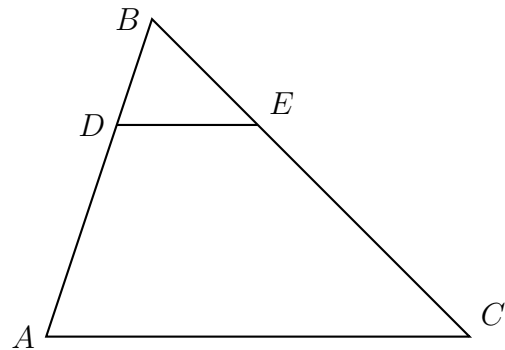


9.7 Classwork: Similarity ratios, dilation, transformations, symmetry

1. Find the image of $P(1, -4)$ after the translation $(x, y) \rightarrow (x - 5, y + 4)$.

2. Given $\triangle ABC \sim \triangle DEF$. $m\angle A = 90^\circ$ and $m\angle F = 45^\circ$. Find the measure of $\angle D$.

3. In the diagram of $\triangle ABC$, D is a point on \overline{BA} , E is a point on \overline{BC} , and \overline{DE} is drawn. If $BD = 6.5$, $DA = 13$, and $BE = 8$, what is the length of \overline{BC} so that $\overline{AC} \parallel \overline{DE}$?



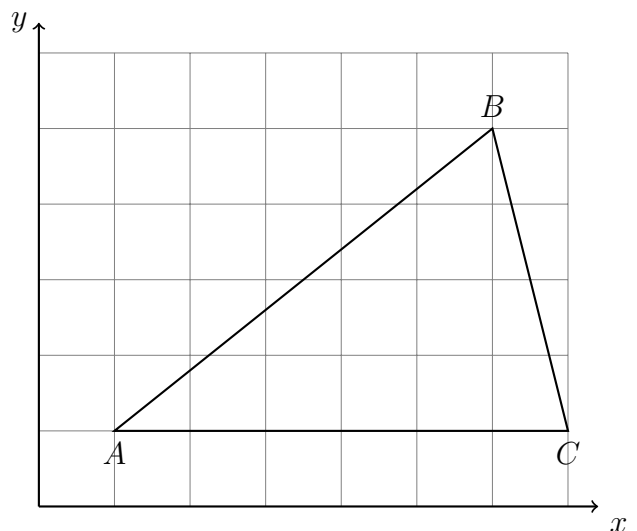
4. (a) In diagram below, each centimeter represents one foot. Find the length of each side in feet. (measure with a metric scale)

i. $AC =$

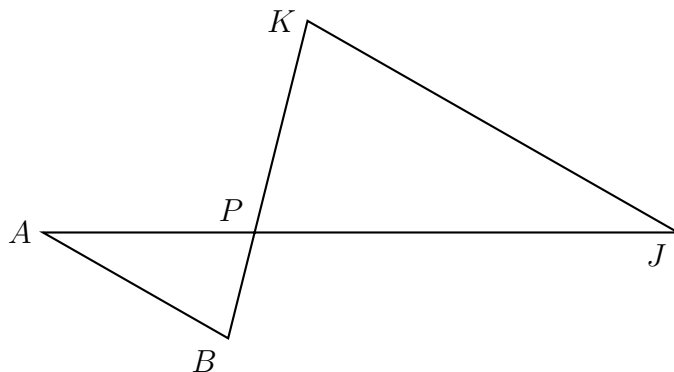
ii. $BC =$

iii. $AB =$

iv. Find the area of $\triangle ABC$



5. Given $\triangle ABP \sim \triangle JKP$ as shown below. $AB = 13.5$, $AP = 10.0$, $BP = 9$, and $JP = 27.0$. Find JK .

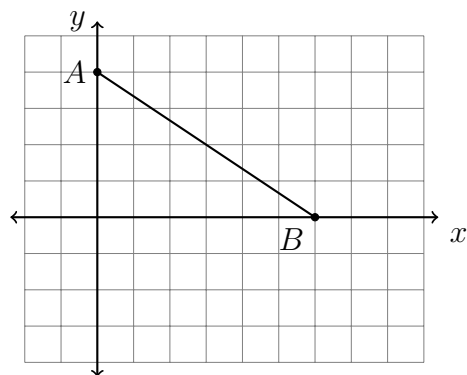


6. A dilation centered at the origin with scale factor $k = \frac{1}{2}$ maps $\overline{AB} \rightarrow \overline{A'B'}$.

