[G21 7.4-7.5 Practice]

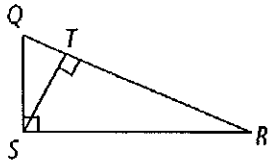
Name ANSWERS Class _____ Date _____

# 7-4 Practice

Form G

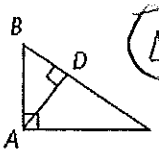
## Similarity in Right Triangles

**Identify the following in right $\Delta QRS$.**

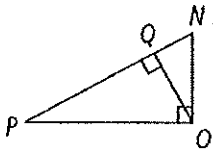



1. the hypotenuse $\overline{QR}$
2. the segments of the hypotenuse $\overline{QT}$, $\overline{TR}$
3. the altitude $\overline{ST}$
4. the segment of the hypotenuse adjacent to leg $\overline{QS}$ $\overline{QT}$

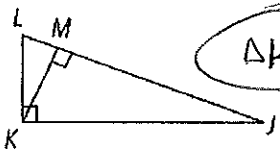
**Write a similarity statement relating the three triangles in the diagram.**

5. 

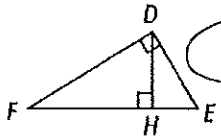
$\Delta ABC \sim \Delta DBA \sim \Delta DAC$

6. 

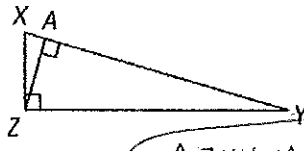
$\Delta ONP \sim \Delta QNO \sim \Delta QOP$

7. 

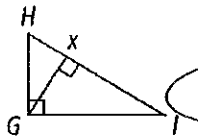
$\Delta KLJ \sim \Delta MLK \sim \Delta MKJ$

8. 

$\Delta DEF \sim \Delta HED \sim \Delta HDF$

9. 

$\Delta ZXY \sim \Delta AXZ \sim \Delta AZY$

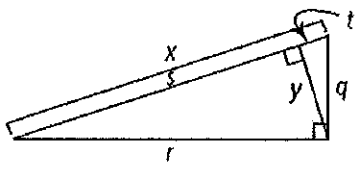
10. 

$\Delta GHI \sim \Delta XHG \sim \Delta XGI$

**Algebra Find the geometric mean of each pair of numbers.**

11. 9 and 4 $\frac{x}{9} = \frac{4}{x}$ $x^2 = 36$ $x = 6$
12. 14 and 6 $\frac{14}{x} = \frac{x}{6}$ $x^2 = 84$ $x = \sqrt{84}$ $x = 2\sqrt{21}$
13. 9 and 30 $\frac{9}{x} = \frac{x}{30}$ $x^2 = 270$ $x = 3\sqrt{30}$
14. 25 and 49 $\frac{x}{25} = \frac{49}{x}$ $x^2 = \sqrt{25}\sqrt{49}$ $x = 35$
15. 4 and 120 $\frac{4}{x} = \frac{x}{120}$ $x^2 = 4\sqrt{30}$
16. 9 and 18 $\frac{9}{x} = \frac{x}{18}$ $x^2 = \sqrt{9}\sqrt{9}\sqrt{2}$ $9\sqrt{2}$
17. 16 and 64 $\frac{x}{16} = \frac{64}{x}$ $x^2 = 32$
18. 5 and 25 $\frac{5}{x} = \frac{x}{25}$ $x^2 = 5\sqrt{5}$
19. 12 and 16 $\frac{x}{12} = \frac{16}{x}$ $x^2 = 8\sqrt{3}$

**Use the figure at the right to complete each proportion.**



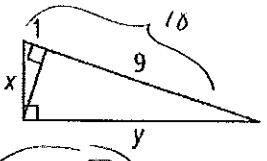

20. $\frac{q}{r} = \frac{t}{y}$
21. $\frac{s}{y} = \frac{y}{t}$
22. $\frac{t}{q} = \frac{q}{x}$
23. $\frac{q}{x} = \frac{t}{q}$
24. $\frac{s}{r} = \frac{y}{q}$
25. $\frac{s}{r} = \frac{r}{x}$

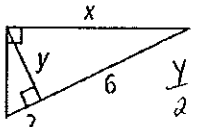
Name _____ Class _____ Date _____

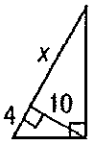
# 7-4 Practice (continued) Form G

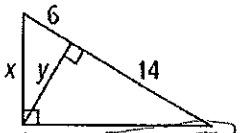
## Similarity in Right Triangles

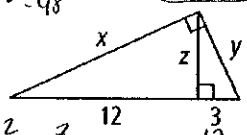
**Algebra** Solve for the value of the variables in each right triangle.

