

12 December 2019

6.12 Exam: Graphing, perpendicular and parallel slopes

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

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

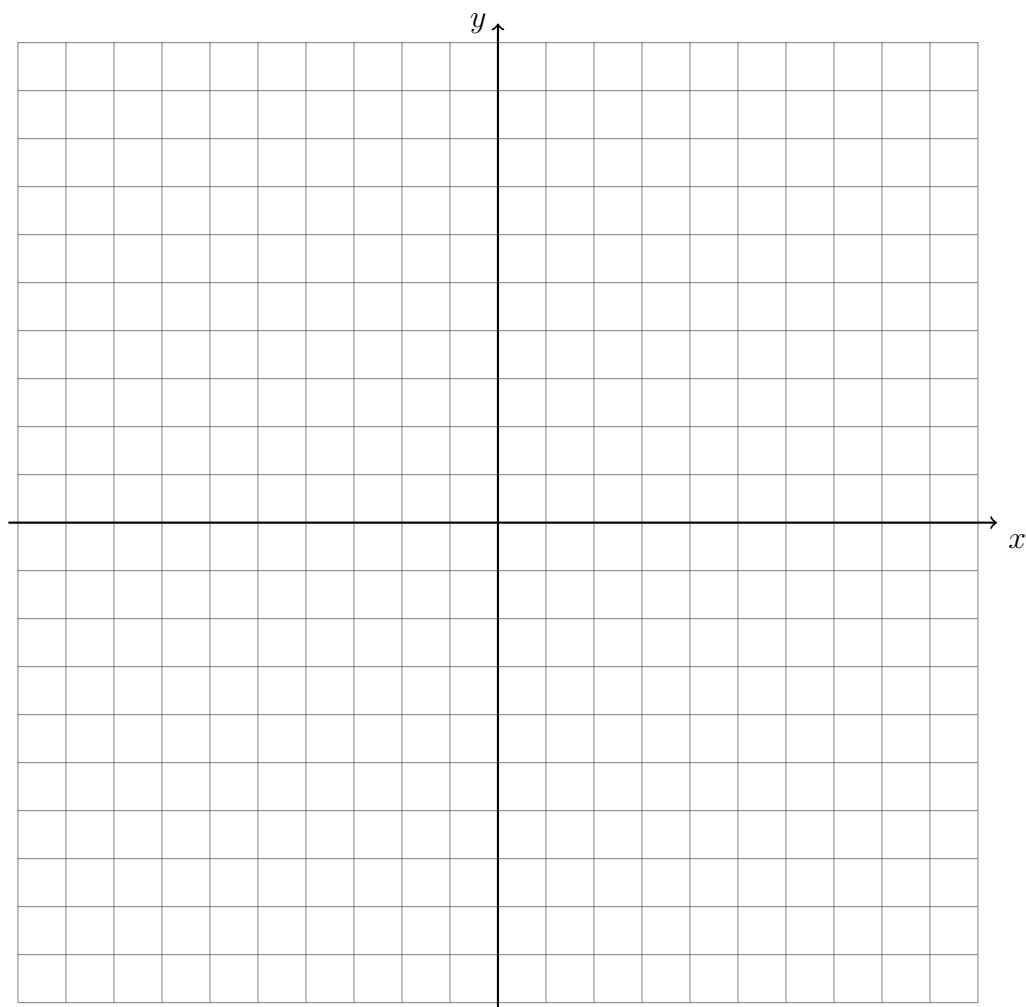
$$y = -x + 2$$

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.