(a) Draw and label the image.

(b) What is the ratio of the length of $\overline{A'B'}$ to \overline{AB} ?

(c) What is the relationship of the slope of $\overline{A'B'}$ and \overline{AB} ?

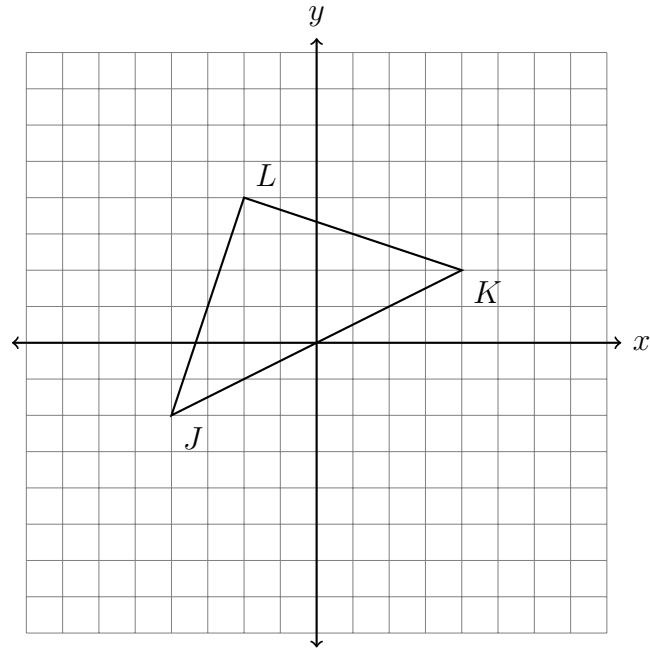


7. A translation maps $N(-2, 7) \rightarrow N'(-4, 9)$. What is the image of $M(3, -1)$ under the same translation?

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8. The vertices of $\triangle JKL$ have the coordinates $J(-4, -2)$, $K(4, 2)$, and $L(-2, 4)$, as shown.

Apply a dilation to $\triangle JKL \rightarrow \triangle J'K'L'$, centered on the origin and with a scale factor $k = 1.5$. Draw the image $\triangle J'K'L'$ on the set of axes below, labeling the vertices, and make a table showing the correspondence of both triangles' coordinate pairs.



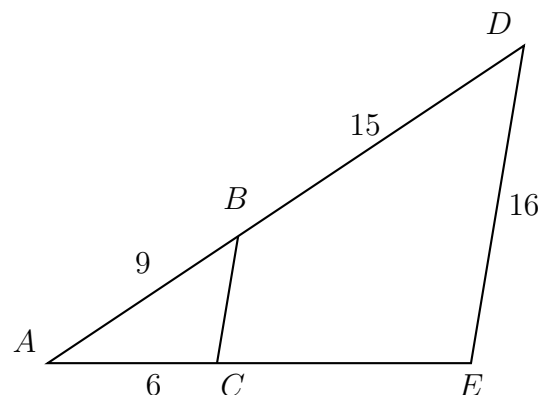
9. A dilation centered at A maps $\triangle ABC \rightarrow \triangle ADE$. Given $AB = 9$, $AC = 6$, $BD = 15$, and $DE = 16$. Find AD and the scale factor k . Then find AE and BC .

(a) $AD =$

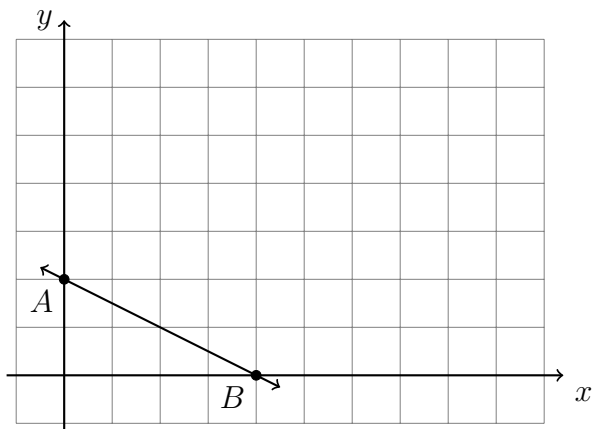
(b) $k =$

(c) $AE =$

(d) $BC =$



10. The line \overleftrightarrow{AB} has the equation $y = -\frac{1}{2}x + 2$. Apply a dilation mapping $\overleftrightarrow{AB} \rightarrow \overleftrightarrow{A'B'}$ with a factor of $k = 2$ centered at the origin. Draw and label the image on the grid. Write the equation of the line $\overleftrightarrow{A'B'}$.