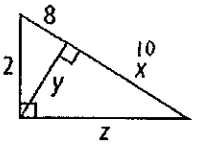
26. 


27. 

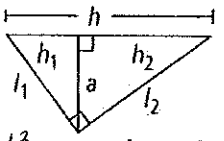

28. 


29. 


30. 


31. 


**The diagram shows the parts of a right triangle with an altitude to the hypotenuse. For the two given measures, find the other four. Use simplest radical form.**



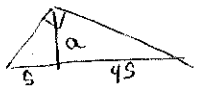

32. $h = 12, h_1 = 4$

33. $a = 6, h_2 = 9$

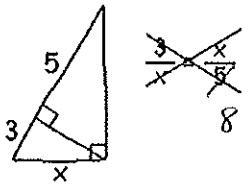
34. $\ell_1 = 6\sqrt{3}, h_2 = 3$

35. $h_1 = 5, \ell_2 = 2\sqrt{51}$

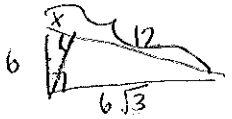
36. The altitude of the hypotenuse of a right triangle divides the hypotenuse into 45 in. and 5 in. segments. What is the length of the altitude?




37. **Error Analysis** A classmate writes an incorrect proportion to find $x$. Explain and correct the error.




38. **Draw a Diagram** The sides of a right triangle measure $6\sqrt{3}$ in., 6 in., and 12 in. If an altitude is drawn from the right angle to the hypotenuse, what is the length of the segment of the hypotenuse adjacent to the shorter leg? What is the length of the altitude?



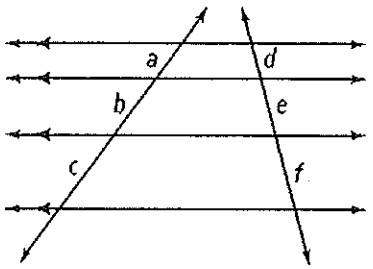
Name _____ Class _____ Date _____

# 7-5 Practice

Form G

## Proportions in Triangles

**Use the figure at the right to complete each proportion.**




1. $\frac{a}{c} = \frac{[d]}{f}$

2. $\frac{f}{e} = \frac{c}{[b]}$

3. $\frac{[b]}{c} = \frac{e}{f}$

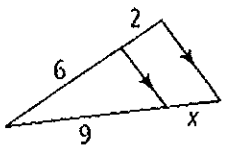
4. $\frac{a}{[d]} = \frac{b}{e}$

5. $\frac{a}{b} = \frac{[d]}{e}$

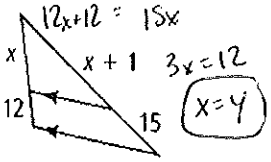
6. $\frac{e}{[b]} = \frac{f}{c}$

**Algebra Solve for $x$.**

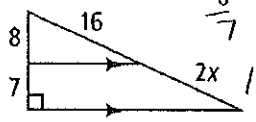
7. $\frac{6}{2} = \frac{9}{x}$, $6x = 18$, $x = 3$



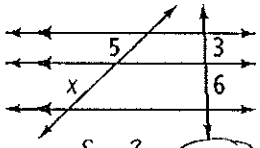

8. $\frac{x}{12} = \frac{x+1}{15}$, $12x + 12 = 15x$, $3x = 12$, $x = 4$




9. $\frac{8}{7} = \frac{16}{2x}$, $112 = 16x$, $x = 7$

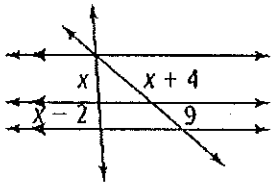



10.




