Geometry Math Week 2

Dear Parent/Guardian,

During Week 2, we will review and support mastery of the Geometry Similarity and Right Triangles standards. Your child will work towards understanding and using definitions of similarity to solve real-world and mathematical problems involving properties of right triangles. The table below lists this week's tasks and practice problems. Each student task ends with a 'Lesson Summary' section; there, your child can find targeted support for the lesson.

Additionally, students can access both Math Nation and the Pearson textbook through ClassLink. Both sites offer instructional support including video lessons, practice quizzes and more.

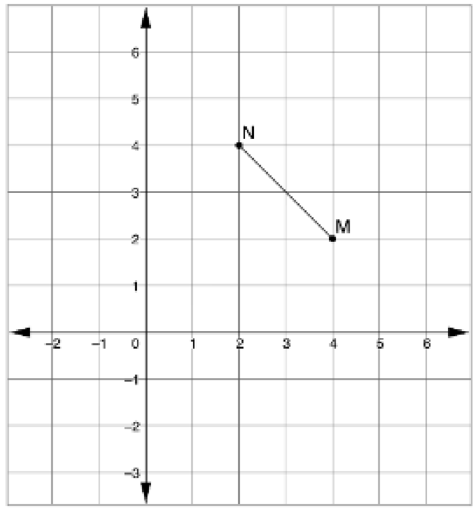
We also suggest that students have an experience with math each day. Practicing at home will make a HUGE difference in your child's school success! Make math part of your everyday routine. Choose online sites that match your child's interests. Online math games, when played repeatedly, can encourage strategic mathematical thinking, help develop computational fluency, and deepen their understanding of numbers.

Links for additional resources to support students at home are listed below:
https://www.brainpop.com/games/sortifyangles/
https://www.hoodamath.com/games/highschool.html
https://www.khanacademy.org/resources/teacher-essentials
http://www.learnalberta.ca/content/mejhm/index.html
https://www.mangahigh.com/en-us/games/wrecksfactor
http://www.xpmath.com/forums/arcade.php?do=play&gameid=115

Week 2 At A Glance	
Day 1	MAFS.912.G-SRT.1.1 ☐ Practice Problems - Math Nation
Day 2	MAFS.912.G-SRT.1.2, MAFS.912.G-SRT.2.5, MAFS.912.G-SRT.3.8 ☐ Practice Problems - Math Nation
Day 3	MAFS.912.G-SRT.1.2, MAFS.912.G-SRT.2.5 ☐ Practice Problems - Math Nation
Day 4	MAFS.912.G-SRT.2.4, MAFS.912.G-SRT.2.5 ☐ Practice Problems - Math Nation
Day 5	MAFS.912.G-SRT.2.4 ☐ Practice Problems - Math Nation

Question 1.

The endpoints of $\overline{MN}$ are $M\ (4, 2)$,and $N\ (2, 4)$.



Choose an ordered pair, a value, a phrase, and word to complete the statement.

When $\overline{MN}$ is dilated using

a scale factor
- greater than 1
- greater than 0 but less than 1

using
- $(2, 4)$
- $(3, 3)$
- $(4, 4)$

as the center of dilation the length

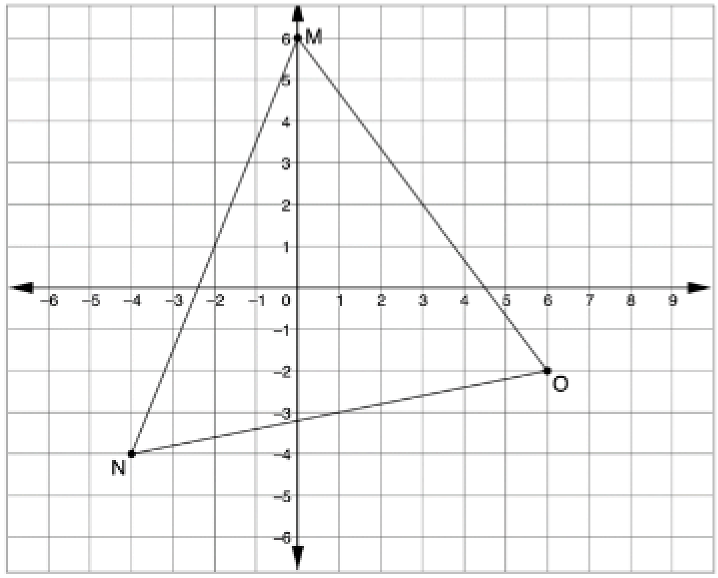
of $\overline{MN}$ is
- longer
- shorter

