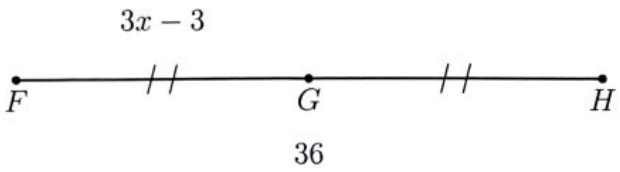
BECA/Huson/Geometry: Trigonometry
12 February 2025

First and last name:
Section: SOLUTIONS

5.5 Exam: Cumulative Review

1. Point G bisects $\overline{FH}$, with $FG = 3x - 3$, $FH = 36$. Find x.

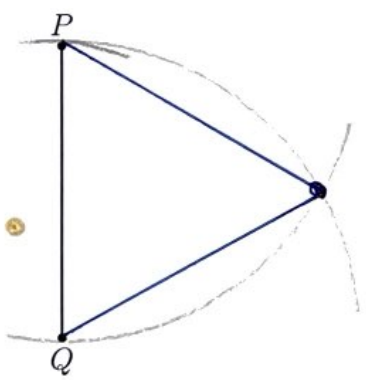


$2(3x-3) = 36$
$3x-3 = 18$
$3x = 21$
$x = 7$

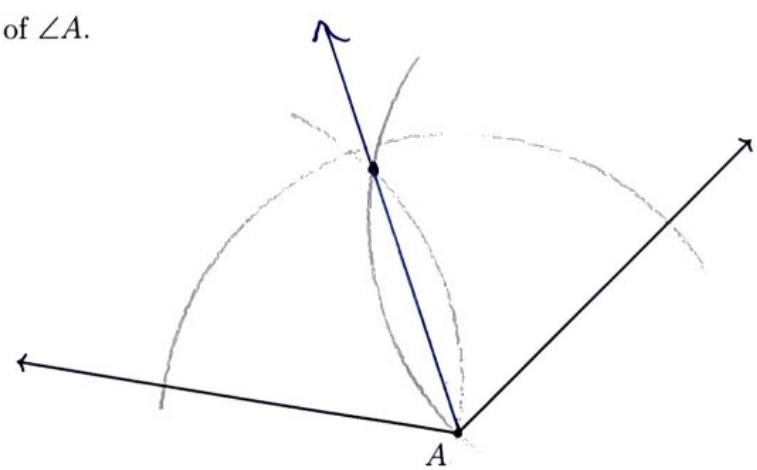
check
$3x-3 = 3(7)-3 = 18$
$18+18 = 36$ ✓

G.CO.12 Make and justify formal geometric constructions

2. Construct an equilateral triangle with side $\overline{PQ}$.

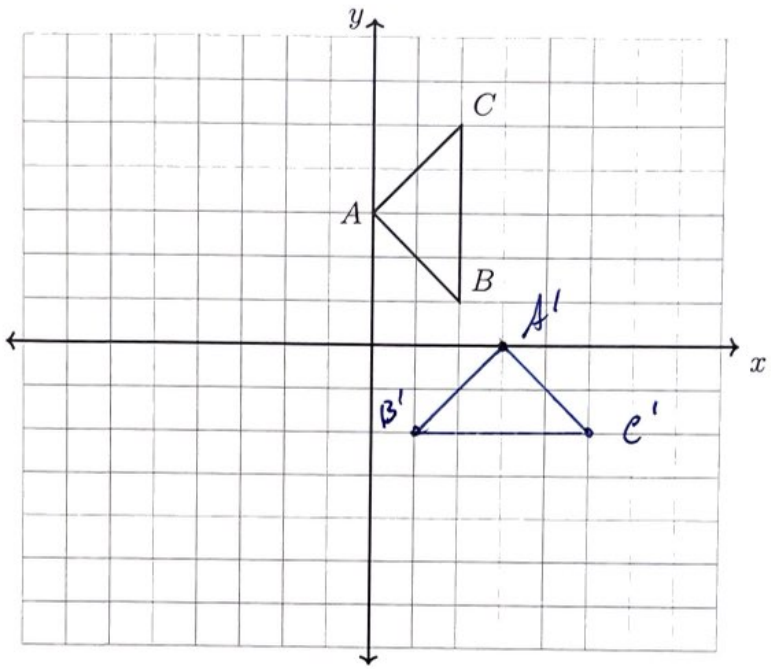


3. Construct the angle bisector of $\angle A$.



G.CO.5 Transform a figure using translation, reflection, or rotation

4. Rotate $\triangle ABC$ 90° clockwise around the origin. Label the image $\triangle A'B'C'$.



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

$T_{-2,+4}$ $Q'(-3,1)$

6. The dilation mapping $x \rightarrow 2x$ and $y \rightarrow 2y$ is applied to $\triangle ABC$.

   (a) Write as coordinate pairs the vertices of the image, $\triangle A'B'C'$

   $A(-3,2) \rightarrow$ $A'(-6,4)$

   $B(5,-2) \rightarrow$ $B'(10,-4)$

   $C(6,0) \rightarrow$ $C'(12,0)$

   (b) Which triangle is larger, or are they the same size? Justify your answer.

