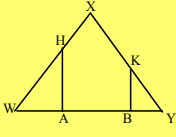


3/27 Aim: Proving proportions in similar triangles

Do now: Worksheet, highlighters
have cheat sheet out
PUT [homework on board](#)

Homework: TBA

Jan 9-9:44 AM

| Do Now | STATEMENTS | REASONS |
|---|------------|---------|
| Given: $\overline{XW} \cong \overline{XY}$ $\overline{HA} \perp \overline{WY}$ $\overline{KB} \perp \overline{WY}$ Prove: $\triangle HWA \sim \triangle KYB$ | | |
|  | | |


Feb 17-10:01 AM

When two triangle are similar we know that the corresponding angles are congruent. We have just proven that the two triangles are similar by $AA \cong AA$ in the do now. The second fact about similar triangles is that the corresponding sides are in proportion. If we look at the triangle that we have just worked with, let us find some of the proportions we could use...

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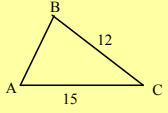
Feb 24-6:59 AM

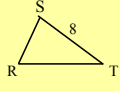
Here we can set up differernt proportions based on the congruent triangles.

| | |
|---|---|
|  | $\frac{WH}{WA} = \underline{\hspace{2cm}}$ $\frac{WH}{HA} = \underline{\hspace{2cm}}$ $\frac{HA}{WA} = \underline{\hspace{2cm}}$ $\frac{BY}{KY} = \underline{\hspace{2cm}}$ |
|---|---|

Feb 17-10:06 AM

Do now: In the accompanying diagram, $\triangle ABC$ is similar to $\triangle RST$. Find the length of RT .





Feb 17-10:13 AM

* Remember !! If two triangles are similar, then the corresponding sides of the two triangles are in proportion.

Once you prove that triangle 1 is similar to triangle 2, you can set up the following proportion:

$$\frac{\text{side of } \Delta 1}{\text{corresponding side of } \Delta 2} = \frac{\text{another side of } \Delta 1}{\text{Corresponding side of } 2}$$

Feb 17-10:14 AM

Corresponding SIDES of similar triangles are in proportion.

this is your new reason

Feb 24-7:11 AM

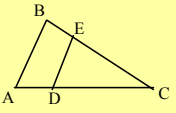
In order to prove a **proportion** you must prove that the two triangles are similar first $AA \cong AA$.

copy

Feb 24-7:16 AM

Example 1
Given: $\overline{AB} \parallel \overline{DE}$

Prove: $\frac{EC}{BC} = \frac{ED}{AB}$



plan:
What triangles are we proving?

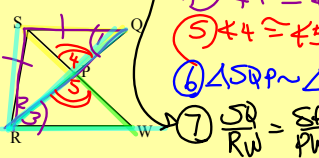
Use your pen or pencil and draw on the lines of the proportion

| Statements | Reasons |
|------------|---------|
|------------|---------|

Feb 17-10:16 AM

Given: $\overline{SR} \cong \overline{SQ}$
 RQ bisects $\angle SRW$

Prove: $\frac{SQ}{RW} = \frac{SP}{PW}$




| statements | reasons |
|--|---|
| 1 $\overline{SR} \cong \overline{SQ}$ RQ bisects $\angle SRW$ | 1 given |
| 2 $\angle 1 \cong \angle 2$ | 2 \angle s opp \cong sides in a Δ are \cong |
| 3 $\angle 2 \cong \angle 3$ | 3 An angle bisects divides an \angle into 2 \cong \angle s. |
| 4 $\angle 1 \cong \angle 3$ | 4 Substitution |
| 5 $\angle 4 \cong \angle 5$ | 5 Int. lines form \cong vertical \angle s |
| 6 $\triangle SQP \sim \triangle RPW$ | 6 $AA \cong AA$ |
| 7 $\frac{SQ}{RW} = \frac{SP}{PW}$ | 7 Corresponding sides of $\sim \Delta$ s are in proportion. |

Feb 17-10:22 AM

Given Isosceles triangle ABC,
 $\overline{BA} \cong \overline{BC}$
 $\overline{AE} \perp \overline{BC}$,
and $\overline{BD} \perp \overline{AC}$.

Prove $\frac{AC}{BA} = \frac{AE}{BD}$

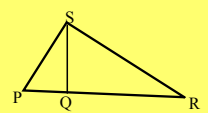


| Statement | Reason |
|--|---|
| 1 Isos. Δ ABC $\overline{BA} \cong \overline{BC}$ $\overline{AE} \perp \overline{BC}$ $\overline{BD} \perp \overline{AC}$ | 1 given |
| 2 $\angle 3 \cong \angle 4$ | 2 Base \angle s \cong in isosceles Δ |
| 3 $\angle 1$ and $\angle 2$ are right \angle s | 3 \perp lines form right \angle s |
| 4 $\angle 1 \cong \angle 2$ | 4 All right \angle s \cong |
| 5 $\triangle AEC \sim \triangle BDA$ | 5 $AA \cong AA$ |
| 6 $\frac{AC}{BA} = \frac{AE}{BD}$ | 6 In $\sim \Delta$'s corr. sides are proportional. |