than $\overline{M'N'}$, and

$\overline{M'N'}$ is
- parallel to
- lies on top of

$\overline{MN}$.

The coordinate grid shows ΔMNO with vertices M (0, 6), N (-4, -4) and O (6, -2).



Question 2.

ΔMNO is dilated using a scale factor of $\frac{3}{2}$ centered at (0, 6).

Select all of the statements that are true.

- ☐ $\overline{M'N'}$ is shorter than $\overline{MN}$.
- ☐ $\overline{ON}$ is shorter than $\overline{O'N'}$.
- ☐ $\overline{OM}$ is longer than $\overline{O'M'}$.
- ☐ $\overline{ON}$ is parallel to $\overline{O'N'}$.
- ☐ $\overline{OM}$ is parallel to $\overline{O'M'}$.
- ☐ $\overline{M'N'}$ coincides with $\overline{MN}$.

Question 3.

The line $y = 2x + 1$ is dilated using a scale factor of 3 centered at the point $(2, 5)$. Which is true about the dilation?

- ☐ The equation of the new line is $y = 6x + 3$.
- ☐ The equation of the new line is $y - 5 = 6(x - 2)$.
- ☐ The equation of the new line is $y - 5 = 2(x - 2)$.
- ☐ The dilation would result in the same line.

Question 4.

Line segment $\overline{PQ}$ with coordinates $P(-3,4)$ and $Q(13,16)$. Select all dilations whose result is that $\overline{P'Q'}$ lies on $\overline{PQ}$.

☐ A dilation centered at (0, 0) using a scale factor of $\frac{7}{2}$.

☐ A dilation centered at (0, 3) using a scale factor of $\frac{8}{5}$.

☐ A dilation centered at (1, 7) using a scale factor of $\frac{5}{4}$.

☐ A dilation centered at (4, 4) using a scale factor of $\frac{1}{3}$.

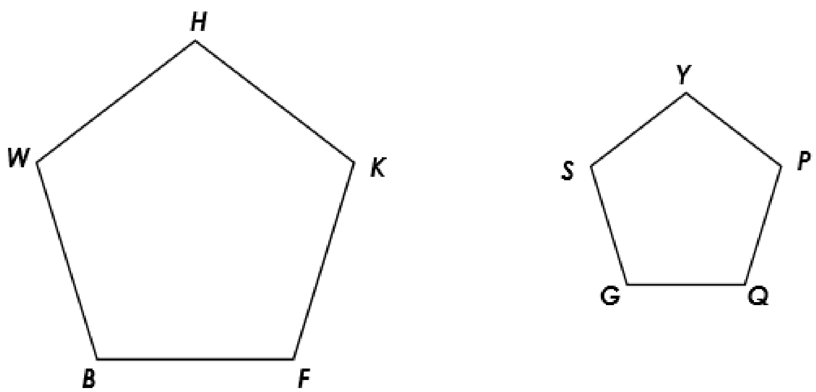
☐ A dilation centered at (5, 10) using a scale factor of $\frac{3}{5}$.

☐ A dilation centered at (9, 13) using a scale factor of $\frac{2}{3}$.

Question 1.

This question has **two** parts.

Pentagons *HKFBW* and *SGQPY* are shown.