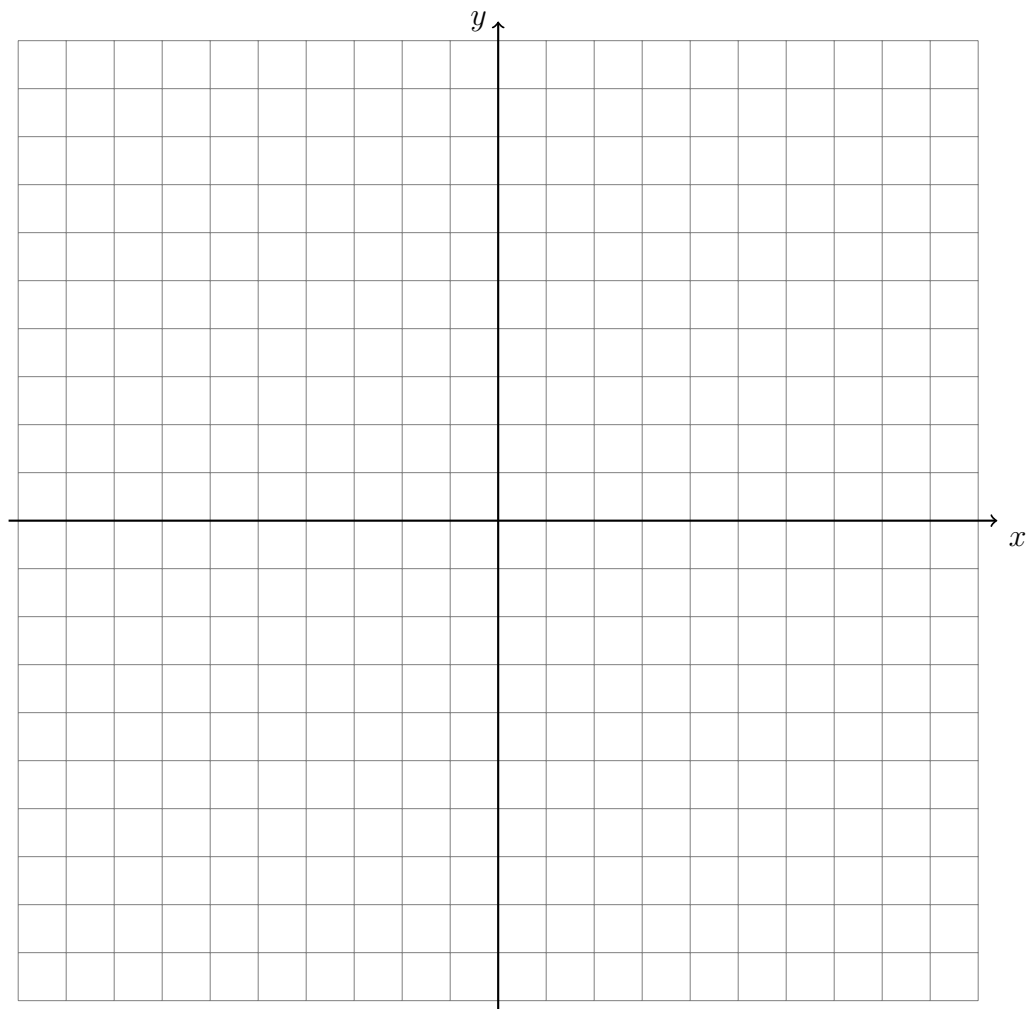


2. Graph and label the two equations. Mark their intersection as an ordered pair.

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

$$3x - y = 6$$

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

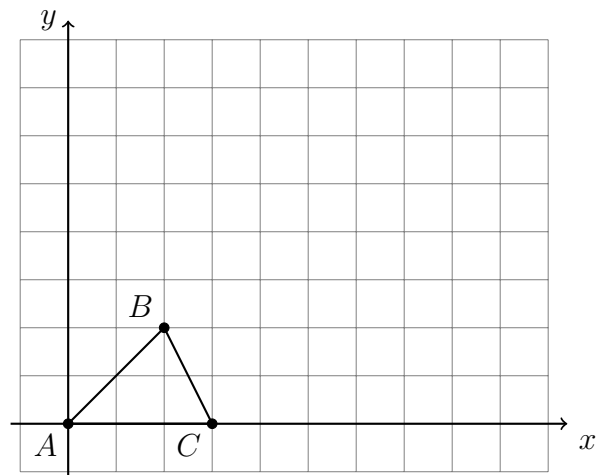


3. The line l has the equation $y = -\frac{3}{5}x + 3$.

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

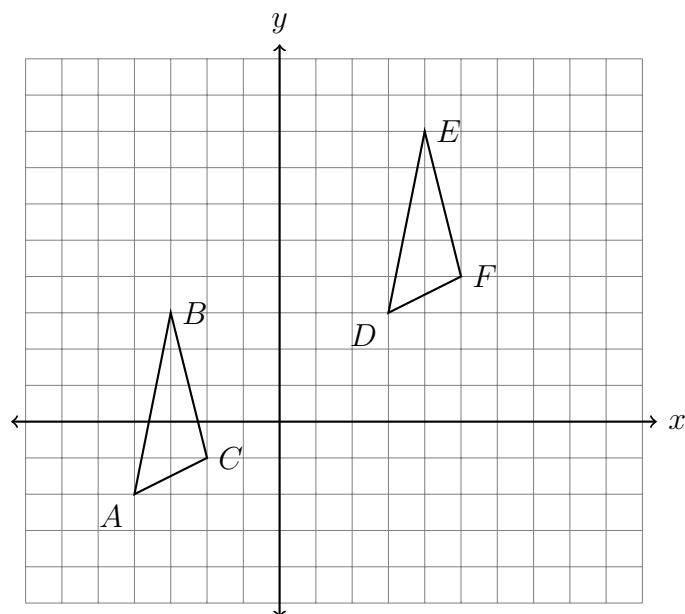