$\frac{5}{x} = \frac{3}{6}$, $x = 10$

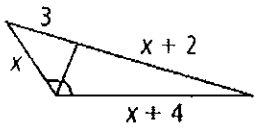
11.




$\frac{x}{x-2} = \frac{x+4}{9}$, $x^2 + 2x - 8 = 9x$

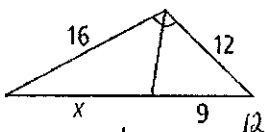
12. $x^2 - 7x - 8 = 0$, $(x+1)(x-8) = 0$, $x = -1$, $8 = x$

13.



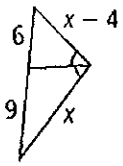

$\frac{x}{3} = \frac{x+4}{x+2}$, $3x + 12 = x^2 + 2x$, $0 = x^2 - x - 12$, $(x+3)(x-4) = 0$, $x = 4$

14.



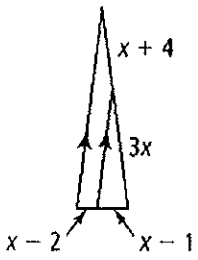

$\frac{16}{x} = \frac{12}{9}$, $12x = 144$, $x = 12$

15.



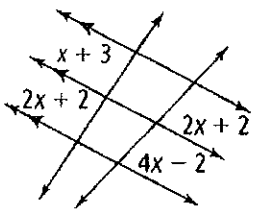

$\frac{x-4}{6} = \frac{x}{9}$, $6x = 9x - 36$, $-3x = -36$, $x = 12$

16.



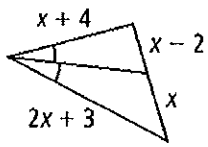

$\frac{3x}{x+4} = \frac{x-1}{x-2}$, $x^2 + 3x - 4 = 3x^2 - 6x$, $0 = 2x^2 - 9x + 4$, $(2x - 8)(-1x + 4) = 0$, $2x(x-4) - 1(x-4)$, $x = 4$, $(2x-1)(x-4) = 0$

17.




$\frac{x+3}{2x+2} = \frac{2x+2}{4x-2}$, $4x^2 + 8x + 4 = 4x^2 + 10x - 6$, $10 = 2x$, $x = 5$

18.

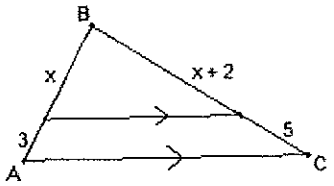



$\frac{x+4}{x-2} = \frac{2x+3}{x}$, $2x^2 - x - 6 = x^2 + 4x$, $x^2 - 5x - 6 = 0$, $(x+1)(x-6) = 0$, $x = -1$, $6 = x$

To solve for X in the triangle below, which method should we use? (check one)

(a) side-splitting theorem ✓

(b) Or similar triangles _____




Proportion $\frac{x}{3} = \frac{x+2}{5}$ $5x = 3x + 6$

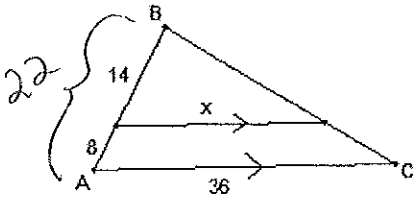
$2x = 6$

$x = 3$

To solve for X in the triangle below, which method should we use? (check one)

(a) side-splitting theorem _____

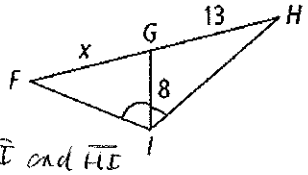
(b) Or similar triangles ✓




Proportion $\frac{14}{x} = \frac{22}{36}\ \frac{11}{18}$ $11x =$

$x =$ _____

**21. Error Analysis** Your classmate says you can use the Triangle-Angle-Bisector Theorem to find the value of $x$ in the diagram. Explain what is wrong with your classmate's statement.




need to know $\overline{FI}$ and $\overline{HI}$

**22. Reasoning** An angle bisector of a triangle divides the opposite side of the triangle into segments 3 in. and 6 in. long. A second side of the triangle is 5 in. long. Find the length of the third side of the triangle. Explain how you arrived at the correct length.



