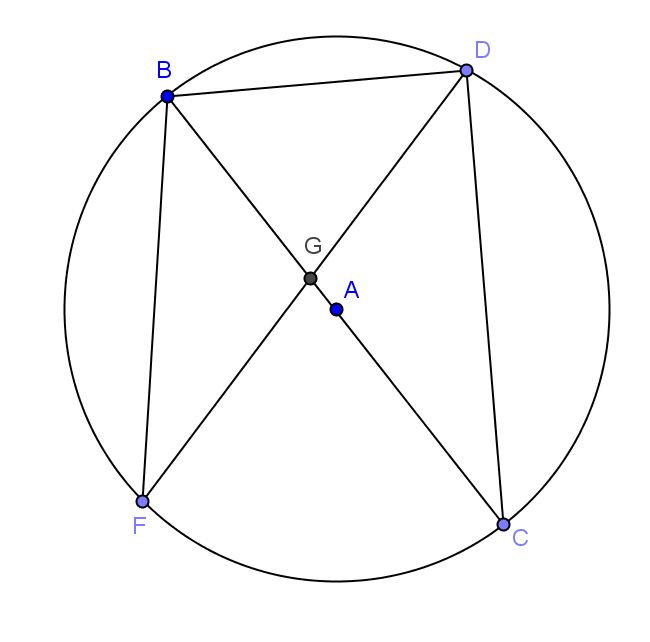
Lesson 13: The Inscribed Angle Alternate a Tangent Angle

Classwork

Opening Exercise

1. In circle , and is a diameter. Find the listed measure, and explain your answer.






   7. Is the ? Explain.
   8. How do you think we could determine the measure of ?

**Example 1**

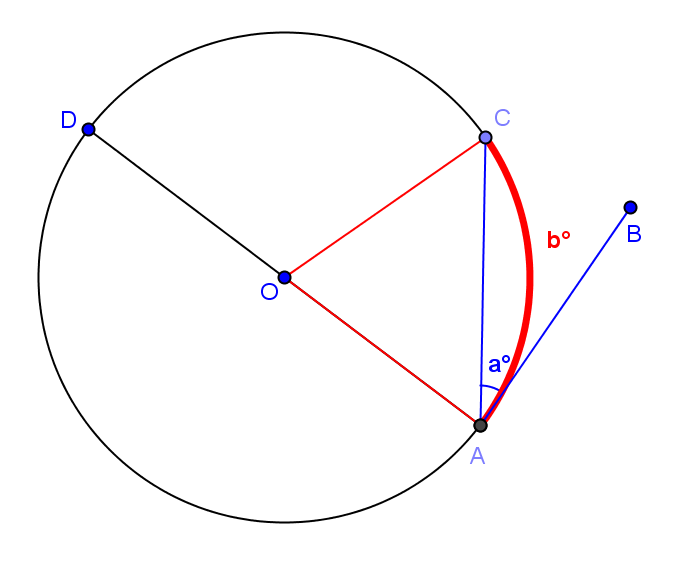
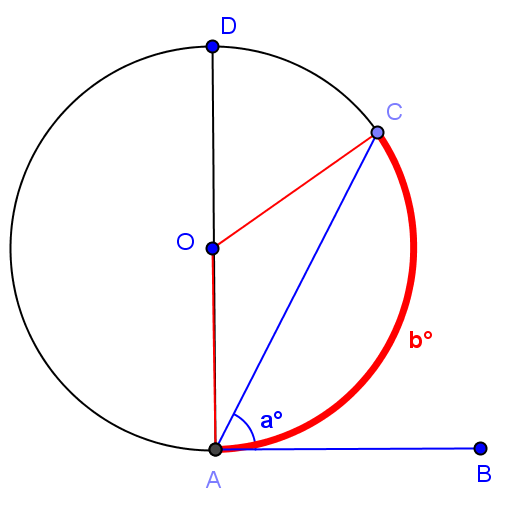


Diagram 1

Diagram 2

Examine the diagrams shown. Develop a conjecture about the relationship between and .