(b) What is the slope of the line j , given $j \perp l$?

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.

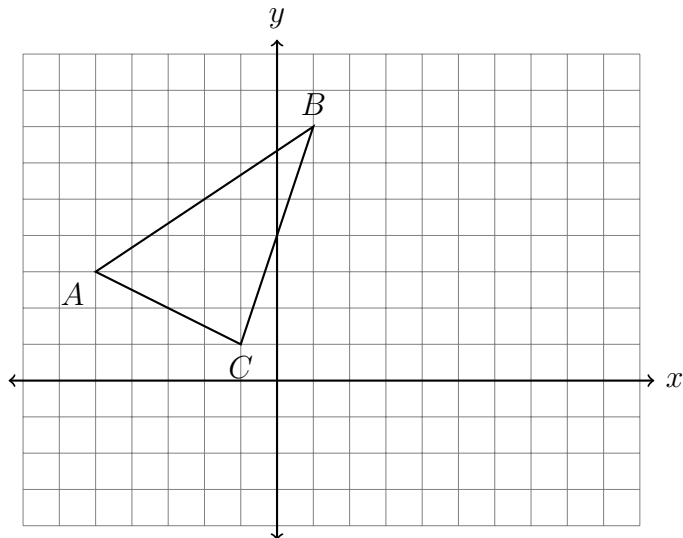


5. Find the image of $P(-2, 7)$ after the translation $(x, y) \rightarrow (x + 5, y - 2)$.

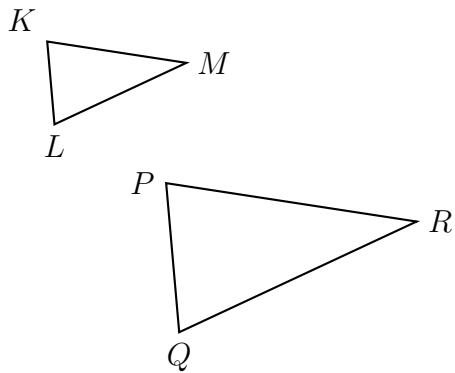
6. What transformation maps $\triangle ABC$ onto $\triangle DEF$, shown below? Fully specify the transformation.



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 .

