

**6.12 Exam: Graphing, perpendicular and parallel slopes**

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

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

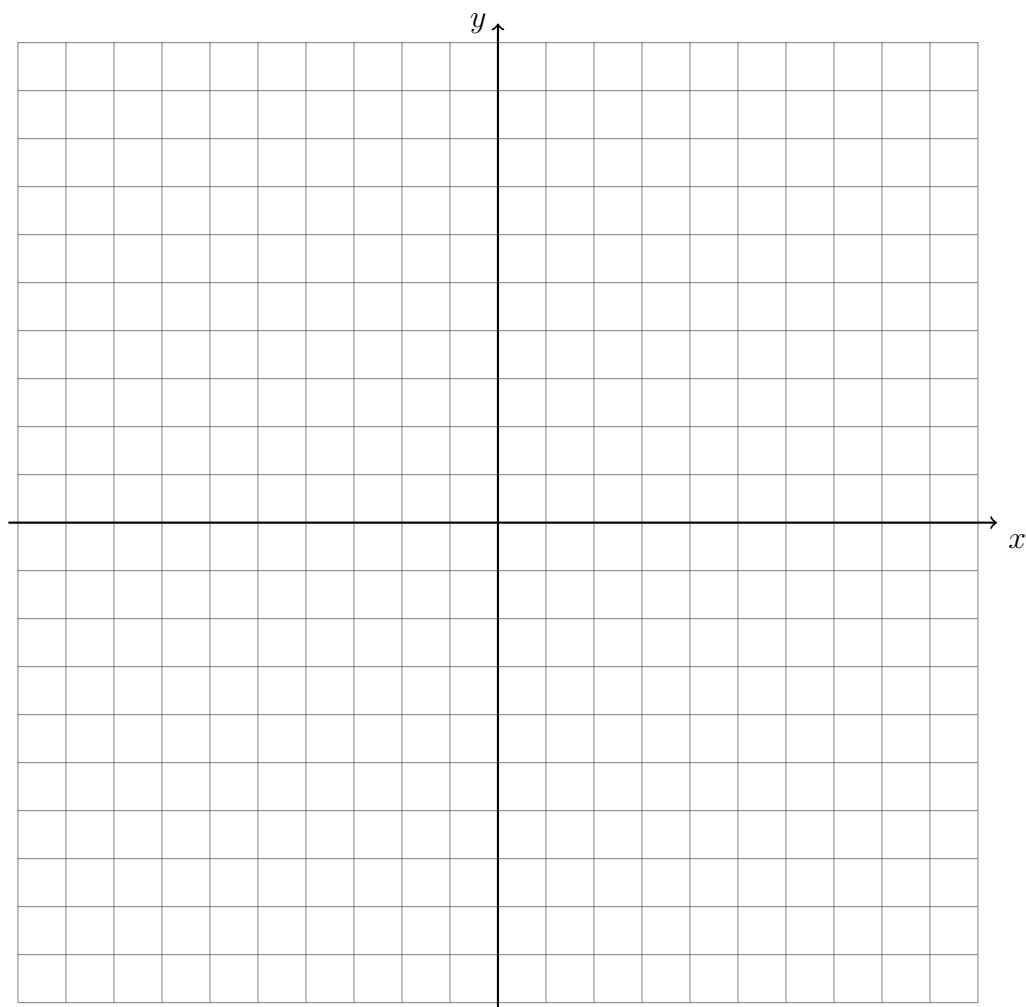
$$y = -x + 2$$

Write down the slopes of the two lines.

