = 5$, $LM = 4$, $PR = 10$.



Complete each mapping or equivalence.

(a) $L \to$ Q

(b) $\angle K \cong$ $\angle P$

(c) $QR =$ $2 \times 4 = 8$

10. Given $\triangle ABC \sim \triangle DEF$. $m\angle A = 33°$ and $m\angle B = 66°$. Find the measure of $\angle D$.

$m\angle D = m\angle A = 33°$

11. A dilation centered at A maps $\triangle ABC \rightarrow \triangle ADE$. Given the sides of the preimage, $AC = 6$, $BC = 4$, $AB = 8$, and of $DE = 10$ find the scale factor k and the lengths AD and AE. Then find CE and BD.

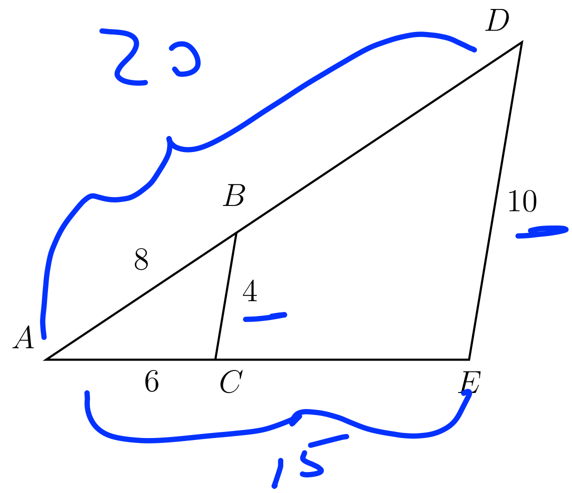
(a) $k = \frac{10}{4} = 2.5$

(b) $AD = 2.5 \times 8 = 20$

(c) $AE = 2.5 \times 6 = 15$

(d) $CE = 9$

(e) $BD = 12$



12. Triangle ABC is dilated with a scale factor of k centered at A, yielding $\triangle ADE$, as shown. Given $AB = 12$, $BC = 16$, $AC = 20$, and $DE = 20$.

Find the scale factor k and the segment lengths AD and CE.

(the diagram is not to scale)

$\overline{BC} \rightarrow \overline{DE}$

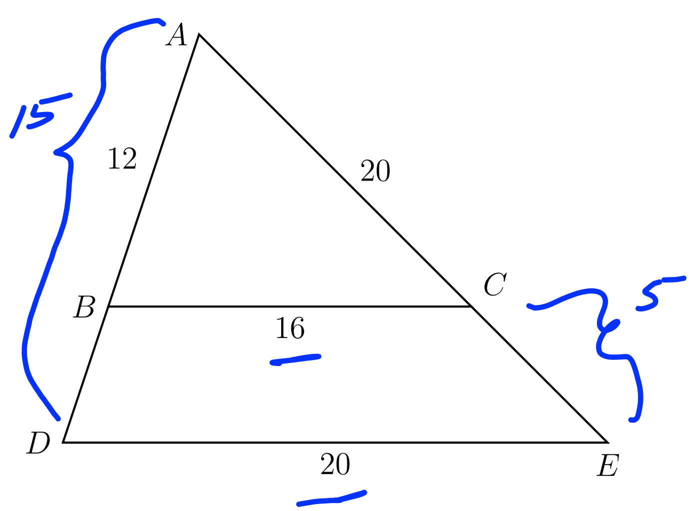
$16 \rightarrow 20$

$K = \frac{20}{16} = 1.25$

$AD = 1.25 \times 12 = 15$

$AE = 1.25 \times 20 = 25$

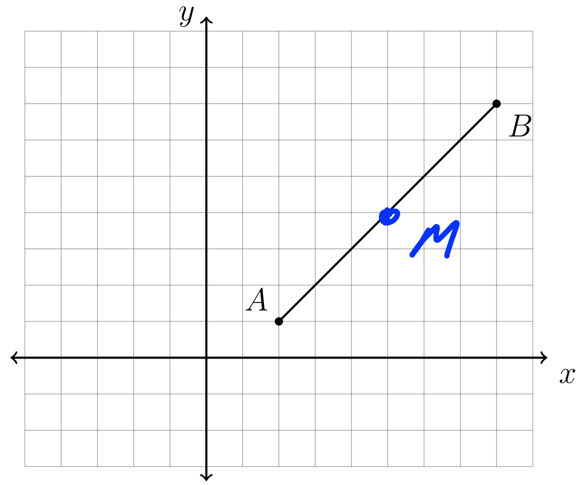
$CE = 25 - 20 = 5$



13. As shown, $\overline{AB}$ has endpoints with coordinates $A(2,1)$ and $B(8,7)$. Show the calculation for the coordinates of the midpoint M of $\overline{AB}$. Mark and label it on the graph.

