Comparing Tasks and Their Modifications

TASK A1

MAKING CONJECTURES—Complete the conjecture based on the pattern you observe in the specific cases.

Conjecture: The sum of any two odd numbers is: ________.

1 + 1 = 2	7 + 13 = 20
1 + 5 = 6	15 + 19 = 34
3 + 5 = 8	201 + 305 = 506

Conjecture: The product of any two odd numbers is: ______.

1 x 1 = 1	7 x 13 = 91
1 x 5 = 5	15 x 19 = 285
3 x 5 = 15	201 x 305 = 61,305

TASK A2

Complete the conjectures below based on the pattern you observe in the examples. Then explain why the conjecture is always true *or* show a case in which it is not true.

Conjecture: The sum of any two odd numbers is: ________.

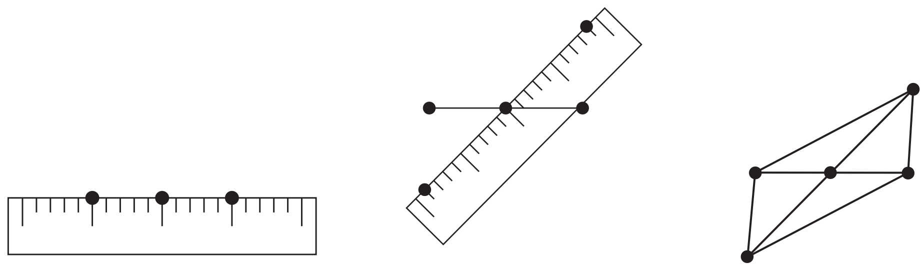
1 + 1 = 2	7 + 13 = 20
1 + 5 = 6	15 + 19 = 34
3 + 5 = 8	201 + 305 = 506

Conjecture: The product of any two odd numbers is: ______.

1 x 1 = 1	7 x 13 = 91
1 x 5 = 5	15 x 19 = 285
3 x 5 = 15	201 x 305 = 61,305

TASK B1

REASONING WITH VISUALS—Explain why this method for drawing a parallelogram works. Name a theorem that supports your answer.



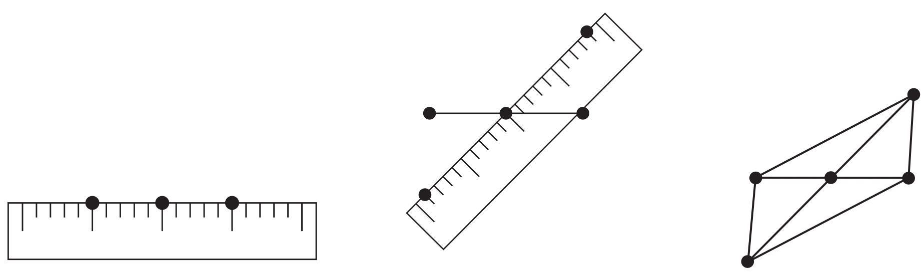
1. Use a straightedge to draw a segment. Identify and mark the midpoint.

2. Draw a second segment whose midpoint coincides with the first segment's midpoint.

3. Connect the endpoints of the two segments.

TASK B2: The Construction Conjectures task

Use a ruler and the three steps outlined below to complete Prompts a–d.



1. Use a straightedge to draw a segment. Identify and mark the midpoint.

2. Draw a second segment whose midpoint coincides with the first segment's midpoint.

3. Connect the endpoints of the two segments.

Record your work on the following questions in your notebook or binder.