$$m_1 =$$

$$m_2 =$$

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

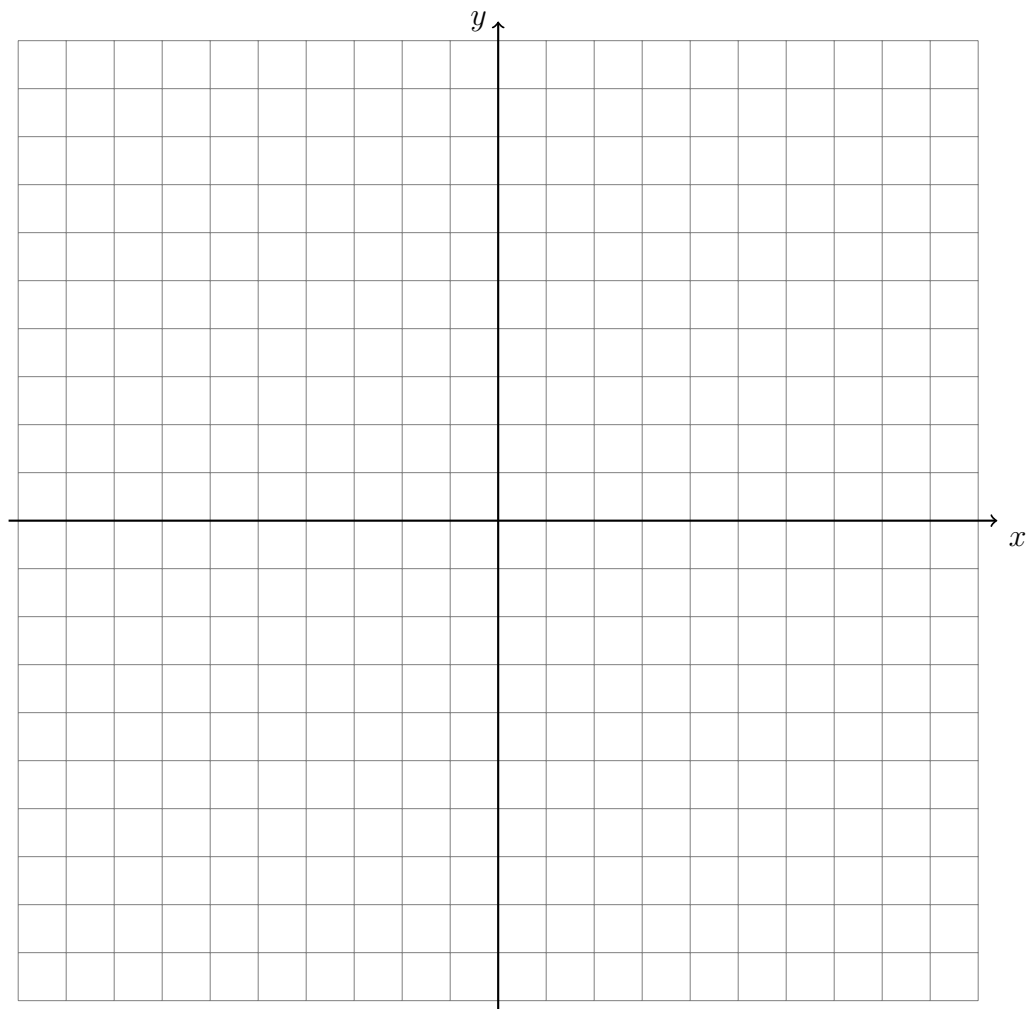


2. Graph and label the two equations. Mark their intersection as an ordered pair.

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

$$3x - y = 6$$

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

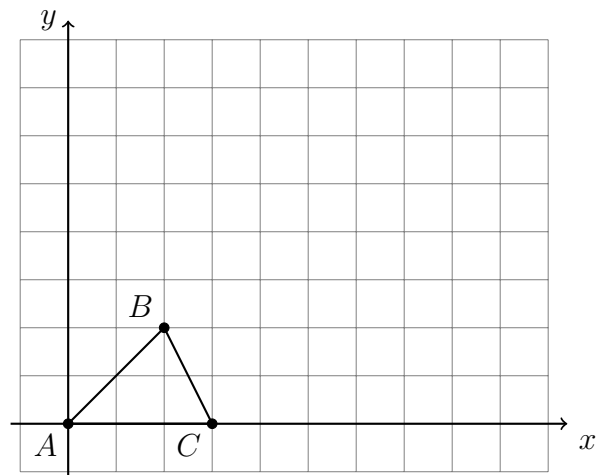


3. The line  $l$  has the equation  $y = -\frac{3}{5}x + 3$ .

(a) What is the slope of the line  $k$ , given  $k \parallel l$ ?