$$M = \left(\frac{2+8}{2}, \frac{1+7}{2}\right)$$

$$= (5, 4)$$



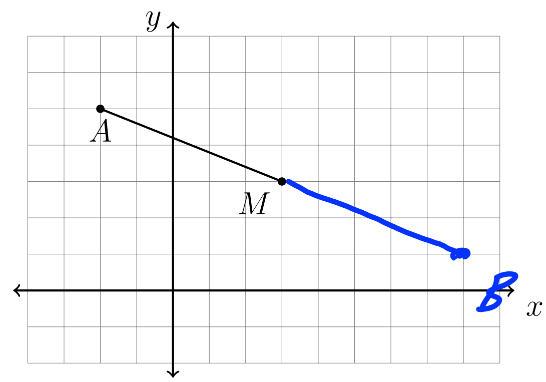
14. $A(-2,5)$ is one endpoint of $\overline{AB}$. The segment's midpoint is $M(3,3)$. Find the other endpoint, B.

What translation maps

$A(-2,5) \to M(3,3)$?

$T_{+5,-2}$

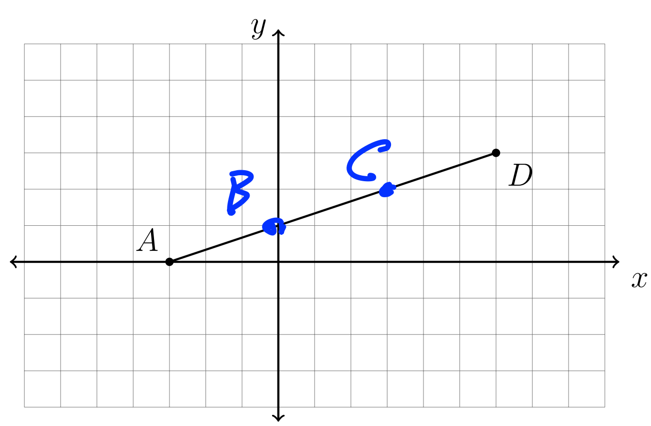
$M \to (8,1)$



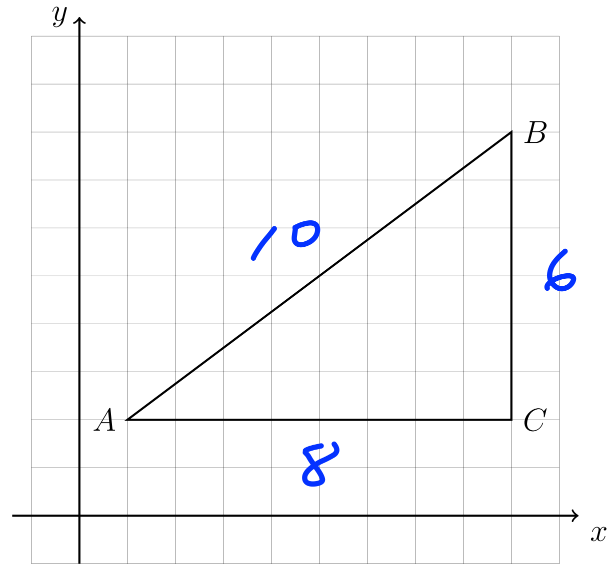
15. In the diagram below, $\overline{AD}$ has endpoints with coordinates $A(-3,0)$ and $D(6,3)$. What points B and C trisect $\overline{AD}$ into three congruent segments? Mark and label them on the graph. State their coordinates.

