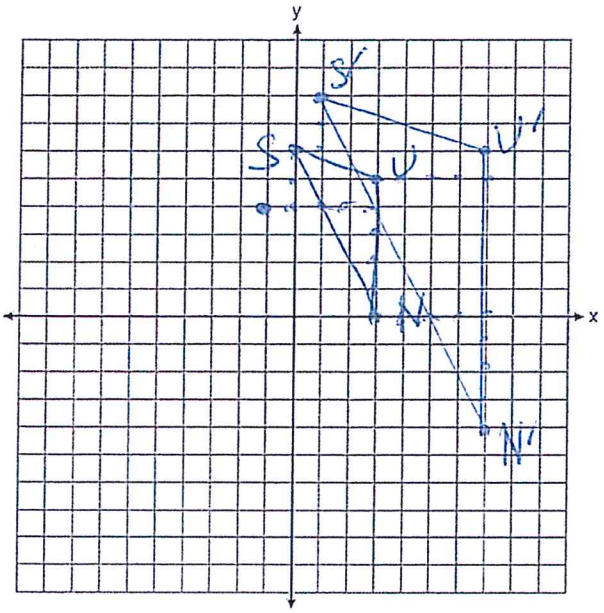
Name Schlansky
Mr. Schlansky

Date _____
Geometry

Similar Triangles Review Sheet

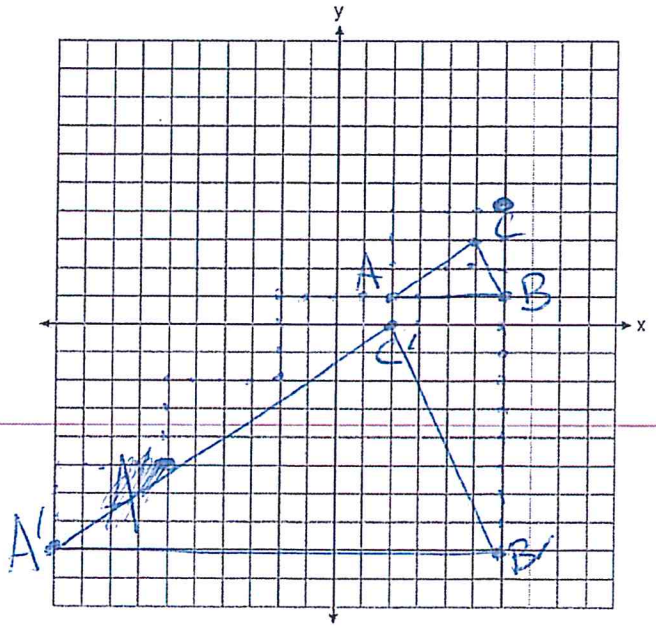
1. Triangle *SUN* has coordinates *S*(0,6), *U*(3,5), and *N*(3,0). On the accompanying grid, draw and label $\triangle SUN$. Then, graph and state the coordinates of $\triangle S'U'N'$, the image of $\triangle SUN$ after a dilation of 2 centered at (-1,4).



S'(1,8)
U'(7,6)
N'(7,-4)

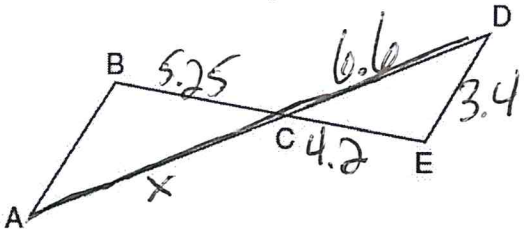
Count from the center of dilation to each point and do that the scale factor number of times.

2. Triangle ABC has coordinates $A(2,1)$, $B(6,1)$, $C(5,3)$. What is the image of this triangle after a dilation of 4 centered at (6,4). Graph both the image and the pre image.