   $\triangle A'B'C'$ is larger. The dilation doubled the lengths

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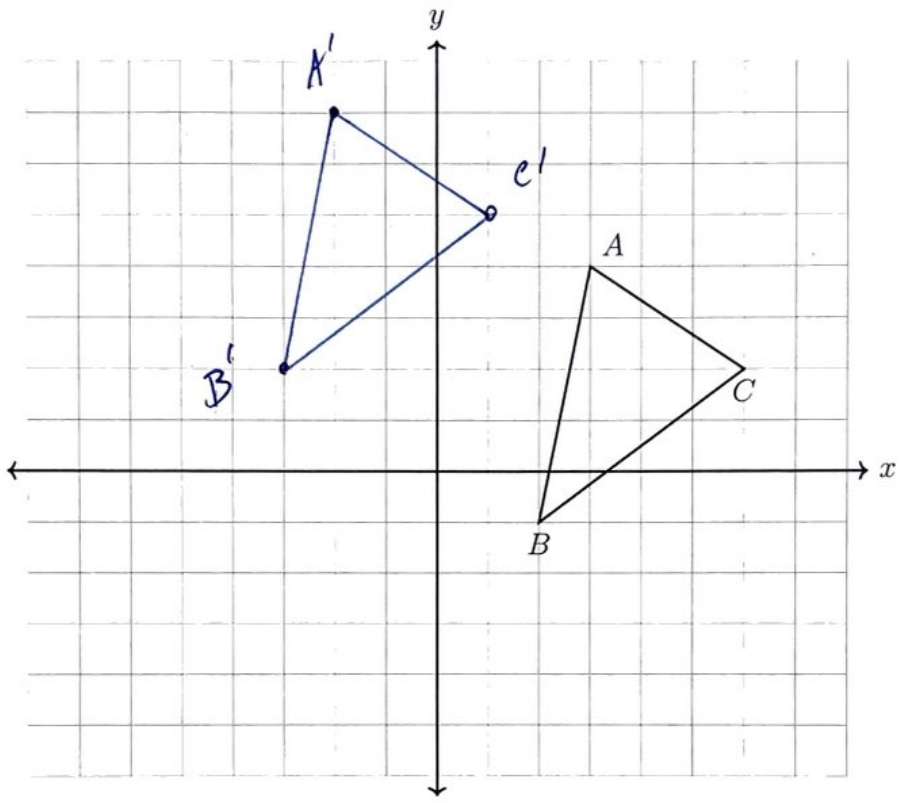
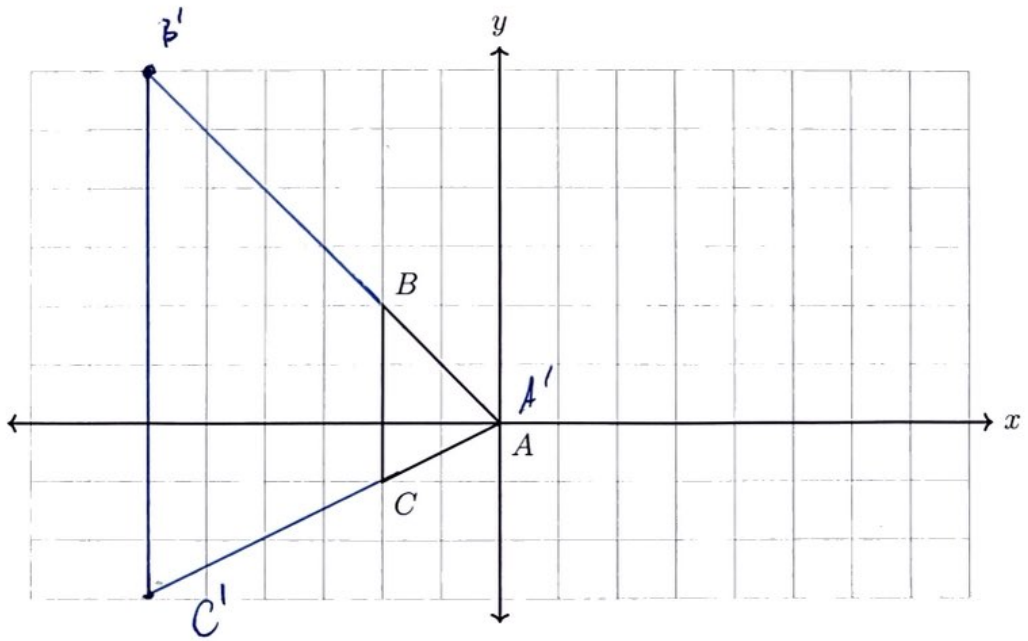
7. Apply a translation of up three and left five to $\triangle ABC$. Plot and label the image $\triangle A'B'C'$ on the axes below.