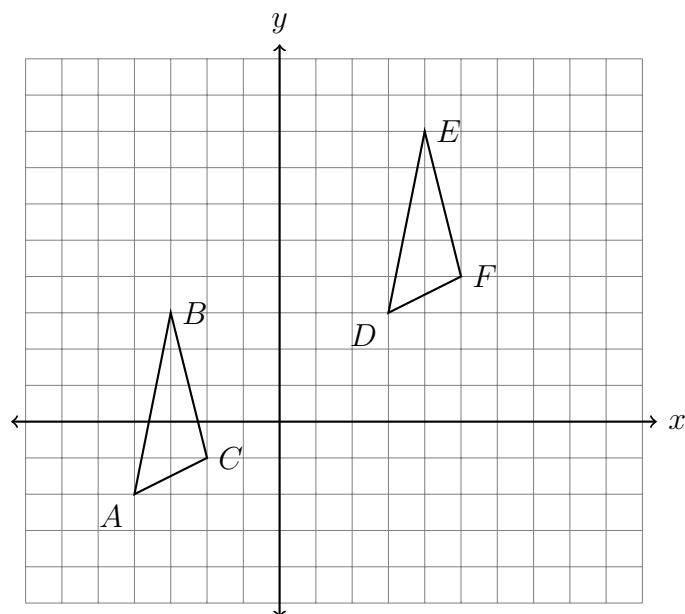
(b) What is the slope of the line  $j$ , given  $j \perp l$ ?

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.

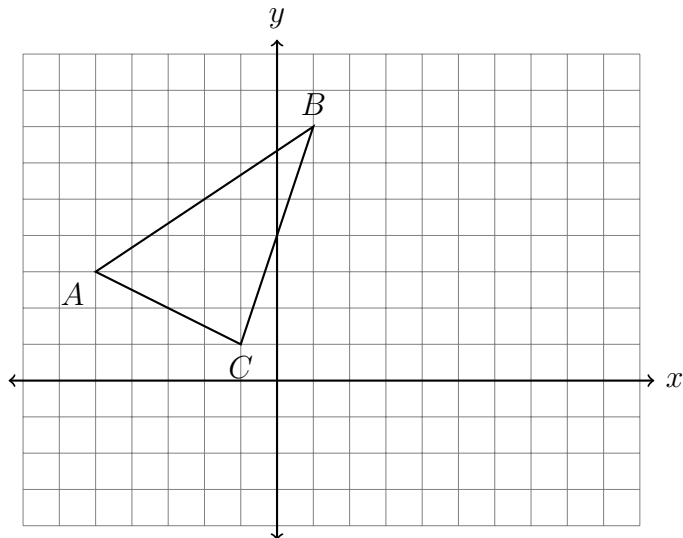


5. Find the image of  $P(-2, 7)$  after the translation  $(x, y) \rightarrow (x + 5, y - 2)$ .

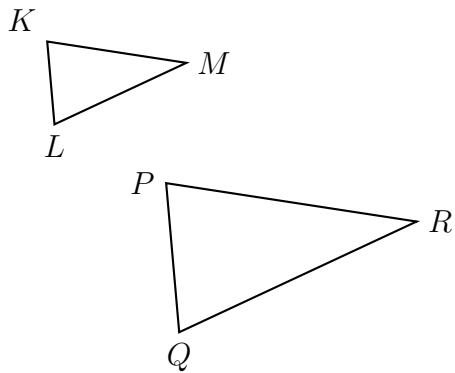
6. What transformation maps  $\triangle ABC$  onto  $\triangle DEF$ , shown below? Fully specify the transformation.



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.



8. A translation maps  $P(-5, 3) \rightarrow P'(6, 1)$ . What is the image of  $Q(1, 9)$  under the same translation?
9. A dilation maps triangle  $KLM$  onto triangle  $PQR$ , with  $KM = 5$ ,  $LM = 4$ ,  $PR = 10$ .



