4-4 - Geometry Scot Foresman Integrated Math

Agenda

Objective: SWBAT…

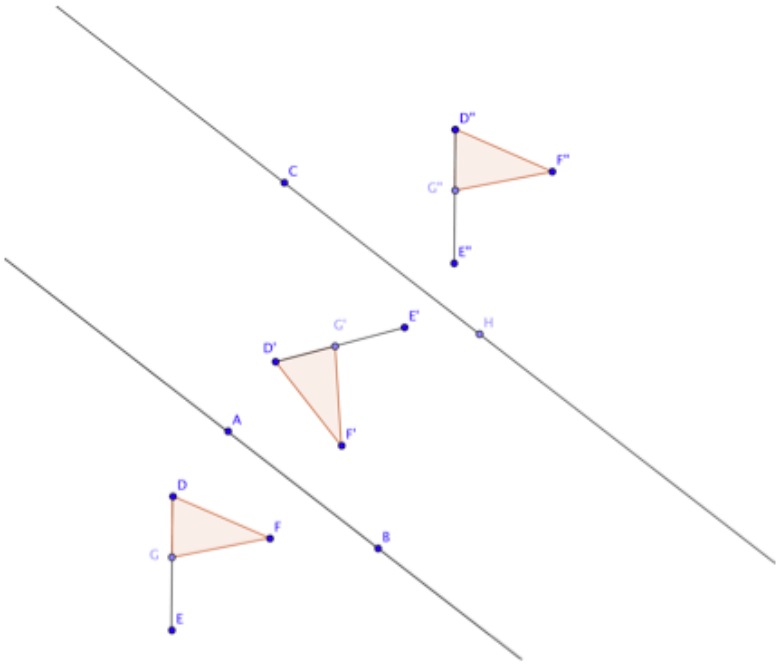
- **Discover** the result of a **composite** of 2 **reflections** over parallel lines
- **Define translation** and **examine** its **properties**

Language Objective: SWBAT…Compare and Contrast the properties of Reflections and Translations by **listing** the similarities and differences in a table with a group.

1) Take out HW to be checked
2) Do Now - Investigation with Parallel Lines
   Composite Reflections
3) Notes
   Vocabulary, Compare and Contrast, Strategies
4) Practice Worksheet:
   Lesson Master 4-4 A

HW: NONE- (Passover)

Investigation: Composite Reflections



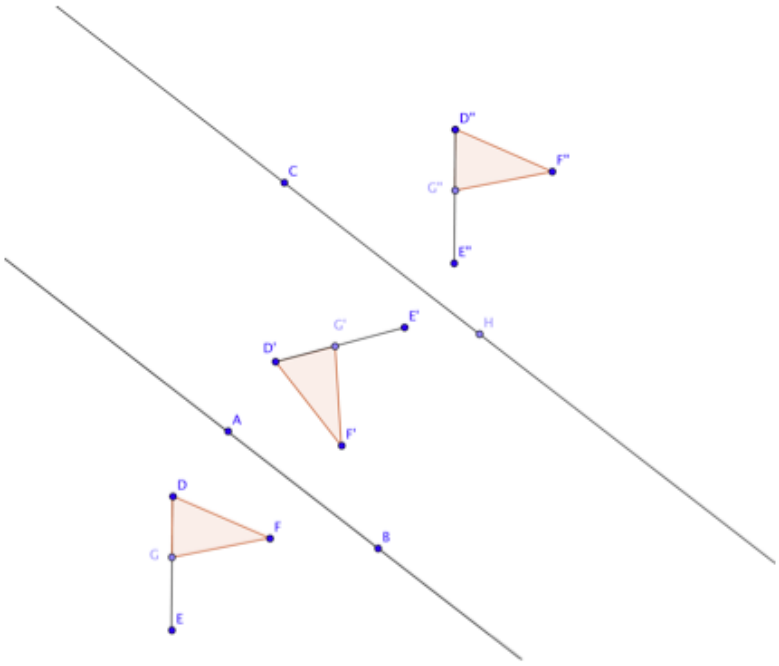
1) **What is the relationship between EGDF and E'G'D'F'? How do you know?**

2) **What is the relationship between E'G'D'F' and E"G"D"F"? How do you know?**

3) **A. Draw and measure the following line segments:** $\overline{DD''}, \overline{EE''}, \overline{GG''}, \overline{FF''}$
B. Use this information to explain the relationship between EGDF and E"G"D"F".