Part A: Choose two transformations from list of transformations that when applied can be used to determine if the pentagons are similar.

Transformation 1	
Transformation 2	

Transformation 1	**Transformation 2**
Translate *HKFBW* to the right and up so that point *B* lies on top of point *G*.	Dilate *Y'P'Q'G'S'* using point *S'* as the center of dilation using the scale factor $\frac{YS}{HW}$.
Reflect *YPQGS* across the perpendicular line that passes through the midpoint of $\overline{KS}$.	Dilate *H'K'F'B'W'* using point *B'* as the center of dilation using the scale factor $\frac{GQ}{BF}$.
Translate *YPQGS* to the left and down so that point *S* lies on top of point *W*.	Dilate *H'K'F'B'W'* using center of *H'K'F'B'W'* as the center of dilation using the scale factor $\frac{SG}{WB}$.

Part B: Complete the explanation about the transformations chosen

Because the transformations include a
- dilation
- rigid motion

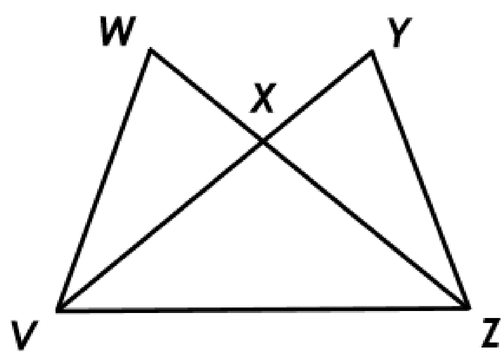
the pentagons can be shown to be similar if after the transformations are performed that pentagon
- *HKFBW*
- *H''K''F''B''W''*
- *SGQPY*
- *S''G''Q''P''Y''*
- *YPQGS*
- *Y''P''Q''G''S''*

is
- congruent
- similar

pentagon
- *HKFBW*.
- *H''K''F''B''W''*.
- *SGQPY*.
- *S''G''Q''P''Y''*.
- *YPQGS*.
- *Y''P''Q''G''S''*.

Question 2.

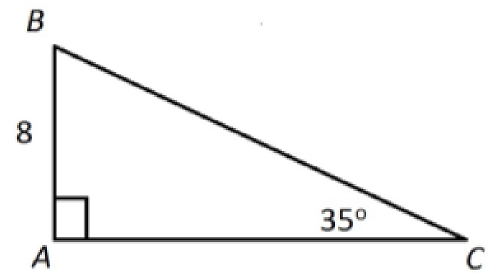
In the diagram shown, $\triangle VWZ \cong \triangle ZYV$, $WZ = 31 - 2k$, $XY = k + 3$, $VX = 3k - 2$, $YZ = 3k - 1$, and $VZ = 6k + 1$.



What is the length of VZ?

Question 3.

In the diagram shown of right triangle $\triangle ABC$, $BA = 8$, and $m\angle C = 35°$.



Which single function can be used to determine the length of BC?

A $\tan 35°$

B $8 * \cos 35°$

C $\frac{8}{\sin 55°}$

D $\frac{8}{\cos 55°}$

Question 4.

Which of the following statements represents the relationship between the sine and cosine of complementary angles? Select all that apply.