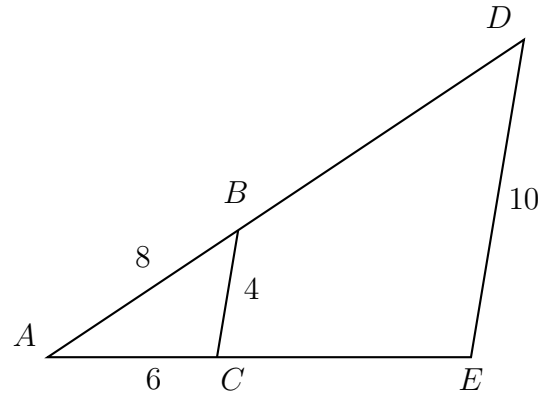
(a) $k =$

(b) $AD =$

(c) $AE =$

(d) $CE =$

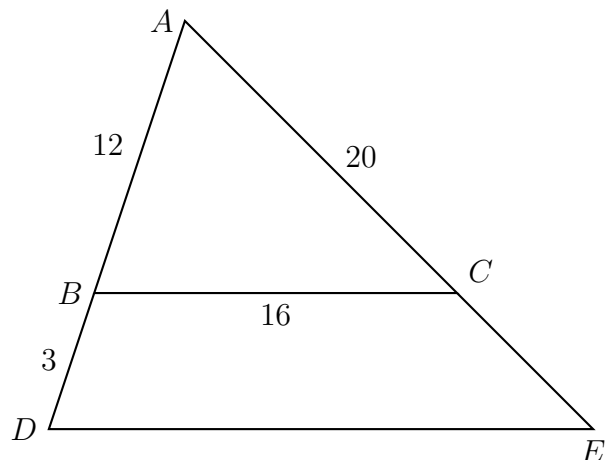
(e) $BD =$



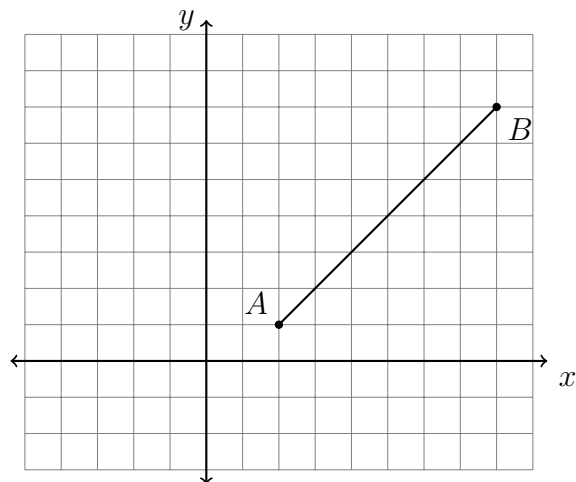
12. Triangle ABC is dilated with a scale factor of k centered at A , yielding $\triangle ADE$, as shown. Given $AB = 12$, $BC = 16$, $AC = 20$, and $BD = 3$.

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.

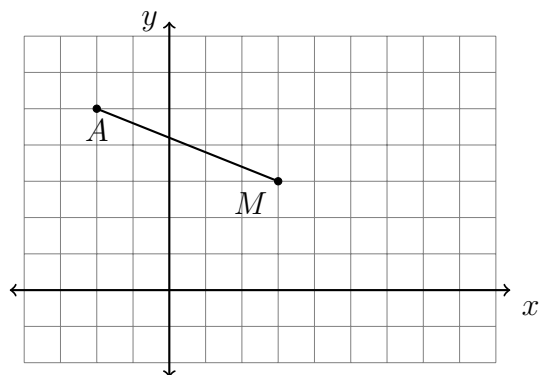


14. $A(-2, 5)$ is one endpoint of \overline{AB} . The segment's midpoint is $M(3, 3)$, as shown below.

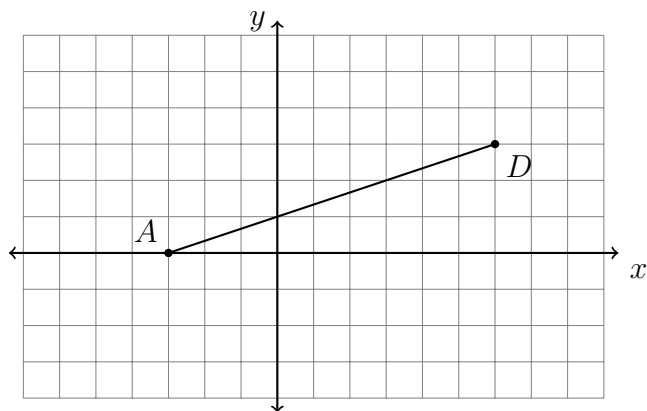
(a) What translation maps

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

(b) Find the other endpoint, B .



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. $A(1, 2)$, $B(9, 8)$, $C(9, 2)$.