Conjecture: When reflections are composed over parallel lines, the result is…

Investigation: Composite Reflections



1) What is the relationship between EGDF and E'G'D'F'? How do you know?

EGD'F is the reflected image of EGDF. We know because... the properties of the Reflection Postulate are preserved (angles, betweeness, collinearity, distance, each point has ONE image)

2) What is the relationship between E'G'D'F' and E"G"D"F"? How do you know?

E"G"D"F" is the reflected image of EGD'F. We know because... the properties of the Reflection Postulate are preserved (angles, betweeness, collinearity, distance, each point has ONE image)

3) A. Draw and measure the following line segments: DD'', EE'', GG'', FF''

B. Use this information to explain the relationship between EGDF and E"G"D"F".

All the segments are congruent.

The relationship between EGDF and E"G"D"F" is a slide/ translation.

Conjecture: When reflections are composed over parallel lines, the result is...

a translation

Vocabulary

Composite Transformation: If transformation S is followed by transformation T, it is the transformation that maps each point P onto T(S(P))

Translation: the image appears to slide along a path. From the preimage, a translation is the composite of two reflections over parallel lines.

Direction: Any ray from a preimage point through its image point, (⊥ to the line of reflection) is the direction of the translation.

Notation: $r_x(r_y)$ or $h_{x \to y}$ is in the direction from x to y (per Two-Reflection Theorem for Translations)

Magnitude: The distance between any point and its image is the magnitude of the translation.

Notation: $r_x(r_y)$ or $h_{x \to y}$ has magnitude 2 times the distance between x and y (per Two-Reflection Theorem for Translations) (twice the distance between the parallel lines)

Go back to your exploration and measure the distance between the parallel lines. Verify the result!

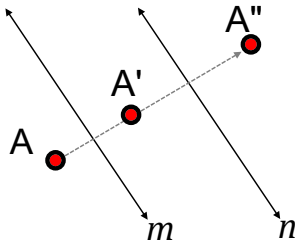
Vocabulary

Composite Transformation: If transformation S is followed by transformation T, it is the transformation that maps each point P onto T(S(P))

Translation: the image appears to slide along a path from the preimage, a translation is the composite of two reflections over parallel lines.

Direction: Any ray from a preimage point through its image point, (⊥ to the line of reflection) is the direction of the translation.

Notation: $r_n(r_m)$ or $r_n \circ r_m$ is in the direction from m to n (per Two-Reflection Theorem for Translations)

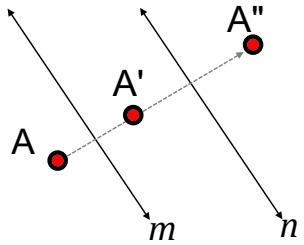


*evaluate from inside to outside. Like Functions!

*$f(x) = 2x$
$g(x) = x + 4$
ex.
$f(g(3)) = 2(3+4)=14$

Magnitude: The distance between any point and its image is the magnitude of the translation.

Notation: $r_n(r_m)$ or $r_n \circ r_m$ has magnitude 2 times the distance between m and n (per Two-Reflection Theorem for Translations) (twice the distance between the parallel lines)



Go back to your exploration and measure the distance between the parallel lines. Verify the result!

Properties

Take 1 minute to discuss with our groups the following question: *"How are translations and reflections the **same**? How are they **different**?"*

Similarities	Differences
. Angle Measure is preserved. . Betweenness is preserved. . Collinearity is preserved. . Distance is preserved. . Each point has exactly one image	. When figures are rotated... orientation is reversed . When figures are translated... orientation is preserved

Translating Figures

Since a translation is defined by reflections, the Figure Reflection Theorem holds for translations. Therefore, you can locate the transformation image of a point in either of to ways:

1) Slide the point the proper distance in the proper direction

2) Reflect the point over each of the parallel lines

Properties

Take 1 minute to discuss with our groups the following question: *"How are translations and reflections the **same**? How are they **different**?"*

Similarities	Differences
Reflection Postulate holds: · Angle Measure is preserved · Betweenness is preserved · Collinearity is preserved · Distance is preserved · Each point has exactly one image	· When figures are rotated... orientation is reversed · When figures are translated.... orientation is preserved

Translating Figures

Since a translation is defined by reflections, the Figure Reflection Theorem holds for translations. Therefore, you can locate the transformation image of a point in either of to ways:

1) slide the point the proper distance in the proper direction

2) Reflect the point over each of the parallel lines

Name _____

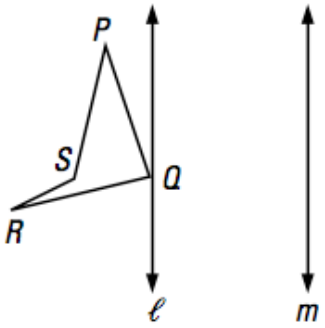
LESSON MASTER **4-4 A**

Questions on SPUR Objectives
See pages 238–241 for objectives.