☐ $sinA = cos(90° - A)$

☐ $cosB = sin(90° + B)$

☐ $sinA = cos(90° - 2A)$

☐ $sinA = cos(90° + A)$

☐ $cosB = sin(90° - B)$

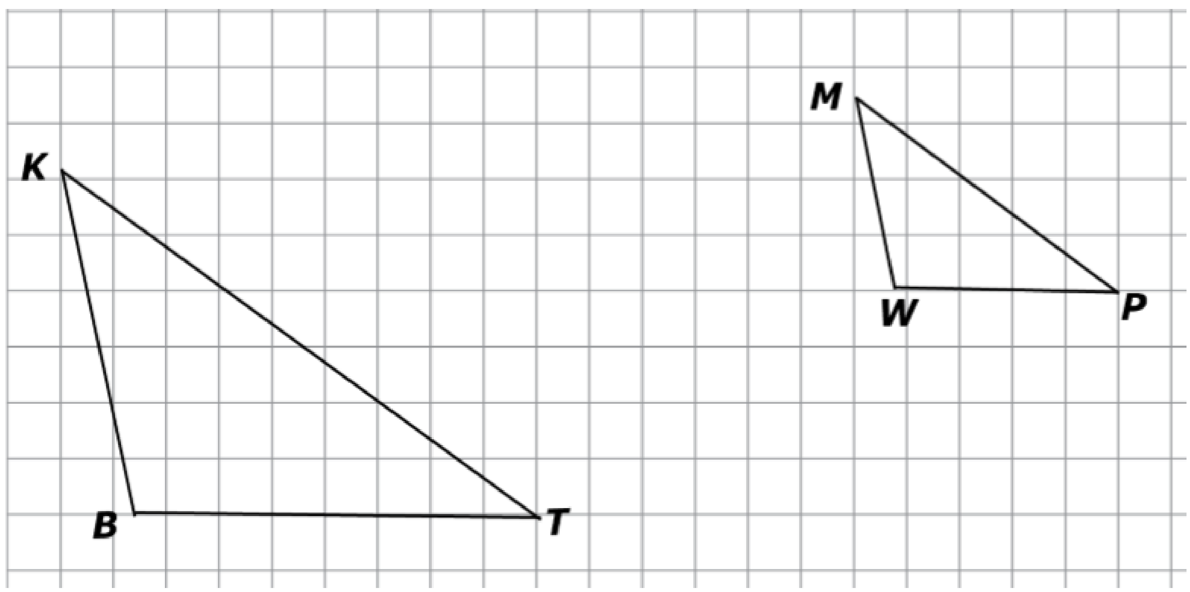
Question 1.

Explain using similarity transformations the meaning of similarity for triangles as the equality of all corresponding pairs of angles and the proportionality of all corresponding pairs of sides.

This question has **three** parts.

Triangles *KTB* and *MPW* are similar.

Part A: Show the mapping that would translate $\triangle KTB$ so that point *T* aligns with point *P*.



Part B: Complete the statement about the next step.

To show that the triangles are similar, dilate $\triangle K'T'B'$ using the

scale factor

- ○ $\frac{PW}{PM}$
- ○ $\frac{PW}{TB}$
- ○ $\frac{TK}{TB}$
- ○ $\frac{TB}{PW}$

using point *P* as the center of dilation.

Part C: Complete the statements about $\triangle K''T''B''$ and $\triangle MPW$.

As a result of the translation and dilation, the corresponding sides of $\triangle K''T''B''$ and $\triangle MPW$ are

- congruent,
- proportional,

and the corresponding angle of $\triangle K''T''B''$ and $\triangle MPW$ are

- congruent.
- proportional.

The transformations demonstrate the definition of

- transformations.
- congruence in terms of rigid motions.
- similarity in terms of similarity transformations.

Question 2.

A line segment has endpoints $\boldsymbol{K}(2, 1)$ and $\boldsymbol{W}(6, 8)$. Which dilation would result in a line segment that is parallel to $\overline{KW}$ and shorter than $\overline{KW}$?

☐ A dilation centered at (2, 8) and a scale factor of $\frac{3}{4}$.

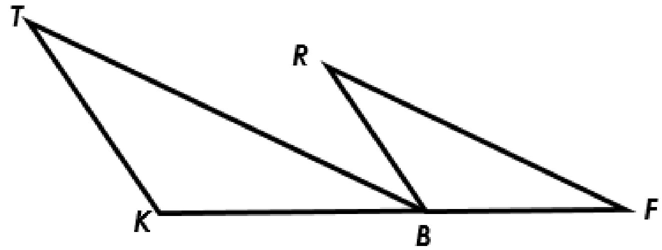
☐ A dilation centered at (4, 4.5) and a scale factor of $\frac{3}{7}$.