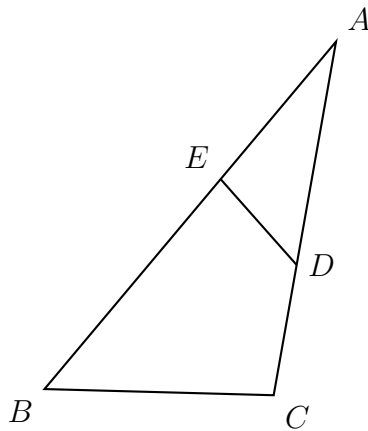


11. The diagram below shows $\triangle ABC$, with \overline{AEB} , \overline{ADC} , and $\angle ACB \cong \angle AED$. $AB = 18$, $AD = 12$, $AE = 9$, and $DE = 7$. Find the scale factor k , AC , and BC .

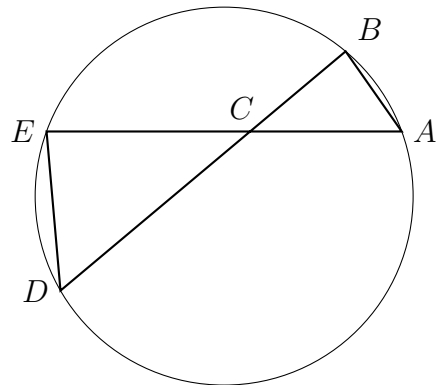
(a) $k =$

(b) $AC =$

(c) $BC =$

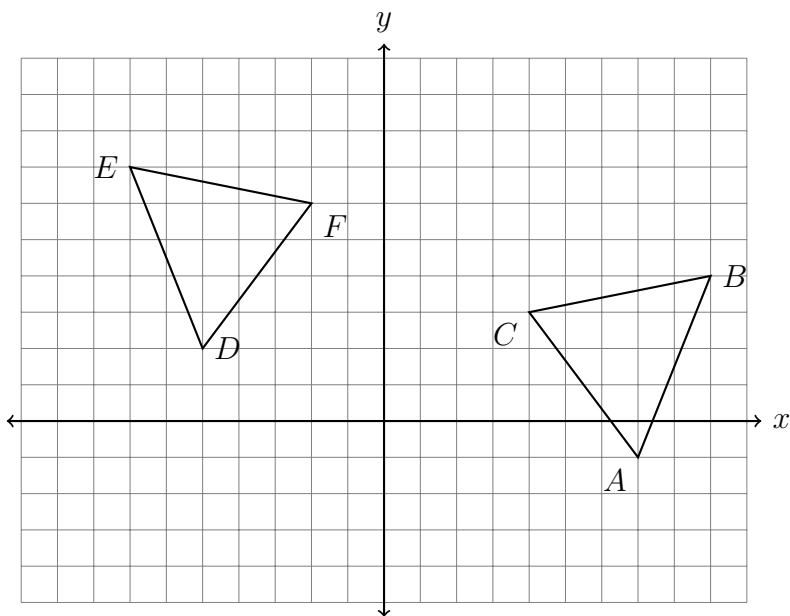


12. In the diagram below, the chords \overline{AE} and \overline{BD} intersect at C . Given $\triangle ABC \sim \triangle DEC$, $BC = 6$, $CD = 10$, and $CE = 8$. Determine the length of \overline{CA} .