$B(0,1)$

$C(3,2)$



16. Given $\triangle ABC$, find the lengths of its sides. $A(1,2)$, $B(9,8)$, $C(9,2)$.

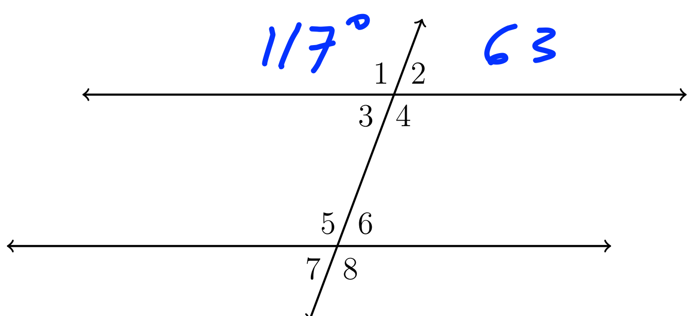


(a) $AC =$ 8

(b) $BC =$ 6

(c) Use the formula for distance:
$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$
$AB =$
$= \sqrt{(9-1)^2 + (8-2)^2}$
$= \sqrt{8^2 + 6^2}$
$= \sqrt{100} = 10$

17. Given two parallel lines and a transversal, as shown below. Given $m\angle 1 = 117$.



(a) Find the measure $m\angle 2$. 63°

(b) Find the measure $m\angle 4$. 117°

(c) Find the measure $m\angle 5$. 117°

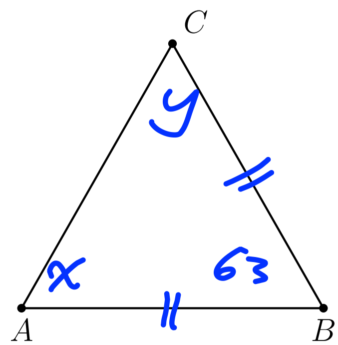
(d) Given $m\angle 8 = (5x - 8)^\circ$. Find x.
$117 = 5x - 8$
$x = \frac{125}{5} = 25$

18. Given isosceles $\triangle ABC$ with $\overline{AB} \cong \overline{BC}$, $m\angle A = x$, $m\angle B = 63$, and $m\angle C = y$. Mark and label the diagram, and then find x and y. (*the diagram is not to scale*)

$x = y$

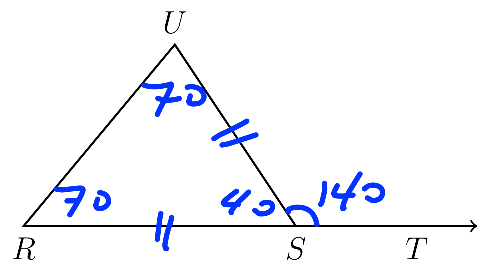
$2x + 63 = 180$

$y = x = \frac{117}{2} = 58\frac{1}{2}$



19. Given isosceles $\triangle RSU$ with $\overline{RS} \cong \overline{US}$. If $m\angle UST = 140$ find $m\angle R$. (mark and label the diagram) (*the diagram is not to scale*)

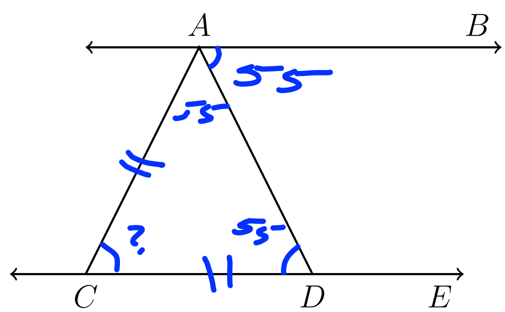
$m\angle R = \frac{140}{2} = 70^\circ$



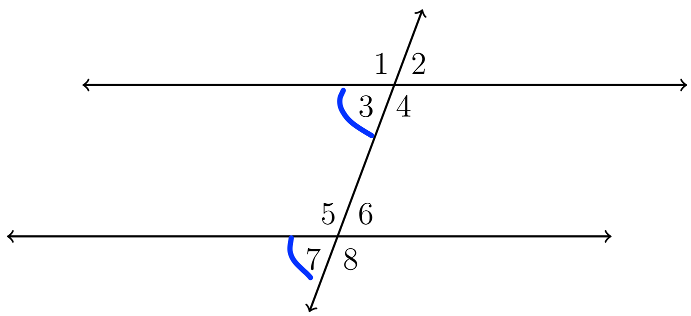
20. Given parallel lines $\overleftrightarrow{AB} \parallel \overleftrightarrow{CDE}$ with $\overline{AC} \cong \overline{CD}$. If $m\angle BAD = 55$ find $m\angle ACD$. (completely mark and label the diagram)