3. In the diagram below, $\overline{AD}$ intersects $\overline{BE}$ at C, and $\overline{AB} \| \overline{DE}$.

If $CD = 6.6$ cm, $DE = 3.4$ cm, $CE = 4.2$ cm, and $BC = 5.25$ cm, what is the length of $\overline{AC}$, to the *nearest hundredth of a centimeter*?

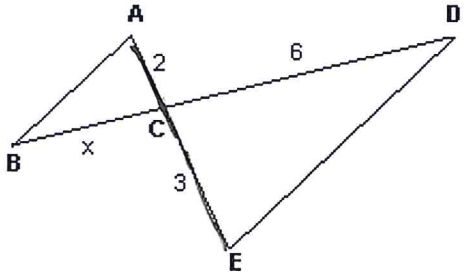


$\frac{X}{6.6} = \frac{5.25}{4.2}$

$\frac{4.2x}{4.2} = \frac{34.65}{4.2}$

$x = 8.25$

4. In the diagram below, $\overline{AB} \| \overline{DE}$. If $AC = 2$, $CD = 6$, and $CE = 3$, what is BC?

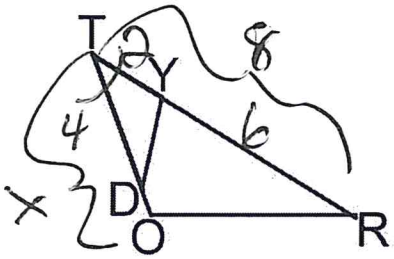


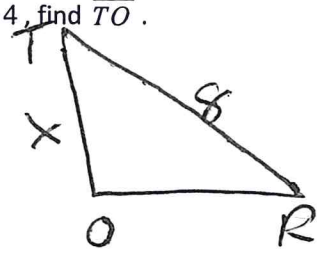
$\frac{2}{3} = \frac{x}{6}$

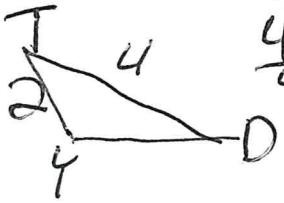
$\frac{3x}{3} = \frac{12}{3}$

$x = 4$

5. In triangle TOR, Y is on $\overline{TR}$, and D is on $\overline{TO}$ so that $\angle TYD \cong \angle ROT$. If $\overline{TY} = 2$, $\overline{YR} = 6$, and $\overline{TD} = 4$, find $\overline{TO}$.





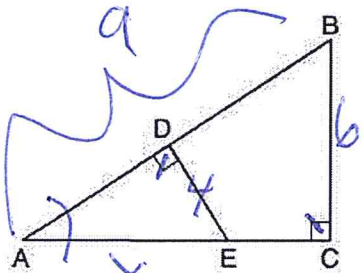


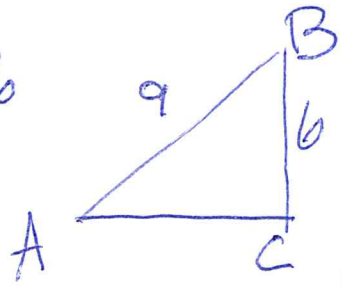
$\frac{x}{2} = \frac{8}{4}$

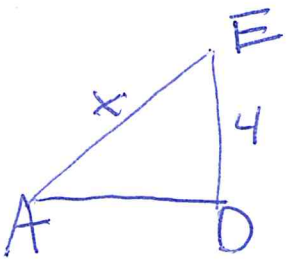
$\frac{4x}{4} = \frac{16}{4}$

$x = 4$

6. In $\triangle ABC$ shown below, $\angle ACB$ is a right angle, E is a point on $\overline{AC}$, and $\overline{ED}$ is drawn perpendicular to hypotenuse $\overline{AB}$. If $AB = 9$, $BC = 6$, and $DE = 4$, what is the length of $\overline{AE}$?