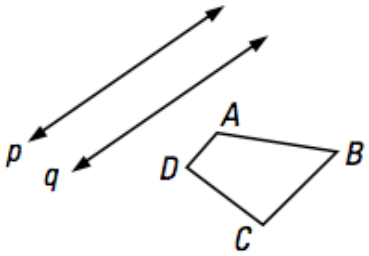
Skills Objective D

In 1 and 2, draw the indicated reflection image.

1. $r_m \circ r_\ell(PQRS)$



2. $r_q \circ r_p(ABCD)$



Properties Objectives F and G

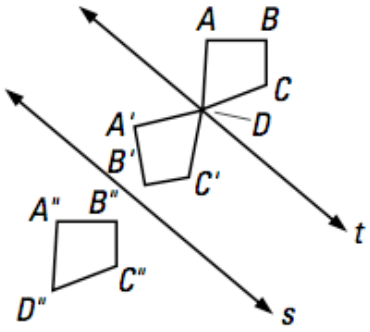
In 3–5, *true or false*.

3. Translations do *not* preserve orientation. _____

4. If $r_p \circ r_q$(Figure N) = Figure M and $p \parallel q$, then M is a translation image of N. _____

5. Under a composite of reflections over two parallel lines 10 inches apart, a point is 5 inches from its image. _____

6. In the figure at the right, $t \parallel s$, $r_t(ABCD) = A'B'C'D$, and $r_s(A'B'C'D) = A''B''C''D''$.



a. If $AA'' = 1$ cm, then $CC'' =$ _____ .

b. If $AA'' = 1$ cm, then the distance between t and s is _____ .

c. Since $r_t(D) = D$, D is on line _____ .

d. Name two segments with length equal to DC'.

_____ _____

Name

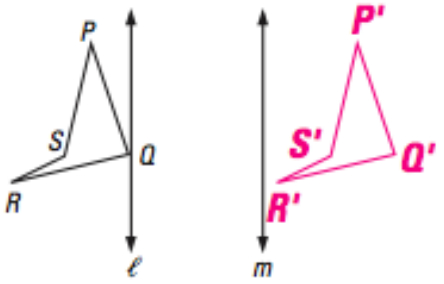
LESSON MASTER 4-4 A

Questions on SPUR Objectives
See pages 238–241 for objectives.

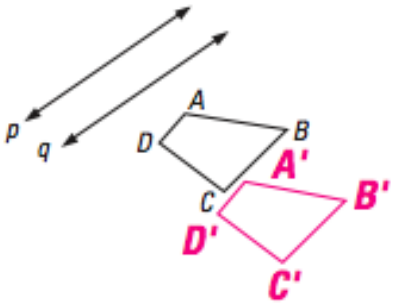
Skills Objective D

In 1 and 2, draw the indicated reflection image.

1. $r_m \circ r_\ell(PQRS)$



2. $r_q \circ r_p(ABCD)$



Properties Objectives F and G

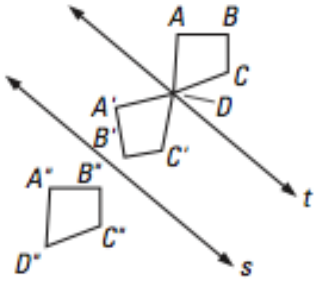
In 3–5, *true or false*.

3. Translations do *not* preserve orientation. **false**

4. If $r_p \circ r_q$(Figure N) = Figure M and $p \parallel q$, then M is a translation image of N. **true**

5. Under a composite of reflections over two parallel lines 10 inches apart, a point is 5 inches from its image. **false**

6. In the figure at the right, $t \parallel s$, $r_t(ABCD) = A'B'C'D'$, and $r_s(A'B'C'D') = A''B''C''D''$.



a. If $AA'' = 1$ cm, then $CC'' =$ **1 cm**.

b. If $AA'' = 1$ cm, then the distance between t and s is **.5 cm**.

c. Since $r_t(D) = D$, D is on line **t**.

d. Name two segments with length equal to DC'.

$\overline{DC}$ **$\overline{D''C''}$**