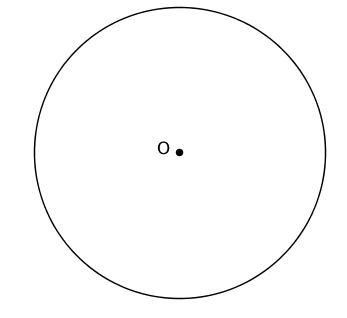
Test your conjecture by using a protractor to measure and .

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| Diagram 1 |  |  |
| Diagram 2 |  |  |

Do your measurements confirm the relationship you found in your homework?

If needed, revise your conjecture about the relationship between and :

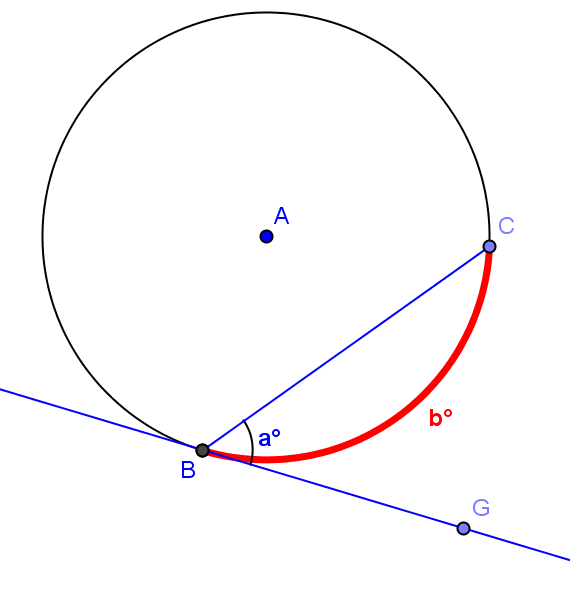
Now test your conjecture further using the circle below.



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Now, we will prove your conjecture, which is stated below as a theorem.

**The tangent-secant theorem**: Let be a point on a circle, let be a tangent ray to the circle, and let be a point on the circle such that is a secant to the circle. If and is the angle measure of the arc intercepted by , then .

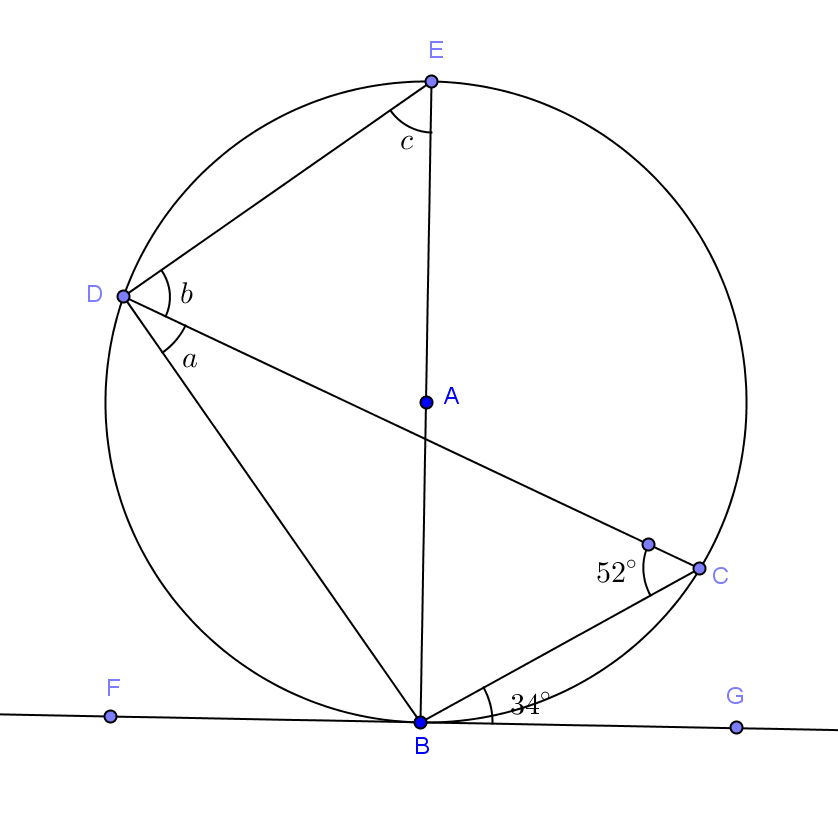
Given circle with tangent , prove what we have just discovered using what you know about the properties of a circle and tangent and secant lines.