$\frac{5}{3} = \frac{x}{6}$

$3x = 30$

$x = 10$

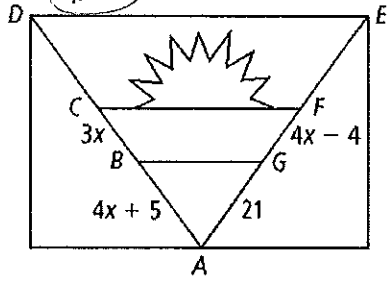
**23.** The flag of Antigua and Barbuda is like the image at the right. In the image, $\overline{DF} \parallel \overline{CF} \parallel \overline{BG}$.

a. An artist has made a sketch of the flag for a mural. The measures indicate the length of the lines in feet. What is the value of $x$?

b. What type of triangle is $\Delta ACF$? Explain.

c. **Given:** $\overline{DF} \parallel \overline{CF} \parallel \overline{BG}$

**Prove:** $\Delta ABG \sim \Delta ACF \sim \Delta ADE$




$\frac{4x+5}{3x} = \frac{21}{4x-4}$

$63x = 16x^2 + 4x - 20$

$0 = 16x^2 - 59x - 20$





320

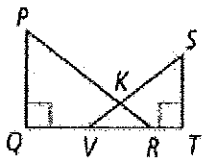
16 · 20

8 · 40

Geometry 21 **7.3 Proving Triangles Similar Practice** Name ANSWERS per____

1) **Given:** $\overline{PQ} \perp \overline{QT}, \overline{ST} \perp \overline{TQ}, \frac{PQ}{ST} = \frac{QR}{TV}$

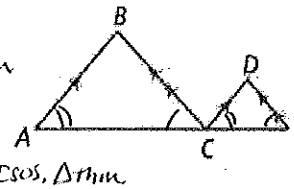
**Prove:** $\triangle VKR$ is isosceles.




| S | R |
|---|---|
| ① $PQ \perp QT$, $ST \perp TQ$, $\frac{PQ}{ST} = \frac{QR}{TV}$ | ① Given |
| ② $\angle Q \cong \angle T$ | ② Def. $\perp$ |
| ③ $\angle Q \cong \angle T$ | ③ Rt. $\angle$ thm |
| ④ $\triangle PQR \sim \triangle STV$ | ④ SAS~ |
| ⑤ $\angle KVR \cong \angle KRV$ | ⑤ PSP |
| ⑥ $\overline{KV} \cong \overline{KR}$ | ⑥ Conv. of Isos. $\triangle$ thm |
| ⑦ $\triangle VKR$ is isos. | ⑦ Def. isos. |

2) **Given:** $\overline{AB} \parallel \overline{CD}, \overline{BC} \parallel \overline{DG}$

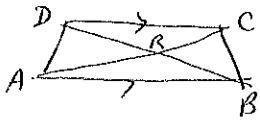
**Prove:** $AB \cdot CG = CD \cdot AC$




| S | R |
|---|---|
| ① $\overline{AB} \parallel \overline{CD}$; $\overline{BC} \parallel \overline{DG}$ | ① Given |
| ② $\angle A \cong \angle DCG$, $\angle G \cong \angle BCA$ | ② Corresp. $\angle$ Thm |
| ③ $\triangle ABC \sim \triangle CDG$ | ③ AA~ |
| ④ $\frac{AB}{CD} = \frac{AC}{CG}$ | ④ PSP |
| ⑤ $AB \cdot CG = CD \cdot AC$ | ⑤ Cross Products Property |

3) **Given:** trapezoid ABCD with $AB \parallel CD$ and diagonals intersecting at point R

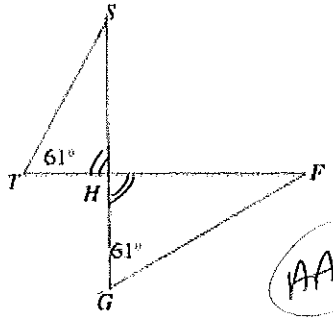
**Prove:** $\triangle ABR \sim \triangle CDR$




| S | R |
|---|---|
| ① Given | ① Given |
| ② $\angle CDR \cong \angle ABR$ | ② Alt. int. $\angle$ thm |
| ③ $\angle DRC \cong \angle BRA$ | ③ Vert. $\angle$ Thm |
| ④ $\triangle ABR \sim \triangle CDR$ | ④ AA~ |

Are the following triangles similar? If yes, give the postulate or theorem and complete the similarity statement.