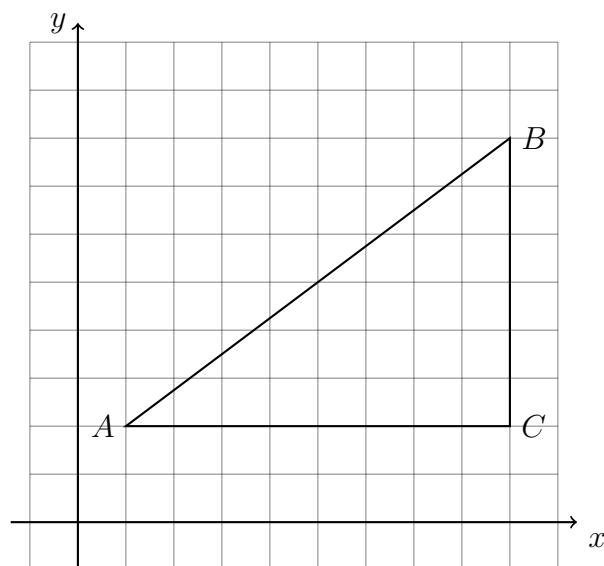
(a) $AC =$

(b) $BC =$

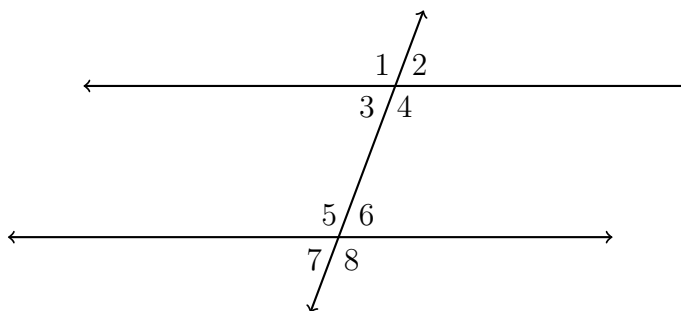
(c) Use the formula for distance:

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

$AB =$



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



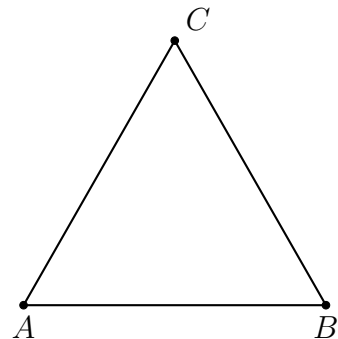
(a) Find the measure $m\angle 2$.

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

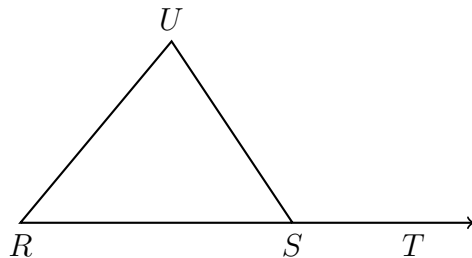
(c) Find the measure $m\angle 5$.

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

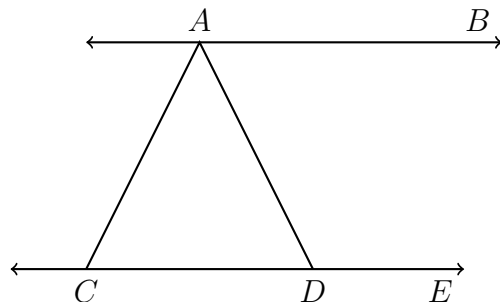
18. Given isosceles $\triangle ABC$ with $\overline{AB} \cong \overline{BC}$, $m\angle A = x$, $m\angle B = 63$, and $m\angle C = y$. Mark and label the diagram, and then find x and y . *(the diagram is not to scale)*



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)*

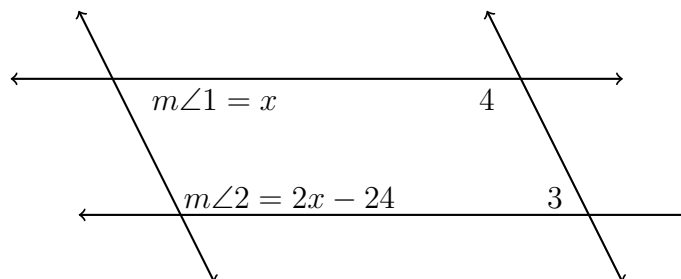


20. Given parallel lines $\overleftrightarrow{AB} \parallel \overleftrightarrow{CDE}$ with $\overline{AC} \cong \overline{CD}$. If $m\angle BAD = 55$ find $m\angle ACD$. (completely mark and label the diagram)