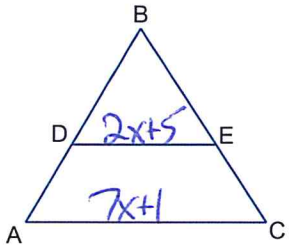


$\frac{9}{x} = \frac{6}{4}$

$\frac{6x}{6} = \frac{36}{6}$

$x = 6$

7. D and E are midpoints of $\overline{AB}$ and $\overline{BC}$ respectively. If $\overline{DE} = 2x+5$ and $\overline{AC} = 7x+1$, find the measure of $\overline{AC}$.



2(midsegment) = opposite side

$2(2x+5) = 7x+1$

$4x+10 = 7x+1$

$-4x \quad -4x$

$10 = 3x+1$

$-1 \quad -1$

$\frac{9}{3} = \frac{3x}{3}$

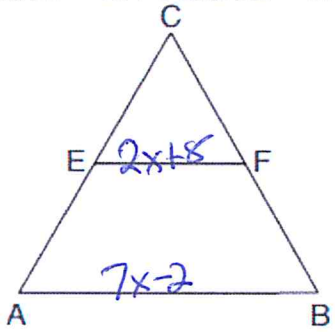
$3 = x$

$AC = 7x+1$

$AC = 7(3)+1$

$AC = 22$

8. In the diagram of ABC shown below, E and F are the midpoints of $\overline{AC}$ and $\overline{BC}$, respectively.
If $EF = 2x+8$ and $AB = 7x-2$, what is AB?



2(midsegment) = opposite side

$2(2x+8) = 7x-2$

$4x+16 = 7x-2$

$-4x \quad -4x$

$16 = 3x-2$

$+2 \quad +2$

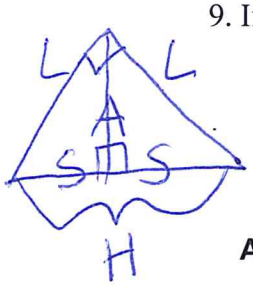
$\frac{18}{3} = \frac{3x}{3}$

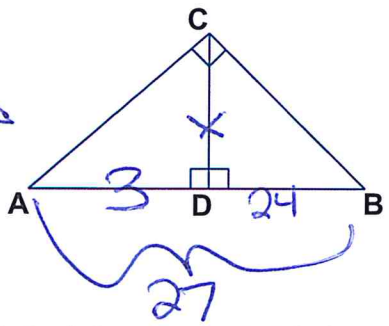
$6 = x$

$AB = 7(6)-2$

$AB = 40$

9. If $\overline{AD} = 3$ and $\overline{AB} = 27$, find $\overline{CD}$ to the *nearest tenth*.





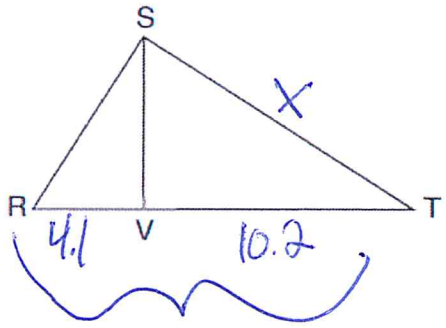
$\frac{S}{A} = \frac{A}{S}$

$\frac{3}{x} = \frac{x}{24}$

$\sqrt{x^2} = \sqrt{72}$

$x = 8.5$

10. In right triangle RST below, altitude $\overline{SV}$ is drawn to hypotenuse $\overline{RT}$. If $RV = 4.1$ and $TV = 10.2$, what is the length of $\overline{ST}$, to the *nearest tenth*?