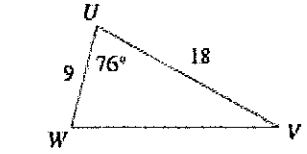
9)

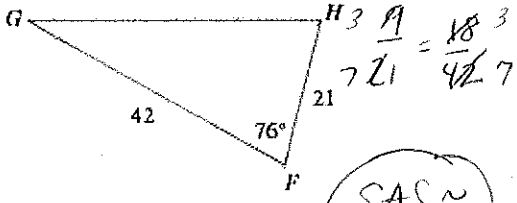



AA~

$\triangle HGF \sim$ $\triangle HTS$

10)



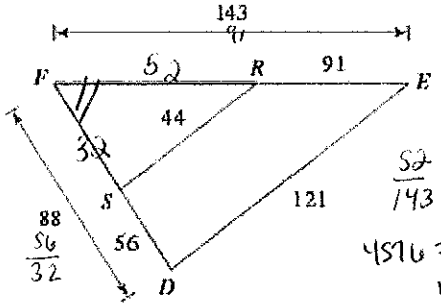




$\frac{9}{21} = \frac{18}{42}$ ✓

SAS~

$\triangle FGH \sim$ $UVW$

11)



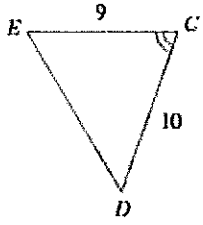

$\frac{52}{143} = \frac{32}{88}$

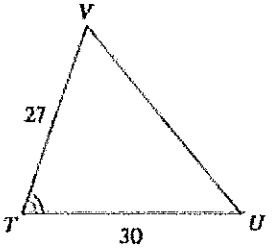
$4576 = 4576$ ✓

SAS~

$\triangle FED \sim$ $FRS$

12)



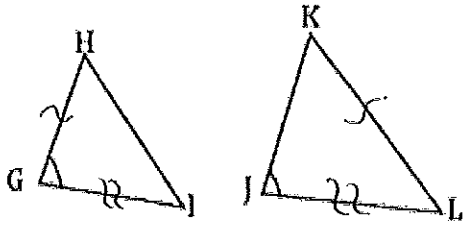

$\frac{9}{27} = \frac{10}{30}$ ✓

SAS~

$\triangle TUV \sim$ $CDG$

16.

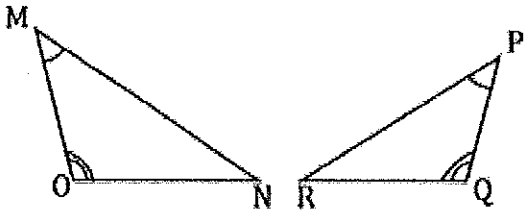
Given: $\frac{GH}{KJ}=\frac{GI}{JL}$, $\angle G\cong\angle J$




Prove: $\triangle GHI\sim\triangle JKL$

| S | R |
|---|---|
| ① $\frac{GH}{KJ}=\frac{GI}{JL}$, $\angle G\cong\angle J$ | ① Given |
| ② $\triangle GHI\sim\triangle JKL$ | ② SAS~ |

17. Given: $\angle M\cong\angle P$, $\angle O\cong\angle Q$

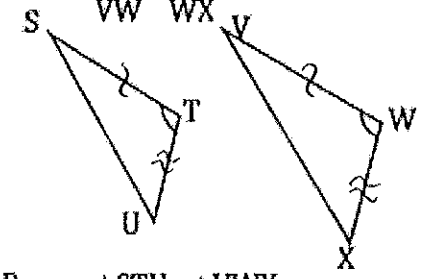



Prove: $\triangle OMN\sim\triangle DBC$

| S | R |
|---|---|
| ① $\angle M\cong\angle P$, $\angle O\cong\angle Q$ | ① Given |
| ② $\triangle OMN\sim\triangle DBC$ | ② AA~ |

18.