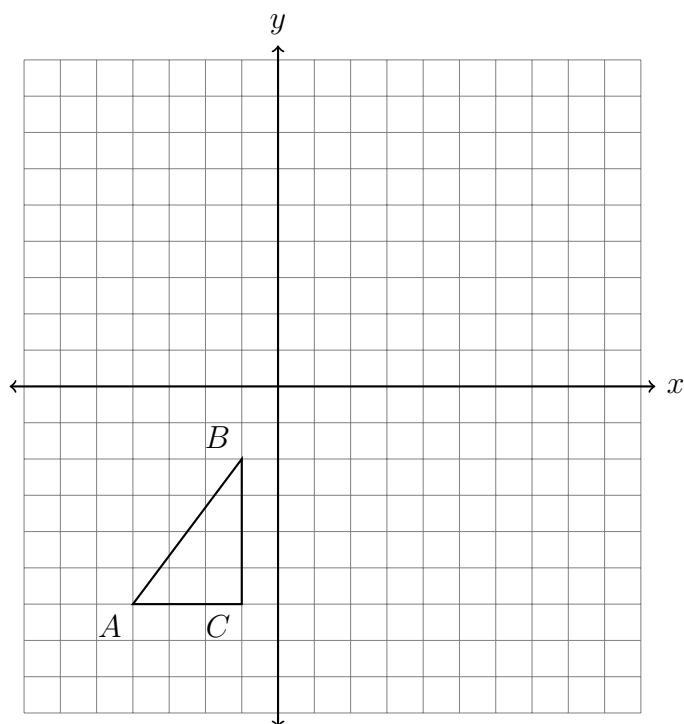


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21. Two parallel lines intersect a second set of parallel lines. Given $m\angle 1 = x$ and $m\angle 2 = 2x - 24$, find the measure of $\angle 4$.

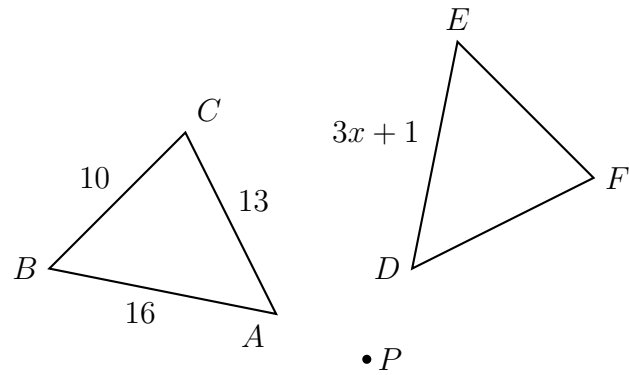


22. Reflect $\triangle ABC$ over the x -axis, then translate it by $(x, y) \rightarrow (x + 9, y + 3)$. Make a table of the coordinates showing $\triangle ABC \rightarrow \triangle A'B'C' \rightarrow \triangle A''B''C''$ and plot and label the image on the axes.

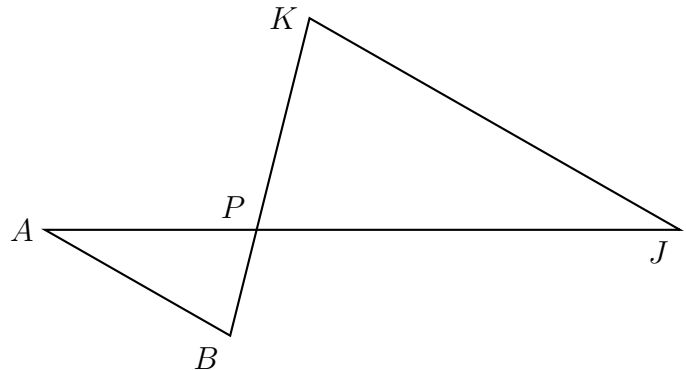


23. In the diagram below, $\triangle ABC$ with sides of 10, 13, and 16, is mapped onto $\triangle DEF$ after a clockwise rotation of 90° about point P .

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 .



Name:

Spicy Regents problems: Using slope to prove a parallelogram

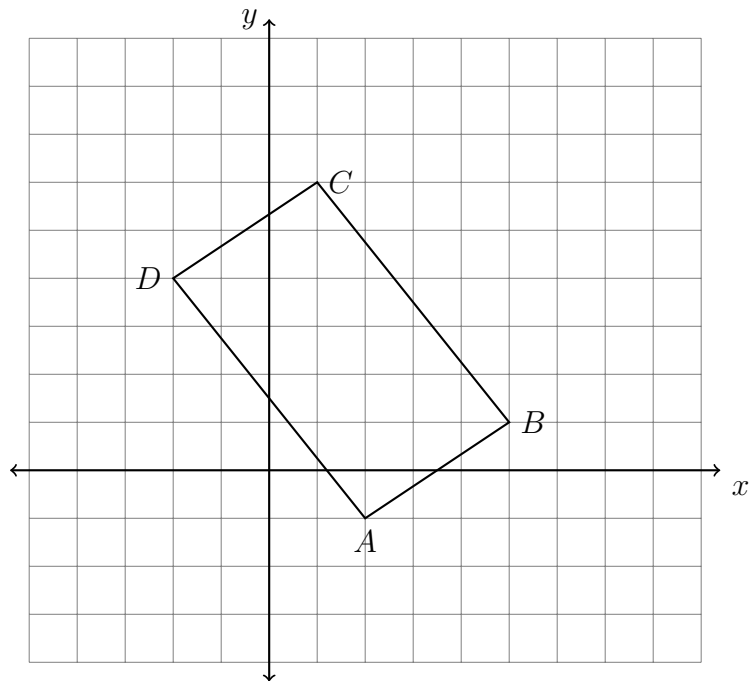
25. In this problem use the following theorem (copy it at the bottom of the page after your calculations):