Jan 9-9:44 AM

4. Given Right Δ PSR with altitude drawn to hypotenuse \overline{PR}

Prove $\frac{PR}{PS} = \frac{PS}{PQ}$



| Statements | Reasons |
|------------|---------|
|------------|---------|

Jan 9-9:44 AM

5. Given: $\overline{AB} \parallel \overline{DC}$
 Prove: $\frac{AE}{CE} = \frac{BE}{DE}$

Jan 9-9:44 AM

6. Given: $\overline{AB} \parallel \overline{CD}$
 Prove: $\frac{AE}{ED} = \frac{BE}{CE}$

Clarke statement

| Statement | Reason |
|---------------------------------------|---|
| ①. $AB \parallel CD$. | ①. Given. |
| ②. $\angle B = \angle C$. | ②. Alternate interior angles congruent to each other. |
| ③. $\angle CED = \angle AEB$ | ③. Vertical angles congruent to each other. |
| ④. $\triangle AEB \sim \triangle CED$ | ④. AA~AA |
| ⑤. $\frac{AE}{ED} = \frac{BE}{CE}$ | ⑤. All sides in a similar triangles are proportional. |

Jan 9-9:44 AM

7. In Right $\triangle ABC$, $m\angle C = 90^\circ$
 $\overline{DE} \perp \overline{CA}$
 Prove: $\frac{AD}{AB} = \frac{DE}{BC}$

Jan 9-9:44 AM

new packet
answer the do now question

Mar 30-6:37 AM

Do Now: Is triangle ABC similar to triangle ADC?
 Explain your answer.

Feb 8-6:49 AM

** To prove that the product of the lengths of two line segments is equal to the products of the lengths of two other line segments:

1. First, prove that two triangles are similar.
2. Next, form a **proportion** that includes the lengths of the four line segments, based on corresponding sides of the similar triangles.
3. Then apply the theorem: In a proportion, the product of the means equals the product of the extremes

Jan 12-6:37 AM

~~$\frac{AB}{CD} = \frac{EF}{GH}$~~
 can be written as
 $AB:CD = EF:GH$

Jan 12-6:46 AM

Sometimes you will have to set up the proportion first to then determine the triangles.

Jan 12-6:46 AM

Let's look at example #1
 When you want to solve a proportion what do you do?

Jan 12-6:46 AM

So when we look at example 1 we need to set up the proportion that reflects our cross multiplication

Mar 30-6:58 AM

$ER \times SD = TE \times DT$

Mar 30-6:49 AM

$ER \times SD = TE \times DT$

Mar 30-6:49 AM

Let's look at example #1

$$ER \times SD = TE \times DT$$

When you want to solve a proportion what do you do?

Jan 12-6:46 AM

example 1:
Given: Isosceles triangle RST with $SR = ST$, $\angle TER$ and $\angle SDT$ are right angles.
Prove: $ER \times SD = TE \times DT$

| Statement | Reasons |
|--|--|
| ① Isos. $\triangle RST$ $SR = ST$ | ① given |
| ② $\angle SET = \angle STD$ | ② Base \angle 's in an isosceles \triangle are \cong |
| ③ $\angle TER$ and $\angle SDT$ are right \angle 's | ③ given |
| ④ $\angle TER \cong \angle SDT$ | ④ all right \angle 's \cong |
| ⑤ $\triangle SDT \sim \triangle TER$ | ⑤ AA \cong AA |
| ⑥ $\frac{ER}{TE} = \frac{DT}{SD}$ | ⑥ In $\sim \triangle$'s, corr. sides are in proportion |
| ⑦ $ER \times SD = TE \times DT$ | ⑦ Product of the means = product of the extremes |

Feb 8-6:59 AM

*****NOTE*****

The order of the last three lines will always be the same!!!!!!

AA \cong AA (triangles similar)

Corresponding sides of similar triangles are in proportion. (the proportion)

In a proportion, the product of the means is equal to the product of the extremes. (the product)

Jan 12-6:53 AM

3. Given: $\angle EBC \cong \angle CDE$
Prove: $FB:FD = FC:FE$

| Statement | Reasons |
|--------------------------------------|--|
| ① $\angle EBC \cong \angle CDE$ | ① given |
| ② $\angle 1 \cong \angle 2$ | ② Vert. \angle 's are \cong |
| ③ $\triangle BFC \sim \triangle DFE$ | ③ AA \cong AA |
| ④ $\frac{FB}{FD} = \frac{FC}{FE}$ | ④ In $\sim \triangle$'s, corr. sides are proportional |