Complete each mapping or equivalence.

(a)  $L \rightarrow$  \_\_\_\_\_

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

(c)  $QR =$  \_\_\_\_\_

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

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  $BD$ .

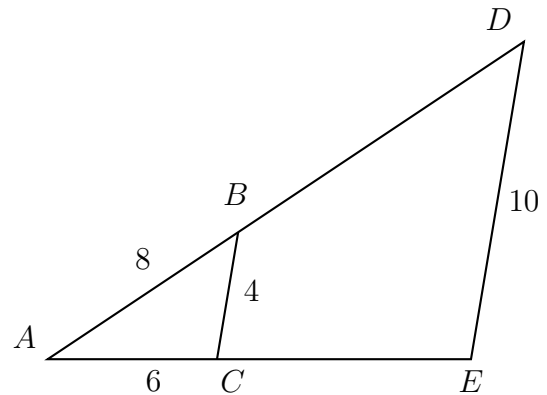
(a)  $k =$

(b)  $AD =$

(c)  $AE =$

(d)  $CE =$

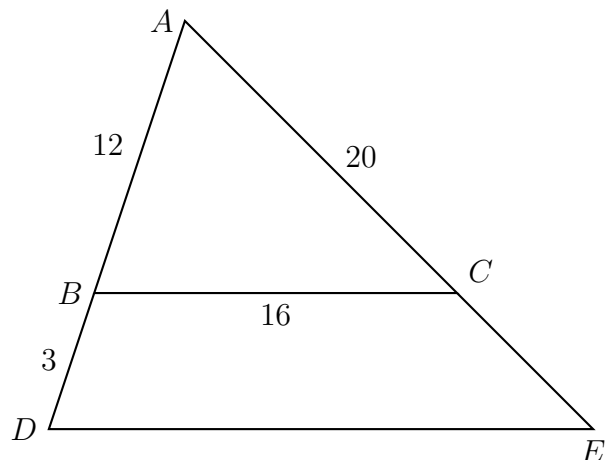
(e)  $BD =$



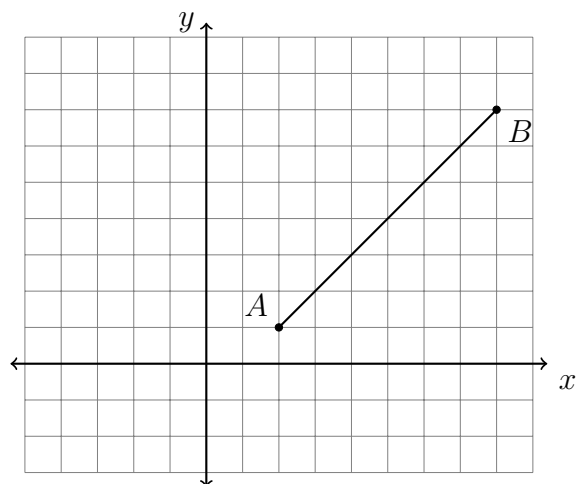
12. Triangle  $ABC$  is dilated with a scale factor of  $k$  centered at  $A$ , yielding  $\triangle ADE$ , as shown. Given  $AB = 12$ ,  $BC = 16$ ,  $AC = 20$ , and  $BD = 3$ .

Find the scale factor  $k$  and the segment lengths  $DE$  and  $CE$ .

(the diagram is not to scale)



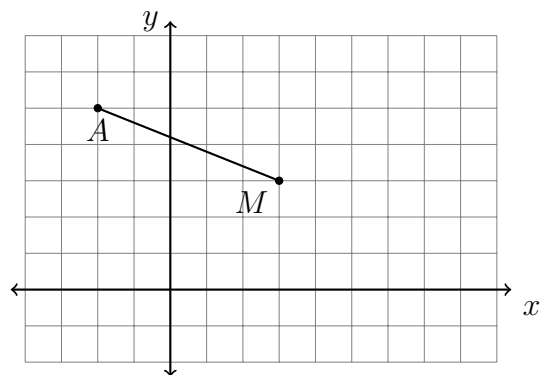
13. As shown,  $\overline{AB}$  has endpoints with coordinates  $A(2, 1)$  and  $B(8, 7)$ . Show the calculation for the coordinates of the midpoint  $M$  of  $\overline{AB}$ . Mark and label it on the graph.