☐ A dilation centered at (6, 1) and a scale factor of $\frac{6}{5}$.

☐ A dilation centered at (2, 3.5) and a scale factor of $\frac{5}{2}$.

Question 3.

In the figure shown, $\overline{TK} \parallel \overline{RB}$ and $\angle KBT \cong \angle BFR$



An incomplete proof is shown.

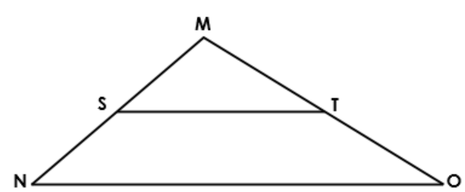
Statement	Reason
1. $\angle KBT \cong \angle BFR$	1.
2. $\overline{TK} \parallel \overline{RB}$	2.
3.	3.
4. $\triangle KBT \sim \triangle BFR$	4.

Which reason completes line 4?

Ⓐ AA similarity Ⓑ SAS similarity Ⓒ SSS similarity Ⓓ ASA similarity

Question 4.

In the diagram shown, ΔMNO ~ ΔMST.



Select all the side lengths that could be true for ΔMNO and ΔMST.

☐ MS = 2, MN = 8, MT = 3, and MO = 7

☐ MS = 2, MN = 8, MT = 4, and MO = 16

☐ MS = 6, MN = 15, MT = 9, and MO = 21

☐ MS =8, MN = 12, MT = 10, and MO = 10

☐ MS = 8, MN = 24, MT = 12, and MO = 36

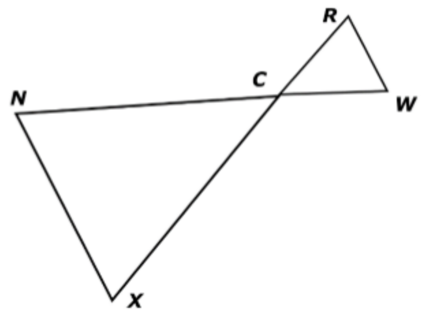
☐ MS = 24, MN = 18, MT =16, and MO = 12

Question 1.

Explain using similarity transformations the meaning of similarity for triangles as the equality of all corresponding pairs of angles and the proportionality of all corresponding pairs of sides.

This question has **three** parts.

Triangles *CRW* and *NXC* are shown.



Part A: Select all the statements that are true if triangles *CRW* and *NXC* are

- ☐ $\frac{CW}{WN} = \frac{WR}{NX} = \frac{CR}{CX}$
- ☐ $\frac{CW}{CN} = \frac{CR}{CX} = \frac{WR}{NX}$
- ☐ $\angle WCR \cong \angle XCN$
- ☐ $\angle CWR \cong \angle CNX$
- ☐ $\angle CWR \cong \angle CRW$
- ☐ $\angle CRW \cong \angle CXN$
- ☐ $\angle CNX \cong \angle CXN$

Part B: Which transformation should be applied to show similarity?

Ⓐ A dilation of $\triangle CXN$ centered at point X using the scale factor $\frac{CR}{RX}$ then a rotation about point C.

Ⓑ A dilation of $\triangle CXN$ centered at point C using the scale factor $\frac{CR}{CW}$ then a reflection across $\overline{XR}$.

Ⓒ A dilation of $\triangle CXN$ centered at point X using the scale factor $\frac{CN}{CX}$ then a reflection across $\overline{XR}$

Ⓓ A dilation of $\triangle CXN$ centered at point C using the scale factor reflection across $\overline{XR}$

Part C: Which conclusion can be made from the transformation?

The properties of dilation can be used to show that as a result of the dilation the angles of $\triangle CRW$ are

- o congruent
- o similar

to the corresponding angles of $\triangle C'X'N'$ and the sides of $\triangle CRW$ are

- o congruent
- o similar

to the corresponding sides of $\triangle C'X'N'$.