$\frac{H}{L} = \frac{L}{S}$

$\frac{14.3}{x} = \frac{x}{10.2}$

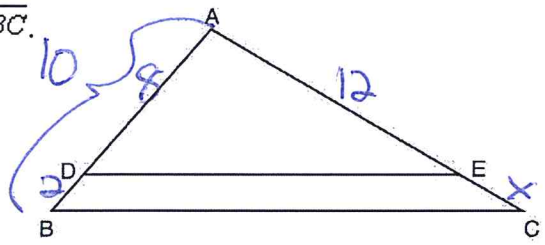
$\sqrt{x^2} = \sqrt{145.86}$

$x = 12.1$

11. In the diagram of $\triangle ABC$ shown below, $\overline{DE} \parallel \overline{BC}$.

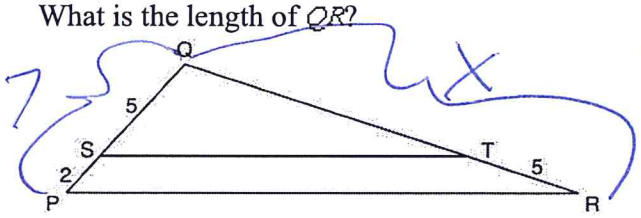
If $AB = 10$, $AD = 8$, and $AE = 12$, what is the length of $\overline{EC}$?

1) 6
2) 2
3) 3
4) 15



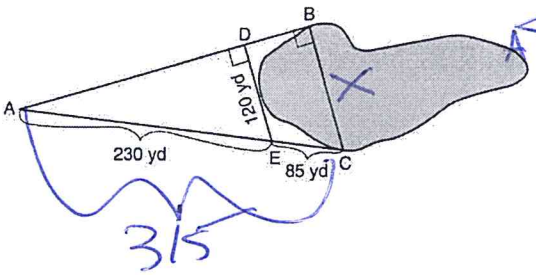
top bottom / top bottom no bases $\frac{8}{12} = \frac{2}{x}$ $8x = 24$ $x = 3$

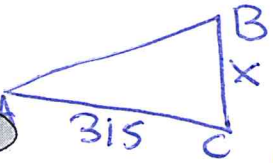
12. In the diagram below of $\triangle PQR$, $\overline{ST}$ is drawn parallel to $\overline{PR}$, $PS = 2$, $SQ = 5$, and $TR = 5$
What is the length of $\overline{QR}$?

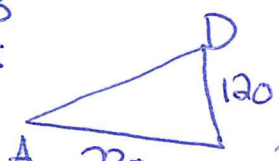


no bases side / side = bottom / bottom $\frac{7}{x} = \frac{2}{5}$ $2x = 35$ $x = 17.5$

13. To find the distance across a pond from point B to point C, a surveyor drew the diagram below. The measurements he made are indicated on his diagram.
Use the surveyor's information to determine and state the distance from point B to point C, to the *nearest yard*.

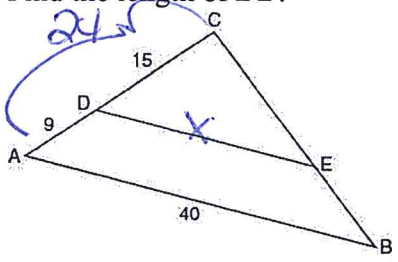




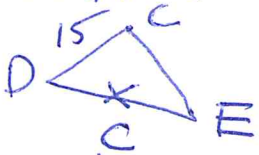


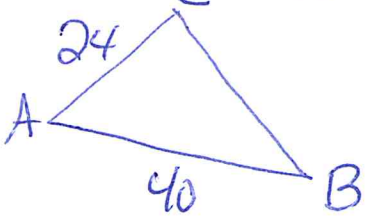
bases separate $\frac{x}{120} = \frac{315}{230}$ $\frac{230x}{230} = \frac{37800}{230}$ $x = 164$

14. In the diagram of $\triangle ABC$ below, $\overline{DE}$ is parallel to $\overline{AB}$, $CD = 15$, $AD = 9$, and $AB = 40$.
Find the length of $\overline{DE}$.