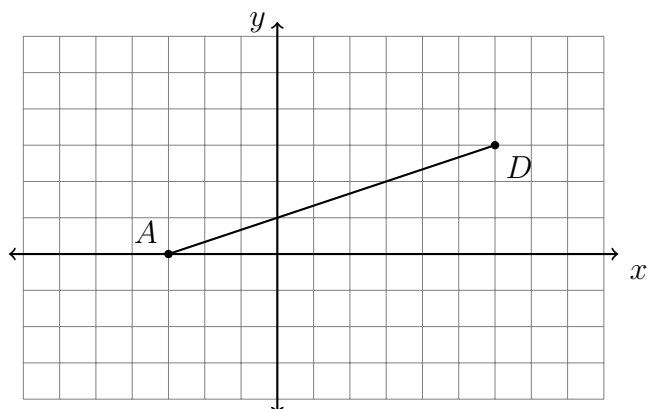
14.  $A(-2, 5)$  is one endpoint of  $\overline{AB}$ . The segment's midpoint is  $M(3, 3)$ . Find the other endpoint,  $B$ .

What translation maps

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



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.



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

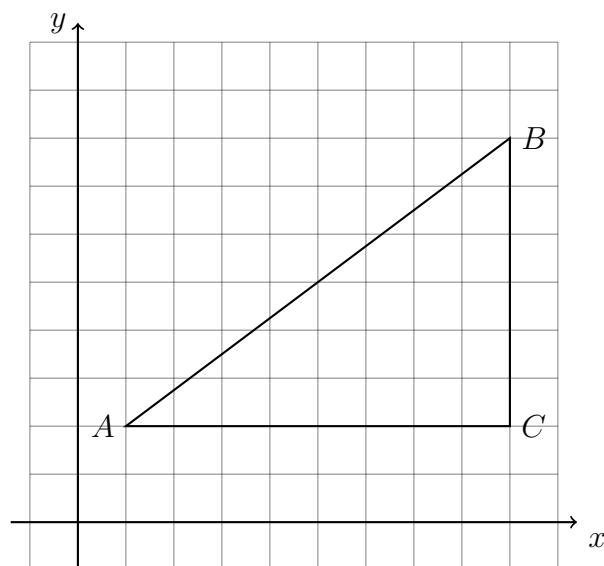
(a)  $AC =$

(b)  $BC =$

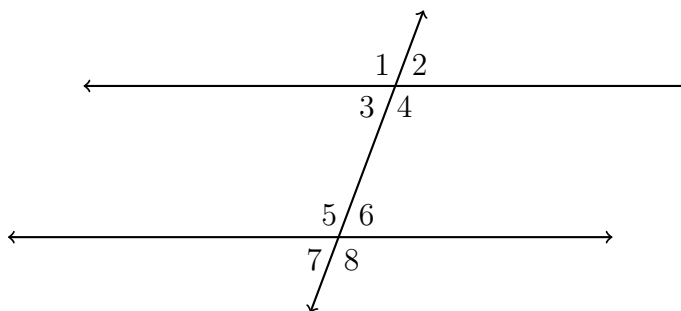
(c) Use the formula for distance:

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

$AB =$



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



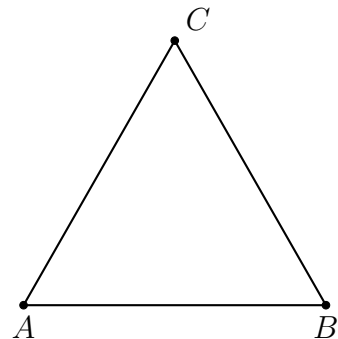
(a) Find the measure  $m\angle 2$ .