* + - * 1. Draw triangle . What is the measure of ? Explain.
        2. What is the measure of ? Explain.
        3. Express the measure of the remaining two angles of triangle in terms of “” and explain.
        4. What is the measure of in terms of “”? Show how you got the answer.
        5. Explain to your neighbor what we have just proven.

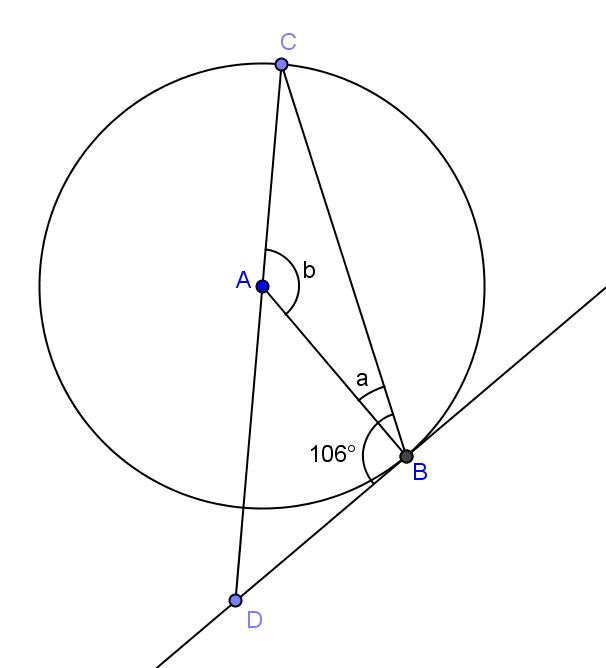
Exercises

Find and/or .

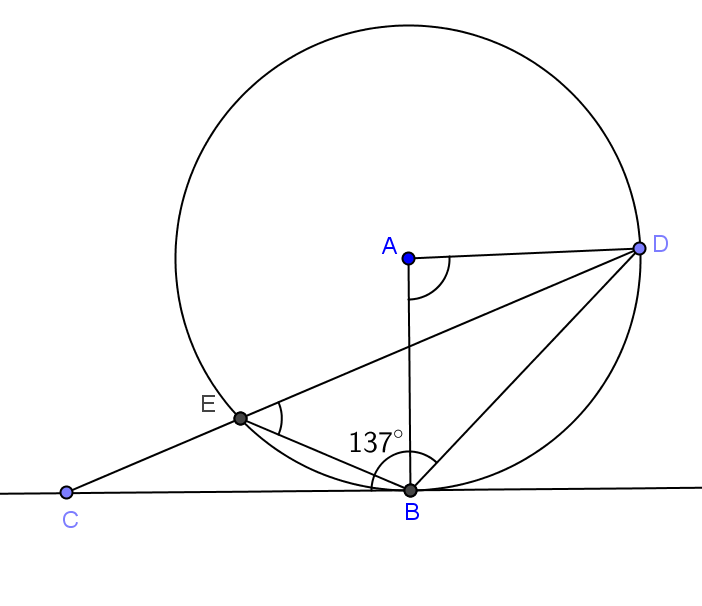
1.

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2.



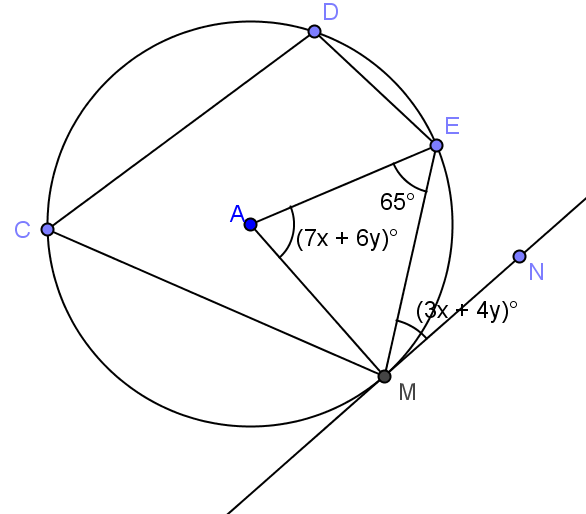
3.