8. Dilate $\triangle ABC \to \triangle A'B'C'$ by a factor of $k = 3$ centered at the origin, $(x, y) \to (2x, 2y)$. Plot and label the image on the axes.



G.SRT.5 Use similarity criteria for triangles to solve problems

9. Given $\triangle ABC \sim \triangle DEF$, $m\angle B = 35°$, and $m\angle C = 100°$. Find $m\angle D$.

$m\angle D + 35 + 100 = 180$

$m\angle D = 45$

10. Similar triangles $\triangle ABP \sim \triangle JKP$ are shown with P the intersection of $\overline{AJ}$ and $\overline{BK}$.

(a) What line is parallel to $\overline{AB}$?

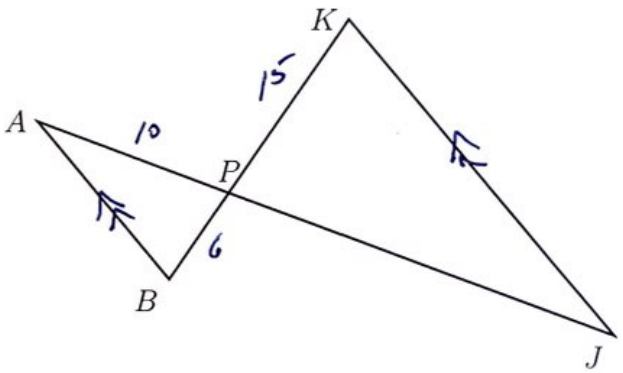
$\overleftrightarrow{JK}$

(b) If $AP = 10$, $BP = 6$, and $KP = 15$, what is the scale factor k?

$BP \to KP$

$6 \to 15$

$k = \frac{15}{6} = 2\frac{1}{2}$



11. A dilation maps $\triangle ABC \to \triangle ADE$. Given $AB = 12$, $AC = 15$, $BC = 10$, $CE = 15$.

Find the scale factor and side lengths:

$AC \to AE$

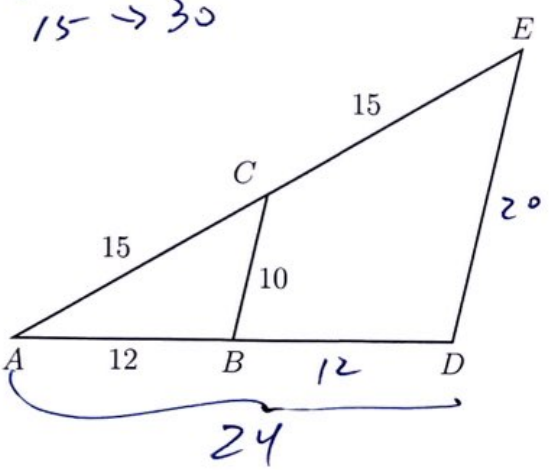
$15 \to 30$

$k = \frac{30}{15} = 2$

$DE = 10 \cdot 2 = 20$

$AD = 12 \cdot 2 = 24$

$BD = 24 - 12 = 12$



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12. Triangle ADE is drawn with $\overline{BC} \parallel \overline{DE}$, as shown. Given $AB = 10$, $BC = 12$, $AC = 14$, and $BD = 15$.

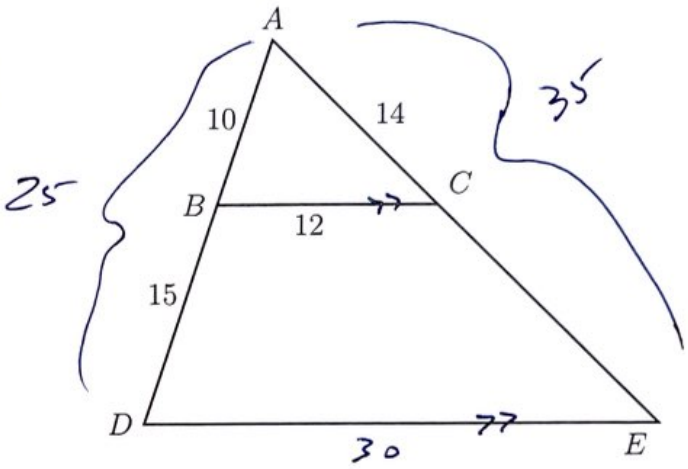
(a) Find DE.