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

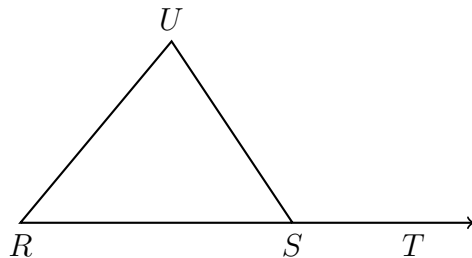
(c) Find the measure  $m\angle 5$ .

(d) Given  $m\angle 8 = (5x - 8)^\circ$ . Find  $x$ .

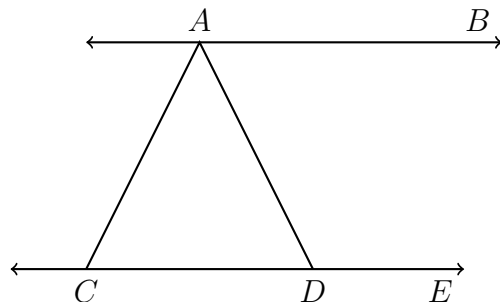
18. Given isosceles  $\triangle ABC$  with  $\overline{AB} \cong \overline{BC}$ ,  $m\angle A = x$ ,  $m\angle B = 63$ , and  $m\angle C = y$ . Mark and label the diagram, and then find  $x$  and  $y$ . *(the diagram is not to scale)*



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)*

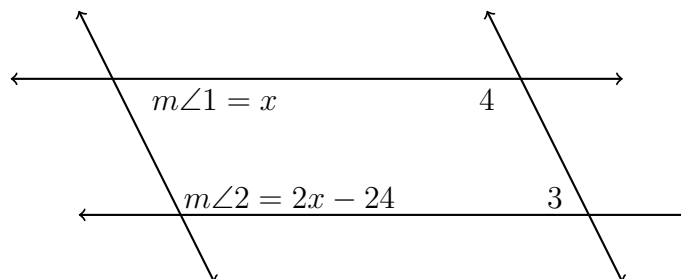


20. Given parallel lines  $\overleftrightarrow{AB} \parallel \overleftrightarrow{CDE}$  with  $\overline{AC} \cong \overline{CD}$ . If  $m\angle BAD = 55$  find  $m\angle ACD$ . (completely mark and label the diagram)

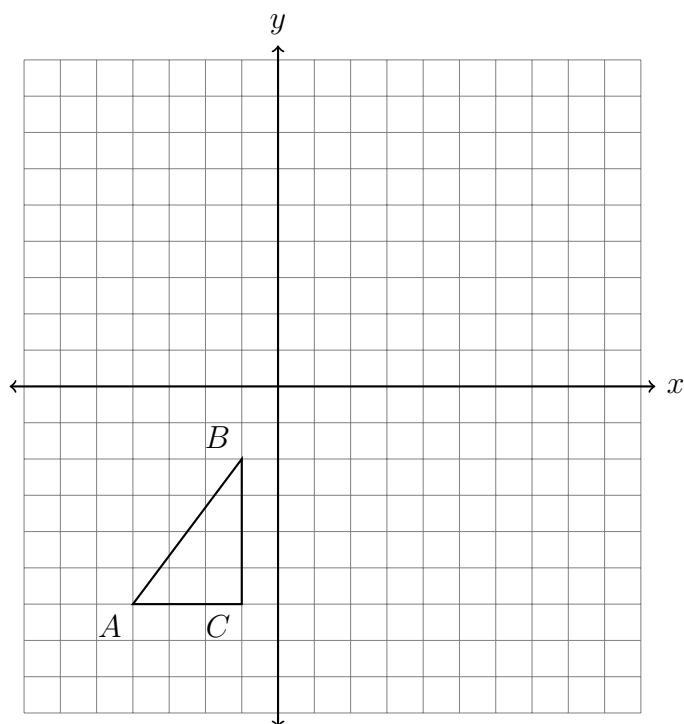




21. Two parallel lines intersect a second set of parallel lines. Given  $m\angle 1 = x$  and  $m\angle 2 = 2x - 24$ , find the measure of  $\angle 4$ .