A quadrilateral is a parallelogram if and only if it's opposite sides are parallel.

Shown below is quadrilateral $ABCD$, $A(2, -1)$, $B(5, 1)$, $C(1, 6)$, and $D(-2, 4)$.

Prove it is a parallelogram by

- (a) finding the slope of each of the four sides,
- (b) stating which sides are parallel,
- (c) copying the theorem as your conclusion.



Using the distance formula to prove a parallelogram

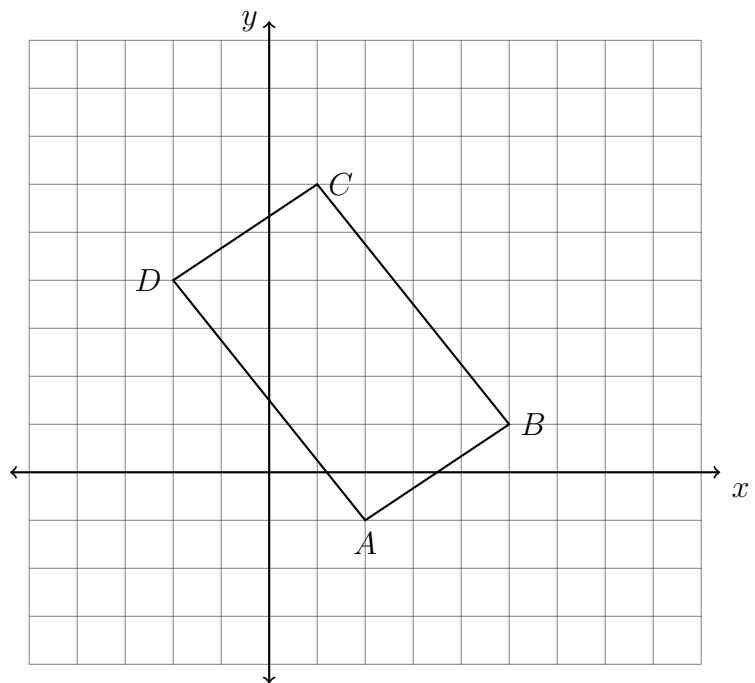
26. In this problem use the following theorem (copy it at the bottom of the page after your calculations):

A quadrilateral is a parallelogram if and only if it's opposite sides are congruent.

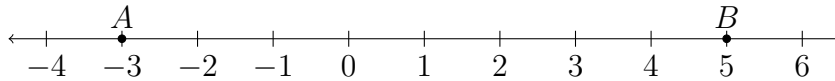
Shown below is quadrilateral $ABCD$, $A(2, -1)$, $B(5, 1)$, $C(1, 6)$, and $D(-2, 4)$.

Prove it is a parallelogram by

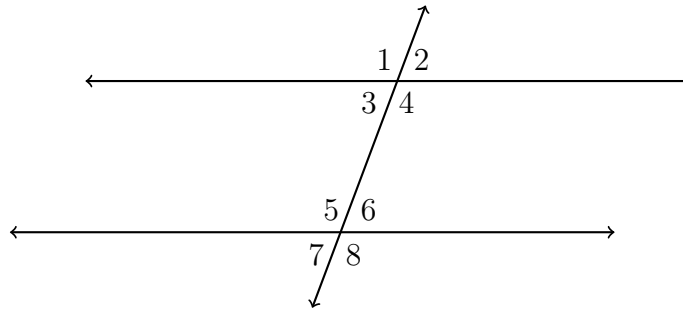
- (a) finding the length of each of the four sides,
- (b) stating which sides are congruent,
- (c) copying the theorem as your conclusion.



27. 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 ?



28. 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 $\angle 5 \cong \angle 8$? _____