$m\angle ACD = 180 - 2 \times 55$

$= 70^\circ$



21. Given two parallel lines and a transversal, as shown below.



(a) State the angle corresponding with $\angle 7$. $\angle 3$

(b) What theorem would justify $m\angle 4 + m\angle 6 = 180°$? Same side interior angles

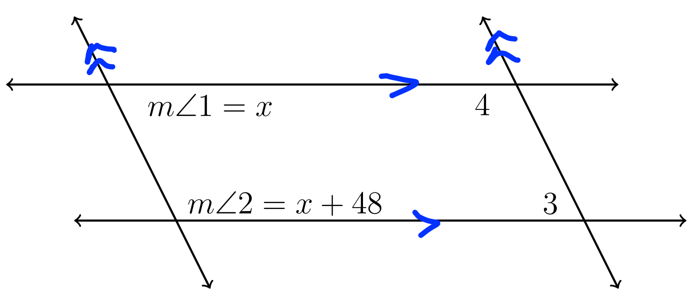
(c) What theorem would justify $\angle 3 \cong \angle 6$? Alternate interior angles

(d) Given $m\angle 1 = 117°$ and $m\angle 8 = (4x - 3)°$. Find x.

$m\angle 1 = m\angle 8$
$117 = 4x - 3$
$x = 30$

Check
$m\angle 8 = 4(30) - 3$
$= 117$ ✓

22. Two parallel lines intersect a second set of parallel lines. Given $m\angle 1 = x$ and $m\angle 2 = x + 48$, find the measure of $\angle 4$.



$x + (x + 48) = 180$
$2x = 132$
$x = 66$

$m\angle 4 = m\angle 2 = 66 + 48$
$= 114$

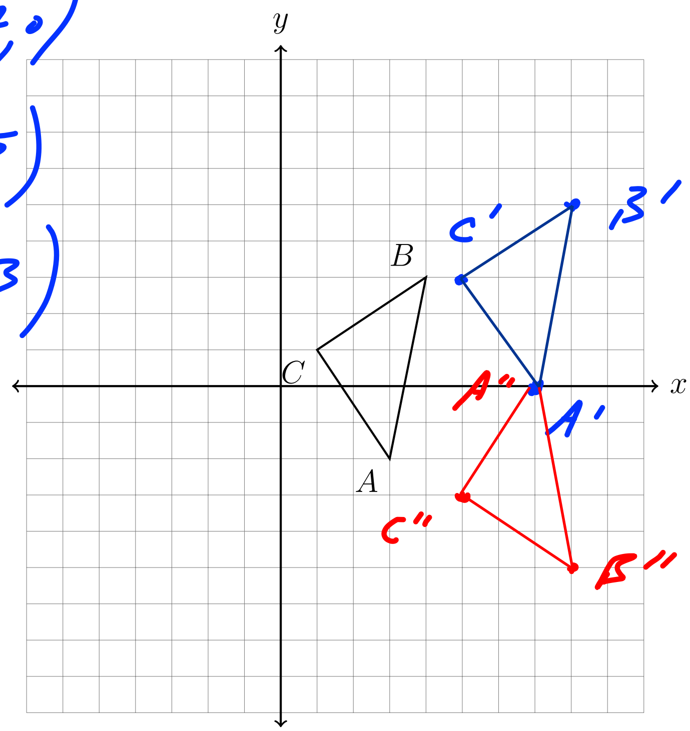
Check
$114 + 66 = 180$ ✓

23. Translate $\triangle ABC$ by $(x, y) \to (x + 4, y + 2)$ then reflect it over the x-axis. Make a table of the coordinates showing $\triangle ABC \to \triangle A'B'C' \to \triangle A''B''C''$ and plot and label the image on the axes.

$A(3,-2) \to A'(7,0) \to A''(7,0)$

$B(4,3) \to B'(8,5) \to B''(8,-5)$

$C(1,1) \to C'(5,3) \to C''(5,-3)$



24. Given $\triangle ABP \sim \triangle JKP$ as shown below. $AB = 9.6$, $AP = 12.0$, $BP = 6.3$, and $JK = 16.0$. Find JP. (3 stars)

$\overline{AB} \to \overline{JK}$

$9.6 \to 16.0$

$K = \frac{16.0}{9.6} = \frac{5}{3}$

$\overline{AP} \to \overline{JP}$

$JP = \frac{5}{3} \times 12.0 = 20$