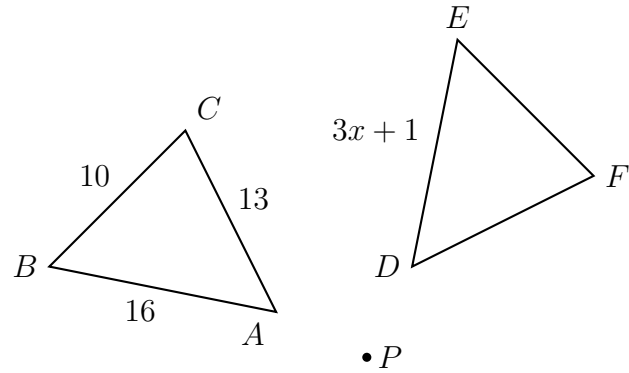


22. Reflect  $\triangle ABC$  over the  $x$ -axis, then translate it by  $(x, y) \rightarrow (x + 9, y + 3)$ . Make a table of the coordinates showing  $\triangle ABC \rightarrow \triangle A'B'C' \rightarrow \triangle A''B''C''$  and plot and label the image on the axes.

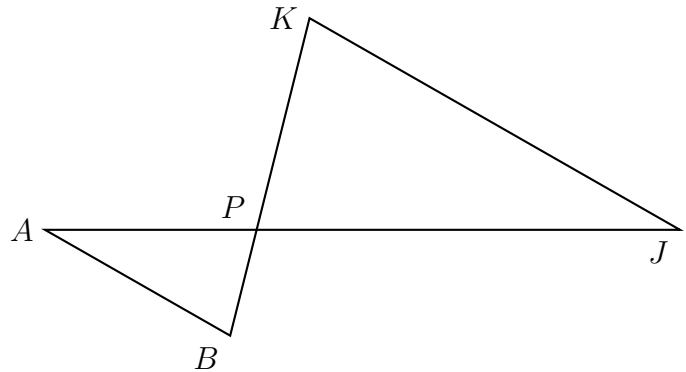


23. In the diagram below,  $\triangle ABC$  with sides of 10, 13, and 16, is mapped onto  $\triangle DEF$  after a clockwise rotation of  $90^\circ$  about point  $P$ .

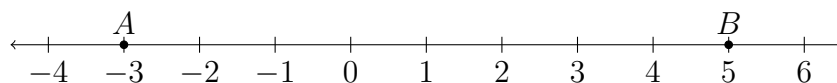
If  $DE = 3x + 1$ , what is the value of  $x$ ?



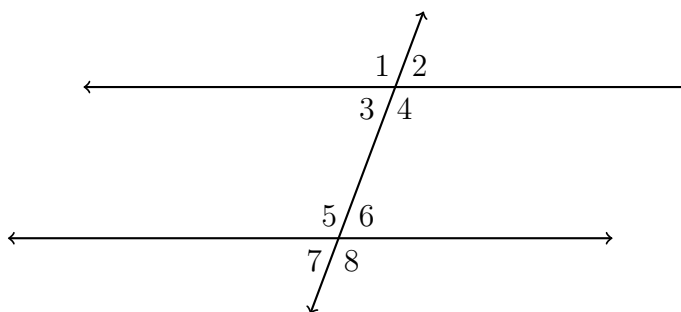
24. Given  $\triangle ABP \sim \triangle JKP$  as shown below.  $AB = 9.6$ ,  $AP = 12.0$ ,  $BP = 6.3$ , and  $JP = 27.0$ . Find  $JK$ .



25. Given  $\overleftrightarrow{AB}$  as shown on the number line, with  $A = -3$  and  $B = 5$ . Mark and label the midpoint  $M$  between  $A$  and  $B$ ?



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



- (a) State the angle corresponding with  $\angle 7$ .
- (b) What theorem would justify  $m\angle 4 + m\angle 6 = 180^\circ$ ? \_\_\_\_\_
- (c) What theorem would justify  $\angle 3 \cong \angle 6$ ? \_\_\_\_\_
- (d) What theorem would justify  $\angle 5 \cong \angle 8$ ? \_\_\_\_\_