Then by applying a

- o reflection,
- o rotation,

the definition of

- o transformations
- o congruence in terms of rigid motions
- o similarity in terms of similarity transformations

can be used to show that $\triangle CRW$ is

- o congruent
- o similar

to $\triangle C''X''N''$. Because the transformations include a

- o dilation,
- o reflection,
- o rotation,

the mapping

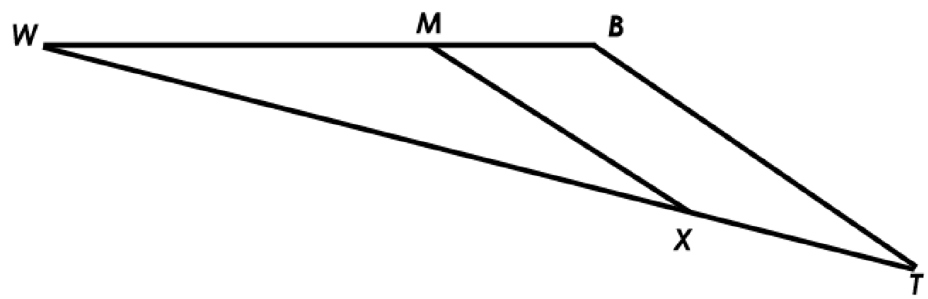
- o $\triangle CNX$
- o $\triangle CXN$

to $\triangle CRW$ demonstrates

- o AA similarity.
- o SSS similarity.
- o the definition of congruence in terms of rigid motions.
- o the definition of similarity in terms of similarity transformations.

Question 2.

Triangle WBT with point M on $\overline{WB}$ and point X on $\overline{WT}$ is shown. The relationship, $\frac{WM}{WB} = \frac{WX}{WT}$, is given.



An incomplete proof is shown.

Statement	Reason
1. $\frac{WM}{WB} = \frac{WX}{WT}$	1. Given
2. $\angle XWM \cong \angle TWB$	2. Reflexive property
3.	3.
4. $\angle WXM \cong \angle WTB$	4.
5.	5.

Which is the correct statement and reason for line 5 of the proof?

A.

5. $\triangle WMX \sim \triangle WBT$	5. SAS similarity

B.

5. $\angle WXM \cong \angle WTB$	5. If two triangles are similar then corresponding angles of the triangle are congruent.

C.

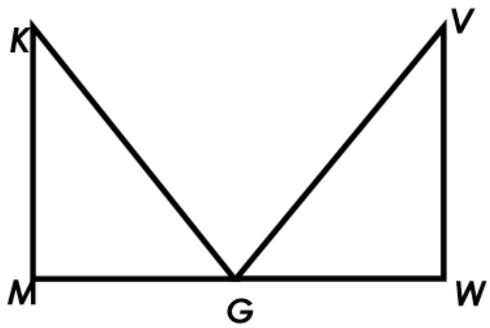
5. $\overline{MX} \parallel \overline{BT}$	5. If two lines are cut by a transversal and the alternate interior angles are congruent, then the lines are parallel.

D.

5. $\frac{WM}{WB} = \frac{MX}{BT}$	5. In a pair of similar triangles, the corresponding sides are proportional.

Question 3.

Triangles KGM and GWV are shown where $\overline{KG} \cong \overline{VG}$, G is the midpoint of $\overline{MW}$, and $\angle M$ and $\angle W$ are right angles.



A partial proof is shown.

Statement	Reason
1. $\overline{KG} \cong \overline{VG}$	1. Given
2. G is the midpoint of $\overline{MW}$	2. Given
3.	3. Definition of a midpoint
4. $\angle M$ and $\angle W$ are right angles	4. Given
5.	5. Definition of a right triangle
6.	6.

Choose from the correct statement from the statements column and the correct reason from the reason column that would complete the proof.