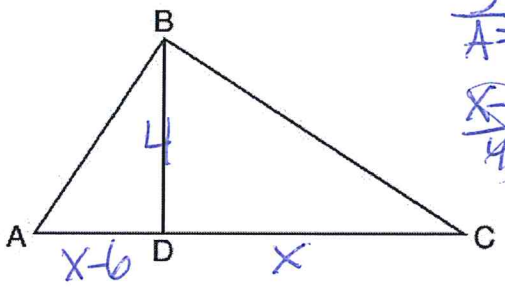
bases separate





$\frac{15}{24} = \frac{x}{40}$ $\frac{24x}{24} = \frac{600}{24}$ $x = 25$

15. In the diagram below of right triangle ABC, altitude $\overline{BD}$ is drawn to hypotenuse $\overline{AC}$. If $BD = 4$, $AD = x - 6$, and $CD = x$, what is the length of $\overline{CD}$?



$\frac{5}{A} = \frac{A}{5}$

$\frac{x-6}{4} = \frac{4}{x}$

$x(x-6) = 16$

$x^2 - 6x = 16$

$-16 \quad -16$

$x^2 - 6x - 16 = 0$

$(x-8)(x+2) = 0$

$x-8=0 \quad x+2=0$

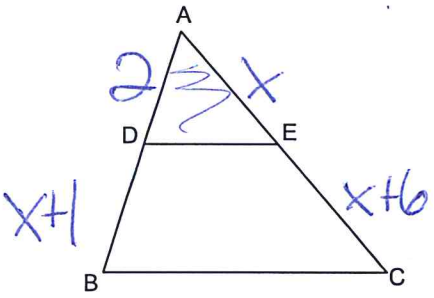
$+8 \quad +8 \quad -2 \quad -2$

$x = 8 \quad x = -2$

$CD = 8$

Mr. X?!

16. In triangle ABC, $\overline{DE} \parallel \overline{BC}$. If $\overline{AD} = 2$, $\overline{DB} = x + 1$, $\overline{AE} = x$, and $\overline{EC} = x + 6$, find $\overline{AE}$



$\frac{\text{top}}{\text{top}} = \frac{\text{bottom}}{\text{bottom}}$

$\frac{2}{x} = \frac{x+1}{x+6}$

$x(x+1) = 2(x+6)$

$x^2 + 1x = 2x + 12$

$-2x - 12 \quad -2x - 12$

$x^2 - 1x - 12 = 0$

$(x-4)(x+3) = 0$

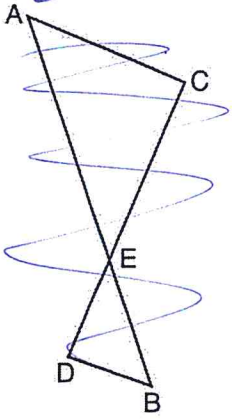
$x-4=0 \quad x+3=0$

$+4 \quad +4 \quad -3 \quad -3$

$x = 4 \quad x = -3$

$AE = 4$

17. As shown in the diagram below, $\overline{AB}$ and $\overline{CD}$ intersect at E, and $\overline{AC} \parallel \overline{BD}$.



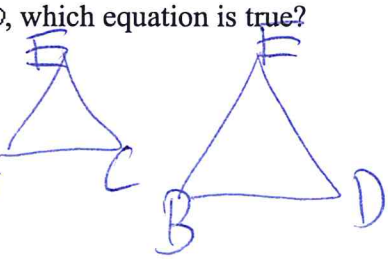
Given $\triangle AEC \sim \triangle BED$, which equation is true?

1) $\frac{CE}{DE} = \frac{EB}{EA}$

2) $\frac{EC}{AE} = \frac{BE}{ED}$

3) $\frac{AE}{BE} = \frac{AC}{BD}$

4) $\frac{ED}{EC} = \frac{AC}{BD}$



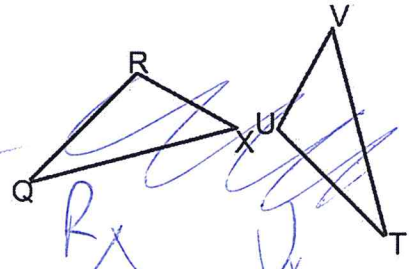
18. In the diagram below, $\Delta QRX \sim \Delta TUV$. Which of the following statements is *not* true?