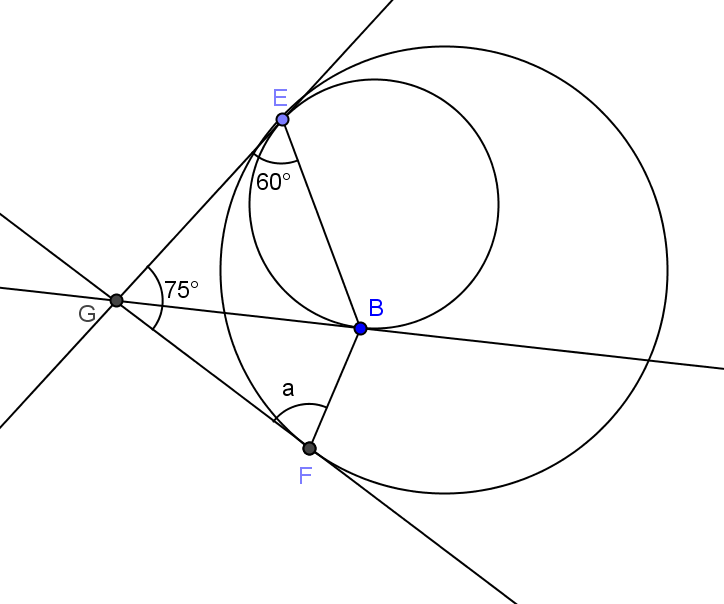
a

b

4.



5.



Problem Set

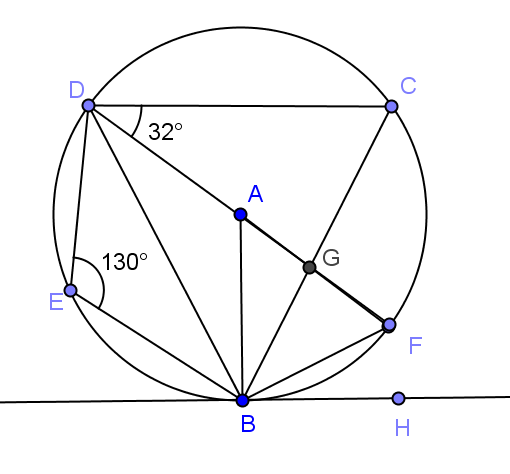
Lesson Summary

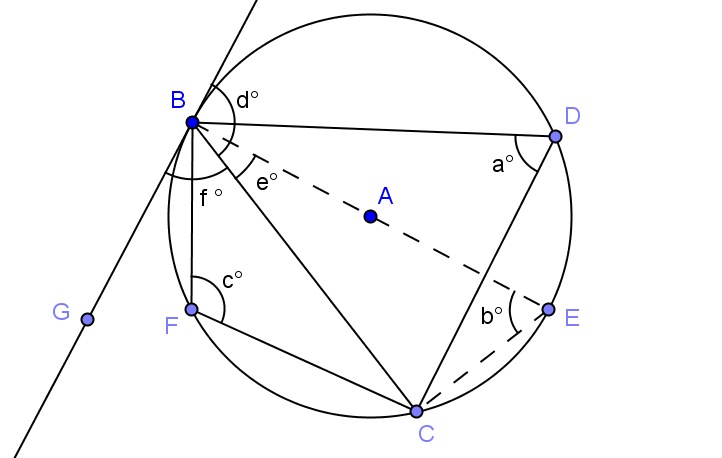
Theorems:

* **Conjecture:**Let be a point on a circle, let be a tangent ray to the circle, and let be a point on the circle such that is a secant to the circle. If and is the angle measure of the arc intercepted by , then .
* The tangent-secant theorem:Let be a point on a circle, let be a tangent ray to the circle, and let be a point on the circle such that is a secant to the circle. If and is the angle measure of the arc intercepted by , then .
* Suppose is a chord of circle , and is a tangent segment to the circle at point . If is any point other than or in the arc of on the opposite side of from , then .

In Problems 1–9, solve for , and/or

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1. is tangent to circle . is a diameter. Find
2. is tangent to circle . is a diameter. Prove: (i) and (ii)

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