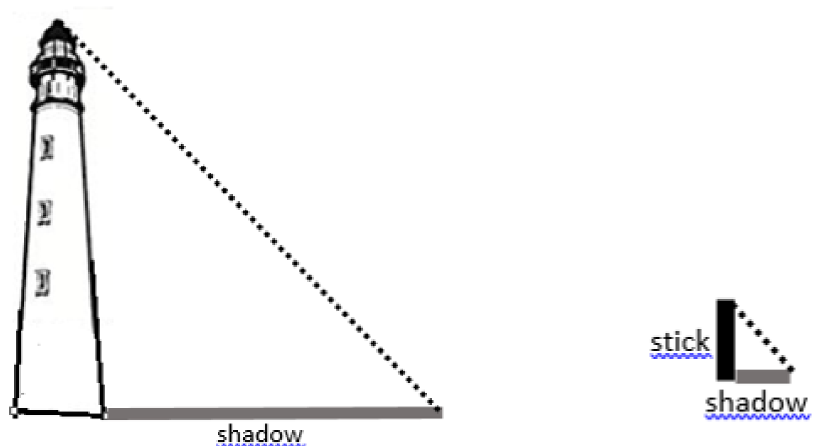
STATEMENTS
$\triangle KGM \cong \triangle GWV$
$\triangle GKM \cong \triangle GWV$
$\triangle MKG \cong \triangle WVG$
$\triangle GMK \cong \triangle GVW$

REASONS
SSS
ASA
SAS
AAS
HL

Question 4.

Matías is trying to determine the height of the Ponce Inlet Lighthouse. He measures the shadow of the lighthouse. He then places a stick into the ground and measures its shadow. Matías' diagram is shown. The dotted lines represent the sun's rays which are parallel because Matías took his measurements at the same time of day.

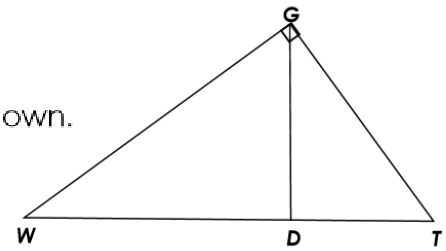
Not to scale



The length of the lighthouse's shadow is 70 feet (ft). The height of the stick is 3 ft and its shadow is 1.2 ft. Find the height of the lighthouse.

Question 1.

Triangle *WGT* with right angle *TGW* and altitude *DG* is shown.



An incomplete proof of the theorem, "the altitude of a right triangle from the vertex of the right angle to the hypotenuse divides the triangle into two similar right triangles that are also similar to the original right triangle", is shown.

Statement	Reason
1. $\angle TGW$ is a right angle	1. Given
2. $\overline{DG}$ is an altitude	2. Given
3. $\overline{DG} \perp \overline{WT}$	3. Definition of altitude
4. $\angle WDG$ and $\angle TDG$ are right angles	4. Definition of perpendicular lines
5. $\angle WDG \cong \angle TGW$ and $\angle TDG \cong \angle TGW$	5. All right angles are congruent
6. $\angle W \cong \angle W$ and $\angle T \cong \angle T$	6. Reflexive property
7. $\triangle WDG \sim \triangle WGT$, $\triangle WGT \sim \triangle GDT$	7.
8.	8. Corresponding angles of similar triangles are congruent
9.	9.
10.	10.

Which are the statements and reasons for lines 8, 9, and 10 of the proof?

A.

Statement	Reason
8. $\angle WGD \cong \angle DTG$	8. Corresponding angles of similar triangles are congruent
9. $\angle WDG \cong \angle TDG$	9. All right angles are congruent
10. $\triangle WGD \sim \triangle GTD$	10. AA Similarity

B.

Statement	Reason
8. $\angle WGD \cong \angle TGD$	8. Definition of angle bisector
9. $\overline{DG} \cong \overline{DG}$	9. Reflexive Property
10. $\triangle WDG \sim \triangle TGD$	10. ASA Similarity

C.