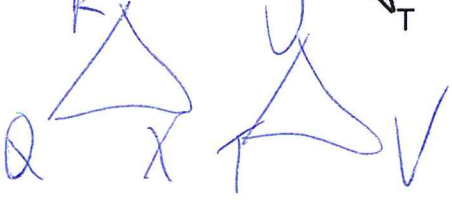
1) $\frac{QR}{TU} = \frac{QX}{TV}$

2) $\frac{\angle X}{\angle V} = \frac{\angle Q}{\angle T}$

3) $\frac{RX}{UV} = \frac{VT}{XQ}$

4) $\frac{QX}{QR} = \frac{TV}{TU}$





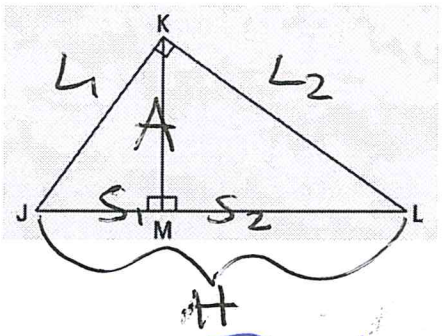
19. In right triangle *JKL* below, altitude $\overline{KM}$ is drawn to hypotenuse $\overline{JL}$. Which of the following proportions is *not* true?

1) $\frac{\overline{JL}}{\overline{JK}} = \frac{\overline{JK}}{\overline{JM}}$ $\frac{H}{L_1} = \frac{L_1}{S_1}$ ✓

2) $\frac{\overline{JM}}{\overline{KM}} = \frac{\overline{KM}}{\overline{ML}}$ $\frac{S_1}{A} = \frac{A}{S_2}$ ✓

3) $\frac{\overline{JL}}{\overline{KL}} = \frac{\overline{KL}}{\overline{JM}}$ $\frac{H}{L_2} = \frac{L_2}{S_1}$ ✗

4) $\frac{\overline{ML}}{\overline{MK}} = \frac{\overline{MK}}{\overline{MJ}}$ $\frac{S_2}{A} = \frac{A}{S_1}$ ✓



20. In right triangle *SNO* below, altitude $\overline{NW}$ is drawn to hypotenuse $\overline{SO}$.

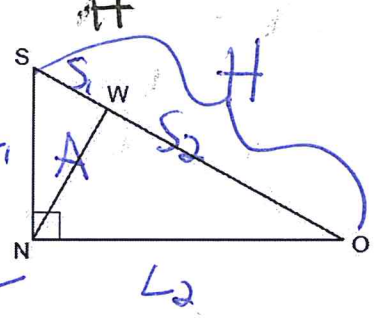
Which statement is *not* always true?

1) $\frac{SO}{SN} = \frac{SN}{SW}$ $\frac{H}{L_1} = \frac{L_1}{S_1}$ ✓

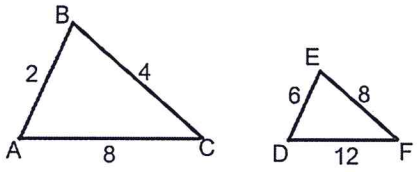
2) $\frac{SW}{NS} = \frac{NS}{OW}$ $\frac{S_1}{L_1} = \frac{L_1}{S_2}$ ✗

3) $\frac{SO}{ON} = \frac{ON}{OW}$ $\frac{H}{L_2} = \frac{L_2}{S_2}$ ✓

4) $\frac{OW}{NW} = \frac{NW}{SW}$ $\frac{S_2}{A} = \frac{A}{S_1}$ ✓



21. Determine whether the following triangles are similar. Explain your answer.

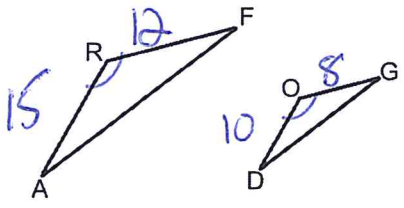


$\frac{2}{6} = \frac{4}{8} = \frac{8}{12}$

$\frac{1}{3} = \frac{1}{2} = \frac{2}{3}$

No, the sides are not in proportion

22. In the diagram below, $\overline{AR} = 15$, $\overline{RF} = 12$, $\overline{DO} = 10$, $\overline{OG} = 8$, and $\angle ARF \cong \angle DOG$. Must $\Delta ARF \sim \Delta DOG$? Explain your answer.