AB → AD
10 → 25
$k = \frac{25}{10} = 2\frac{1}{2}$

$DE = 12 \cdot 2\frac{1}{2} = 30$

(b) Find AE.

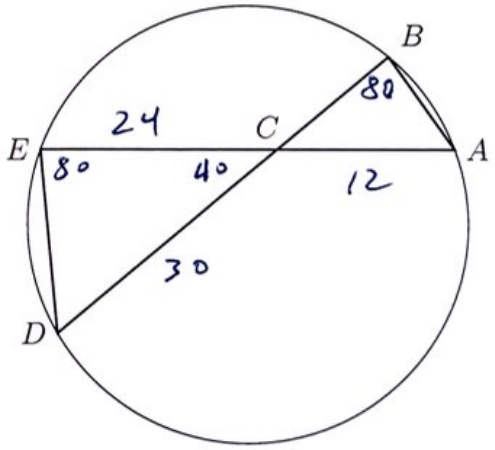
$AE = 14 \cdot 2\frac{1}{2} = 35$



13. In the diagram below, the chords $\overline{AE}$ and $\overline{BD}$ intersect at C, with $\triangle A\underline{B}C \sim \triangle D\underline{E}C$.

(a) $m\angle\underline{E} = 80°$ and $m\angle ECD = 40°$.
Find $m\angle\underline{B}$.

$m\angle B = 80$



(b) $AC = 12$, $CD = 30$, and $CE = 24$.
Find BC.

AC → CD
12 → 30
$k = \frac{30}{12} = 2\frac{1}{2}$

$BC = 24 \div 2\frac{1}{2} = 9.6$

G.SRT.C.8 Use trigonometry to solve problems with right triangles

14. As shown, right $\triangle ABC$ has $AC = 8, BC = 15, AB = 17$, $\text{m}\angle C = 90°$.

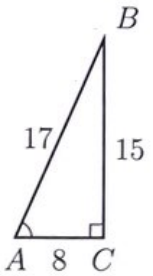
Express each trigonometric ratio as a fraction.

(a) $\sin A =$ $\frac{15}{17}$

(b) $\cos A =$ $\frac{8}{17}$

(c) $\tan A =$ $\frac{15}{8}$

(d) Find the angle measure of $\angle A$ rounded to the *nearest whole degree.*



$m\angle A = \sin^{-1}\frac{15}{17} = 61.927\ldots \approx 62°$

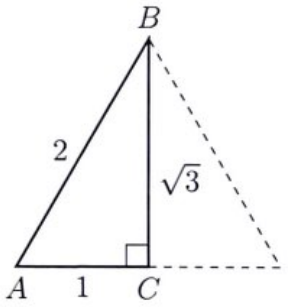
15. Right $\triangle ABC$ has base $AC = 1$, height $BC = \sqrt{3}$, and hypotenuse $AB = 2$ as marked. (A reflection $\triangle ABC$ of is also shown.)

(a) Write down the angle measure of $\angle A$.

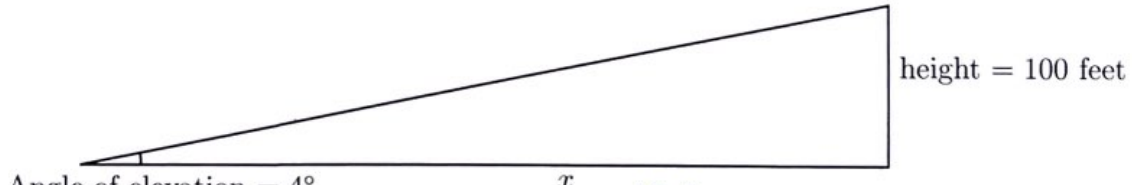
$60°$

(b) Write down $\sin A$.

$\frac{\sqrt{3}}{2}$



16. A sailor observes the top of a lighthouse with an angle of elevation of 4°. She knows the lighthouse is 100 feet tall. Determine and state the distance x between the sailor and the lighthouse, to the *nearest foot.*



$\tan 4° = \frac{100}{x}$

$x = \frac{100}{\tan 4} = 1430.066\ldots$

≈ 1430 ft.