Given: $\frac{ST}{VW}=\frac{TU}{WX}$, $\angle T\cong\angle W$

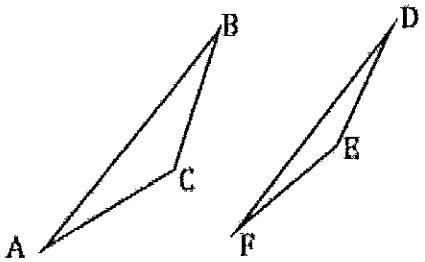



Prove: $\triangle STU\sim\triangle VWX$

| S | R |
|---|---|
| ① $\frac{ST}{VW}=\frac{TU}{WX}$, $\angle T\cong\angle W$ | ① Given |
| ② $\triangle STU\sim\triangle VWX$ | ② SAS~ |

19.

Given: $\frac{AB}{FD}=\frac{BC}{DE}=\frac{CA}{EF}$

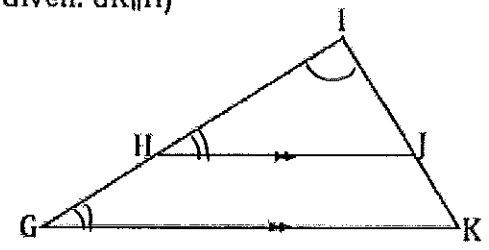



Prove: $\triangle ABC\sim\triangle FDE$

| S | R |
|---|---|
| ① $\frac{AB}{FD}=\frac{BC}{DE}=\frac{CA}{EF}$ | ① Given |
| ② $\triangle ABC\sim\triangle FDE$ | ② SSS~ |

20.

Given: $\overline{GK}\parallel\overline{HJ}$

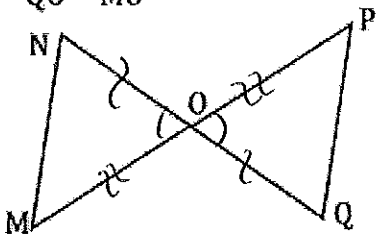



Prove: $\triangle GIK\sim\triangle HIJ$

| S | R |
|---|---|
| ① $\overline{GK}\parallel\overline{HJ}$ | ① Given |
| ② $\angle IHJ\cong\angle IGK$ | ② Corresp. $\angle$ thm |
| ③ $\angle I\cong\angle I$ | ③ Reflexive |
| ④ $\triangle GIK\sim\triangle HIJ$ | ④ AA~ |

21.

Given: $\frac{NO}{QO}=\frac{PO}{MO}$

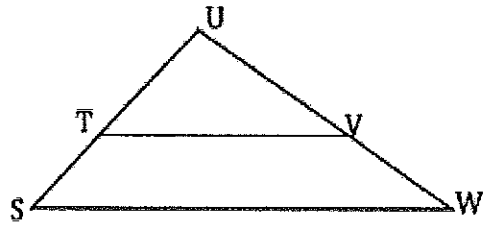



Prove: $\triangle MNO\sim\triangle PQO$

| S | R |
|---|---|
| ① $\frac{NO}{QO}=\frac{PO}{MO}$ | ① Given |
| ② $\angle NOM\cong\angle QOP$ | ② Vert. $\angle$ thm |
| ③ $\triangle MNO\sim\triangle PQO$ | ③ SAS~ |

**22.**

**Given:** $\angle S \cong \angle UTV$

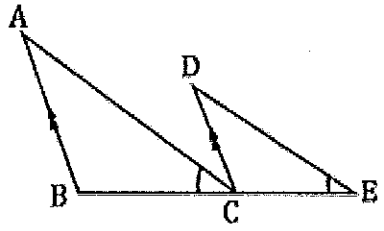



**Prove:** $\triangle SUW \sim \triangle TUV$

| S | R |
|---|---|
| ① $\angle S \cong \angle UTV$ | ① Given |
| ② $\angle U \cong \angle U$ | ② Reflexive |
| ③ $\triangle SUW \sim \triangle TUV$ | ③ AA~ |