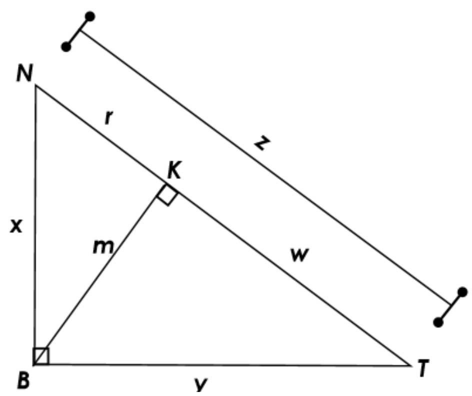
Statement	Reason
8. $\angle GWD \cong \angle GTD$	8. Corresponding angles of similar triangles are congruent
9. $\overline{DG} \cong \overline{DG}$	9. Reflexive Property
10. $\triangle WGD \sim \triangle GTD$	10. ASA Similarity

D.

Statement	Reason
8. $\angle G \cong \angle G$	8. Reflexive Property
9. $\angle GDW \cong \angle GDT$	9. All right angles are congruent
10. $\triangle WDG \sim \triangle TGD$	10. AA Similarity

Question 2.

In the $\triangle NBT$, $\overline{BK}$ is drawn such that $\overline{BK} \perp \overline{NT}$, and $\triangle NTB \sim \triangle BTK \sim \triangle NBK$.



Complete the statements about the triangles.

Since $\triangle NTB \sim \triangle BTK$, $\frac{BT}{NT} =$
- ○ $\frac{BK}{BT}$.
- ○ $\frac{KT}{BT}$.

This proportion can be written as $\frac{y}{z} =$
- ○ $\frac{w}{y}$.
- ○ $\frac{m}{y}$.

This proportion can be rewritten as
- ○ $w = \frac{y^2}{z}$.
- ○ $m = \frac{y^2}{z}$.

Since $\triangle NTB \sim \triangle NBK$, $\frac{BN}{NT} =$
- ○ $\frac{BK}{BN}$.
- ○ $\frac{NK}{BN}$.

This proportion can be written as $\frac{x}{z} =$
- ○ $\frac{m}{x}$.
- ○ $\frac{r}{x}$.

This proportion can be rewritten as
- ○ $r = \frac{x^2}{z}$.
- ○ $m = \frac{x^2}{z}$.

The proportions can be substituted into the equation
- ○ $m + r = x$.
- ○ $w + m = y$.
- ○ $r + w = z$.

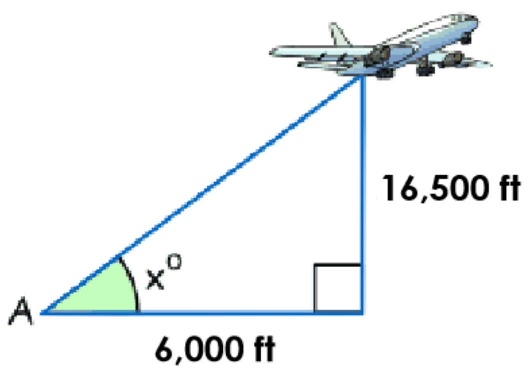
The result is
- ○ $\frac{x^2}{z} + \frac{y^2}{z} = x$.
- ○ $\frac{x^2}{z} + \frac{y^2}{z} = y$.
- ○ $\frac{x^2}{z} + \frac{y^2}{z} = z$.

Using the relationships in the similar triangles demonstrate the
- ○ geometric mean.
- ○ Pythagorean theorem.
- ○ definition of similarity.

Question 3.

This question has **two** parts.

An airplane takes off from an airport. When the airplane reaches a height of 16,500 feet (ft), the airplane has travelled a horizontal distance of 6,000 ft, as shown in the diagram below.



Part A: What is the angle of elevation, x, at take off? Round to the nearest degree.

Part B: What is the distance the airplane travelled in the air? Round to the nearest foot.