$\frac{15}{10} = \frac{12}{8}$ YES, SAS.

$\frac{3}{2} = \frac{3}{2}$

✓

23. After a dilation with center (0, 0), the image of $\overline{DB}$ is $\overline{D'B'}$. If $DB = 4.5$ and $D'B' = 18$, what is the scale factor of this dilation?

$\text{scale factor} = \frac{\text{image}}{\text{original}} = \frac{18}{4.5} = 4$

24. $\overline{DR}$ is dilated centered at point D such that $\overline{DR} = 8$ and $\overline{D'R'} = 12$. What is the scale factor of the dilation?

$\text{scale factor} = \frac{\text{image}}{\text{original}} = \frac{12}{8} = \frac{3}{2}$

25. Triangle JOY has a perimeter of 10 and an area of 12. What is the perimeter and area of triangle JOY after a dilation by a scale factor of 2?

image perimeter = original perimeter(scale factor) $P = 10(2) = 20$

image area = original area(scale factor)^2 $A = 12(2)^2 = 48$

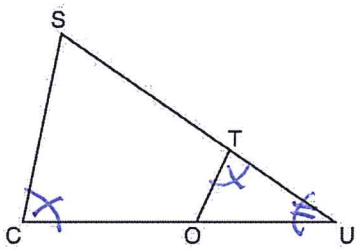
26. Quadrilateral CAMI has a perimeter of 20 and an area of 15. What is the perimeter and area of quadrilateral CAMI after a dilation by a scale factor of 4?

$P = 20(4) = 80$

$A = 15(4)^2 = 240$

27. Given: $\angle C \cong \angle OTU$.

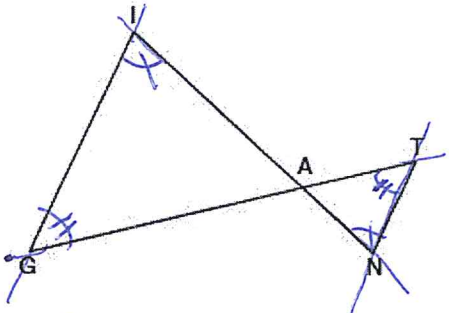
Prove: $\overline{SC} \bullet \overline{OU} = \overline{OT} \bullet \overline{SU}$



Statements	Reasons
① $\angle C \cong \angle OTU$	① given
② $\angle U \cong \angle U$	② reflexive property
③ $\triangle SCU \sim \triangle OTU$	③ AA≅AA
④ $\frac{SC}{SU} = \frac{OT}{OU}$	④ CSSTIP
⑤ $\overline{SC} \cdot \overline{OU} = \overline{OT} \cdot \overline{SU}$	⑤ cross products are equal

28. Given: $\overline{GI}$ is parallel to $\overline{NT}$.

Prove: $\overline{IA} \bullet \overline{TN} = \overline{IG} \bullet \overline{AN}$



Statements	Reasons
① $\overline{GI} \parallel \overline{NT}$	① given
② $\angle I \cong \angle N$, $\angle G \cong \angle T$	② Parallel lines cut by a transversal create congruent alternate interior angles.
③ $\triangle GIA \sim \triangle TNA$	③ AA≅AA
④ $\frac{IA}{AN} = \frac{IG}{TN}$	④ CSSTIP
⑤ $\overline{IA} \cdot \overline{TN} = \overline{IG} \cdot \overline{AN}$	⑤ cross products are equal