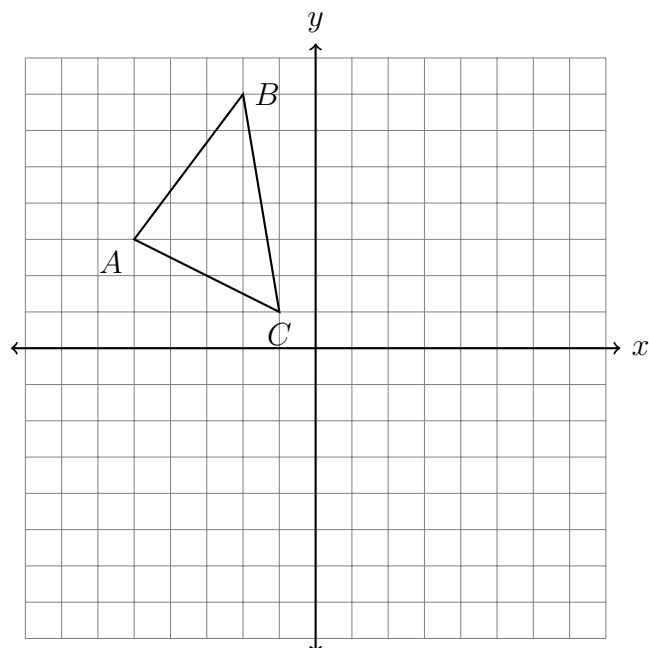


Congruence transformations

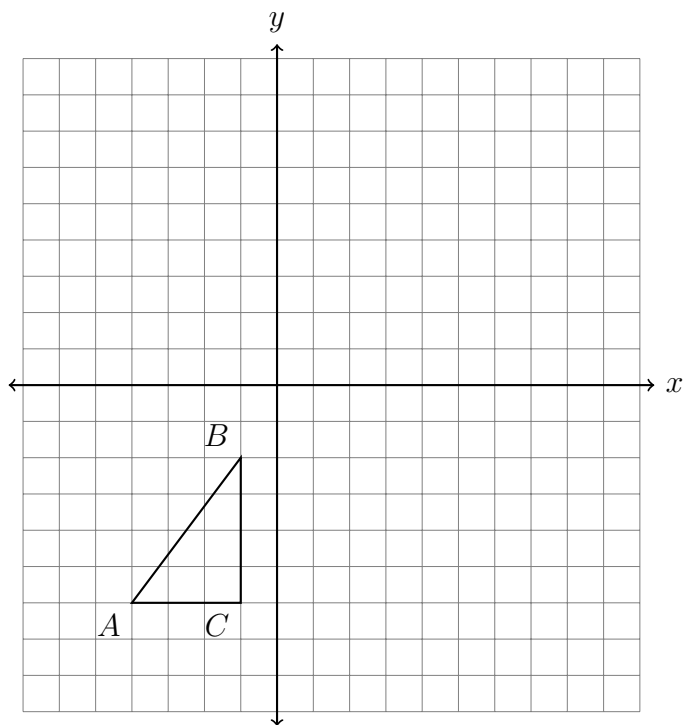
13. What transformation or series of transformations map $\triangle ABC$ onto $\triangle DEF$, shown below? Fully specify the transformation(s).



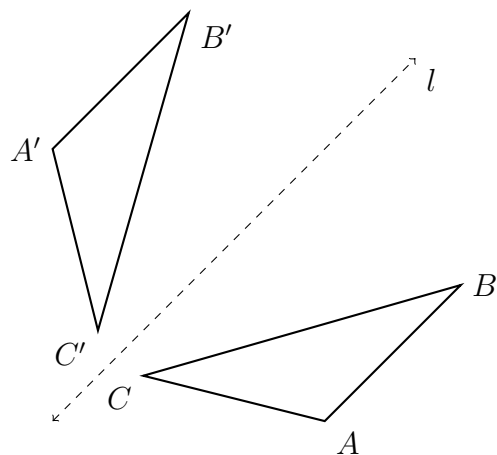
14. Reflect $\triangle ABC$ over the y -axis. Make a table of the coordinates and plot and label the image on the axes.



15. Rotate $\triangle ABC$ 90° counterclockwise around the origin, yielding $\triangle A'B'C'$. Then translate it by $(x, y) \rightarrow (x + 2, y + 7)$. Make a table of the coordinates showing $\triangle ABC \rightarrow \triangle A'B'C' \rightarrow \triangle A''B''C''$ and plot and label the images on the axes.



16. The $\triangle ABC$ is reflected across l to yield $\triangle A'B'C'$. $AB = 4x + 4$, $A'B' = 7x - 8$, and $BC = 5x + 10$. Find the length $B'C'$.



Using the distance formula to prove an isosceles triangle

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

A triangle is isosceles if and only two of its sides are congruent.

Shown below is triangle ABC , $A(-2, 2)$, $B(4, 5)$, and $C(1, -1)$.

Prove it is an isosceles triangle by

- (a) finding the length of each of the three sides,
- (b) stating which sides are congruent,
- (c) copying the theorem as your conclusion, adding *therefore $\triangle ABC$ is isosceles.*