Feb 8-6:59 AM

4. Given: $\triangle ABC$, $\angle ACB$ is a right angle, and $CD \perp AB$
Prove: $AC \times BD = CD \times BC$

$$\frac{AC}{CD} = \frac{BC}{BD}$$

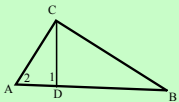
| | |
|---|---|
| 1. $\angle ACB$ is a right angle, $CD \perp AB$ | ① Given |
| 2. $\angle B \cong \angle B$ | ② reflexive |
| 3. $\angle CDB$ is a right angle | ③ \perp lines form right \angle 's |
| 4. $\angle CDB \cong \angle ACB$ | ④ All right \angle 's \cong |
| 5. $\triangle ABC \sim \triangle CBD$ | ⑤ AA \cong AA |
| 6. $\frac{AC}{CD} = \frac{BC}{BD}$ | ⑥ Corresponding sides in $\sim \triangle$'s are proportional |
| 7. $AC \times BD = CD \times BC$ | ⑦ Product of the means = product of the extremes |

Jan 12-7:03 AM

5. If ABCD is a parallelogram, prove:

- $\triangle CED \sim \triangle BEF$
- $\frac{CE}{DE} = \frac{BE}{FE}$
- $DE \times BE = FE \times CE$

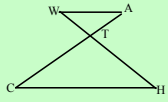
Feb 8-7:06 AM



In right triangle ABC, $\angle C$ is a right angle and $CD \perp AB$.
 Prove:
 a) $\triangle BCA \sim \triangle CDA$
 b) $AD \times CB = DC \times AC$

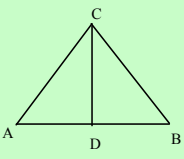
Jan 12-7:24 AM

7. Given: $WA \parallel CH$
 WH and AC intersect at point T.
 Prove that $(WT)(CT) = (HT)(AT)$.



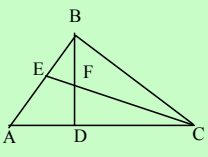
Jan 12-7:24 AM

8. Given: In right triangle ABC,
 $m\angle C = 90$
 $CD \perp AB$
 Prove: $AB:AC = AC:AD$



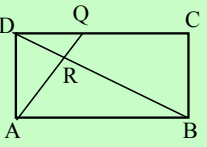
Jan 12-7:24 AM

9. Given: Acute $\triangle ABC$ with altitudes \overline{BD} and \overline{CE} intersecting at F.
 Prove: $BD \times AC = AB \times CE$



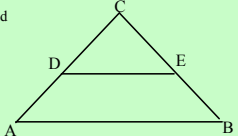
Jan 12-7:24 AM

10. Given: Rectangle ABCD and \overline{AQ} perpendicular to diagonal \overline{BD} at R.
 Prove: $CD \times DA = DB \times AR$



Jan 12-7:24 AM

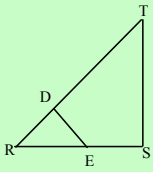
11. Given: In triangle ABC,
 D is the midpoint of AC and
 E is the midpoint of BC
 Prove: $CD : CA = DE : AB$



Jan 12-7:24 AM

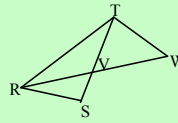
12. Given: $\angle S$ is a right angle
 $DE \perp RT$
 Prove: $DR \times TS = ED \times SR$

(I changed diagram)



Jan 12-7:43 AM

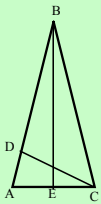
13. Given: V is a point on ST such that RVW bisects $\angle SRT$ and $TW \cong TV$.
 Prove: $RW \times SV = RV \times TW$



Jan 12-7:43 AM

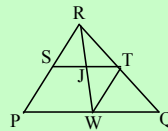
14. Given: Isosceles triangle ABC, $BA \cong BC$.
 Altitudes BE and CD are drawn, $BD \perp AC$ and $CE \perp AB$.

Prove $BC \times DA = CA \times EC$

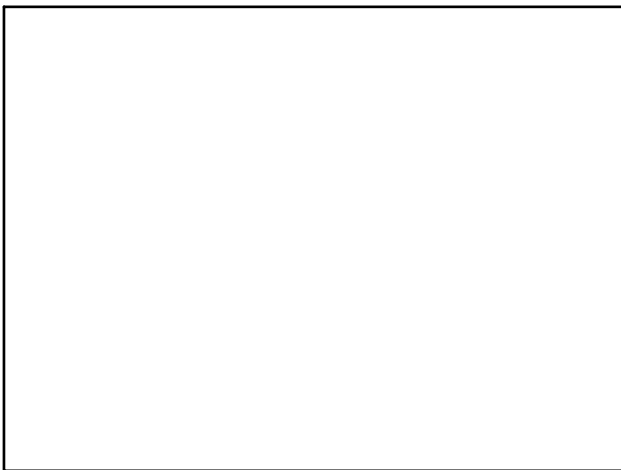


Jan 12-7:43 AM

Given: $RP \parallel TW$
 Prove: $RS \times TJ = TW \times SJ$



Jan 12-7:44 AM



Mar 30-6:41 AM