**23.**

**Given:** $\overline{AB} \parallel \overline{DC}$, $\angle ACB \cong \angle E$

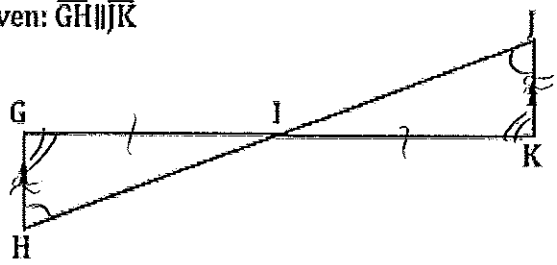



**Prove:** $\triangle ABC \sim \triangle DCE$

| S | R |
|---|---|
| ① $\overline{AB} \parallel \overline{DC}$ ; $\angle ACB \cong \angle E$ | ① Given |
| ② $\angle B \cong \angle DCE$ | ② Corresp. $\angle$s Thm |
| ③ $\triangle ABC \sim \triangle DCE$ | ③ AA~ |

**24.**

**Given:** $\overline{GH} \parallel \overline{JK}$

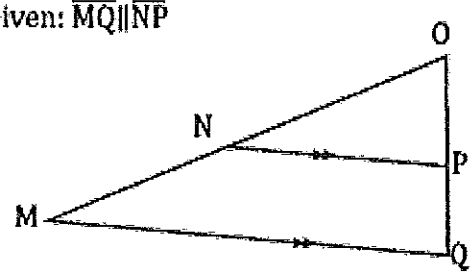



**Prove:** $\frac{GI}{KI} = \frac{HG}{JK}$

| S | R |
|---|---|
| ① $\overline{GH} \parallel \overline{JK}$ | ① Given |
| ② $\angle H \cong \angle J$ ; $\angle G \cong \angle K$ | ② Alt. int. $\angle$s Thm |
| ③ $\triangle GHI \sim \triangle KJI$ | ③ AA~ |
| ④ $\frac{GI}{KI} = \frac{HG}{JK}$ | ④ PSP |

**25.**

**Given:** $\overline{MQ} \parallel \overline{NP}$

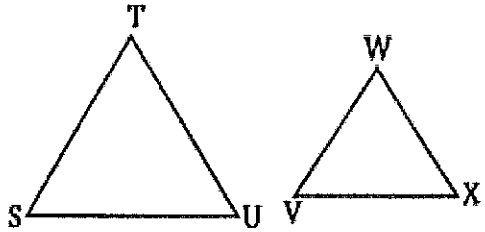



**Prove:** $\frac{OP}{PN} = \frac{OQ}{QM}$

| S | R |
|---|---|
| ① $\overline{MQ} \parallel \overline{NP}$ | ① Given |
| ② $\angle ONP \cong \angle OMQ$, $\angle OPN \cong \angle OQM$ | ② Corresp. $\angle$s Thm |
| ③ $\triangle ONP \sim \triangle OMQ$ | ③ AA~ |
| ④ $\frac{OP}{PN} = \frac{OQ}{QM}$ | ④ PSP |

**26.**

**Given:** $\triangle ABD$ and $\triangle BCD$ are equilateral

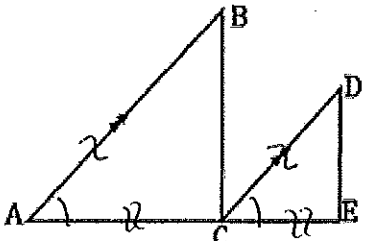



**Prove:** $\triangle STU \sim \triangle VWX$

| S | R |
|---|---|
| ① $\triangle ABD$, $\triangle BCD$ are equil. | ① Given |
| ② $m\angle S = m\angle T = m\angle U = m\angle V = m\angle W = m\angle X = 60$ | ② Def. equil. $\triangle$ |
| ③ $\angle S \cong \angle V$ ; $\angle U \cong \angle X$ | ③ Trans. $\cong$ Thm |
| ④ $\triangle STU \sim \triangle VWX$ | ④ Def. $\cong$ |
| | ⑤ AA~ |