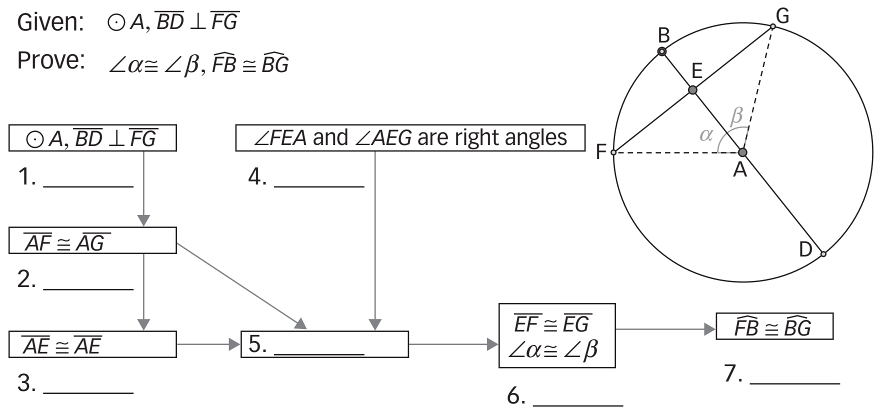
a. Use this construction with a variety of starting segments.
b. Write a conjecture about the type of figure your construction produces.
c. Write a proof that explains why that figure is produced each time by the construction.
d. Revisit the "Criteria for Judging Whether an Argument Is a Proof" list (Figure 3.3) and assess the extent to which your proof meets the criteria. Modify your proof if needed.

TASK C1

Copy and complete the flow proof that proves the theorem: If the diameter or radius of a circle is perpendicular to a chord, then it bisects the chord and its arc.

Given: $\odot A, \overline{BD} \perp \overline{FG}$

Prove: $\angle\alpha \cong \angle\beta, \widehat{FB} \cong \widehat{BG}$

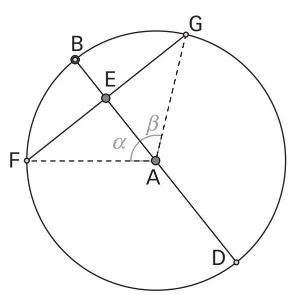


TASK C2

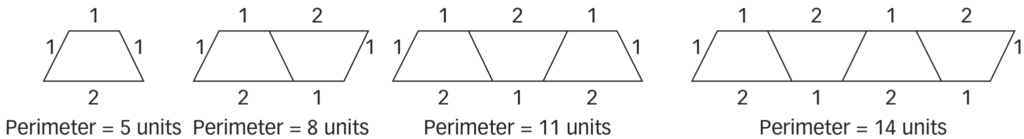
Consider the diagram below. Write down everything you know or can show about the diagram and the mathematical reasons behind those statements. Then, use those ideas to create a flow proof.

Given: $\odot A, \overline{BD} \perp \overline{FG}$

Prove: $\angle\alpha \cong \angle\beta, \widehat{FB} \cong \widehat{BG}$



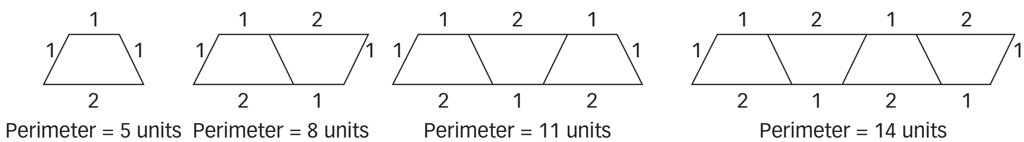
TASK D1



1. Create a formula that finds the perimeter of the trapezoid pattern for *n* trapezoids.
2. What is the perimeter for 12 trapezoids?

TASK D2

Use the diagram below that shows a pattern consisting of trapezoids.



1. Make as many observations as you can about the trapezoid pattern.
2. Find the perimeter of the first four trapezoid patterns shown above.
3. Find the perimeter of the pattern that contains 12 trapezoids without drawing a picture.
4. Write a generalization that can be used to find the perimeter of a pattern containing any number of trapezoids.
5. Using words, numbers, and/or connections to the visual diagram, prove that the generalization you created in Part 4 will always work.

TASK E1

Using the rules of exponents for products of powers, multiply the following monomials.

1. $x^3 \bullet x^5$
2. $y^2 \bullet y^2$
3. $a^3 \bullet a^2 \bullet a^4$
4. $(m^2n)(m^3n^3)$
5. $(5x^2y^4)(3xy^3)$

TASK E2

Complete the following calculations (calculators allowed):

1. 23 • 25
2. 28
3. 52 • 54
4. 56
5. 33 • 32 • 32
6. 37

a. Examine your answers. What patterns do you observe?

b. Based on those patterns, write a conjecture about a procedure for multiplying monomials.

c. Write an argument in which you show that your conjecture will hold true when multiplying any number of monomials.