**27.**

**Given:** $\frac{AB}{CD} = \frac{AC}{CE}$, $\overline{AB} \parallel \overline{CD}$

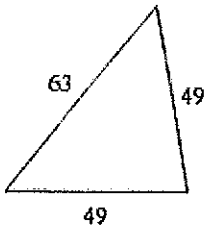



**Prove:** $\angle B \cong \angle D$

| S | R |
|---|---|
| ① $\frac{AB}{CD} = \frac{AC}{CE}$, $\overline{AB} \parallel \overline{CD}$ | ① Given |
| ② $\angle A \cong \angle DCE$ | ② Corresp. $\angle$s Thm |
| ③ $\triangle ABC \sim \triangle CDE$ | ③ SAS~ |
| ④ $\angle B \cong \angle D$ | ④ PSP |

**Solve for $x$. The polygons in each pair are similar.**

15)

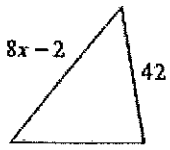



$\frac{8x-2}{63} = \frac{42}{49}\ \frac{6}{7}$

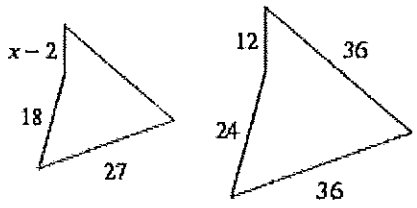
$56x - 14 = 378$

$56x = 392$

$x = 7$




16)



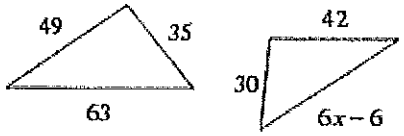

$\frac{x-2}{12} = \frac{18}{24}\ \frac{3}{4}$

$36 = 4x - 8$

$44 = 4x$

$x = 11$

17)



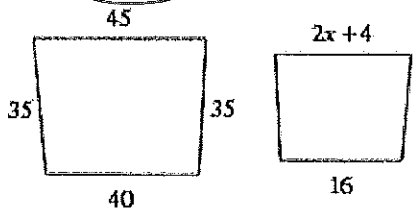

$\frac{6x-6}{63} = \frac{30}{35}\ \frac{6}{7}$

$42x - 42 = 378$

$42x = 420$

$x = 10$

18)




$\frac{2x+4}{48} = \frac{16}{40}\ \frac{8}{10}\ \frac{2}{5}$

$10x + 20 = 90$

$10x = 70$

$x = 7$

19)


scale factor from A to B = 5 : 6

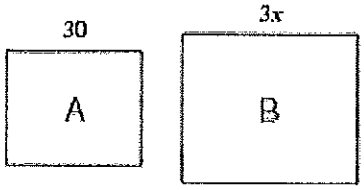
$\frac{5}{6} = \frac{3x+11}{42}$

$18x + 66 = 210$

$18x = 144$

$x = 8$

20)



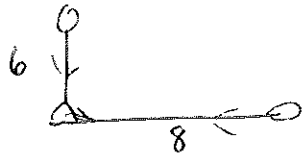

$\frac{5}{6} = \frac{30}{3x}$

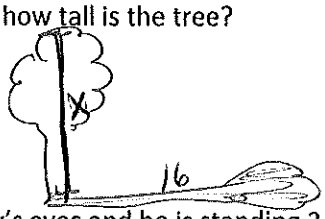
$180 = 15x$

scale factor from A to B = 5 : 6

$x = 12$

21) Jamie's Dad is six feet tall. Standing outside, his shadow is eight feet long. The tree next to him has a shadow that is sixteen feet long. Given these dimensions, how tall is the tree?




$\frac{6}{x} = \frac{8}{16}\ \frac{1}{2}$

$x = 12$

22) It is 6.5 feet from the ground to Tony's eyes and he is standing 3 feet from the mirror. The mirror is 24 feet from the base of the tree. How tall is the tree?

$\frac{6.5}{x} = \frac{3}{24}\ \frac{1}{8}$

$x = 52$ ft