U5L3 WKST

Name: ______

Blk: ______

Discuss the ideas

1. A line may look as if it is a tangent to a circle but it may not be. How can you determine if the line is a tangent?

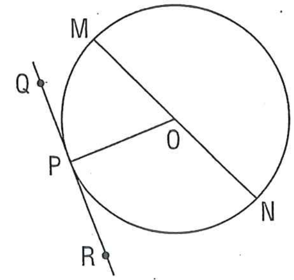
2. The Pythagorean Theorem was used in *Examples 2* and *3*. When is the Pythagorean Theorem useful for solving problems involving tangents?

Practice

Check

3. In each diagram, point O is the centre of each circle. Which lines are tangents?

a)



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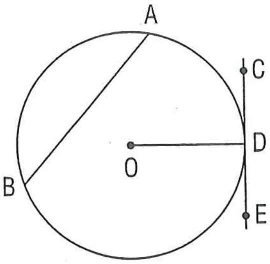
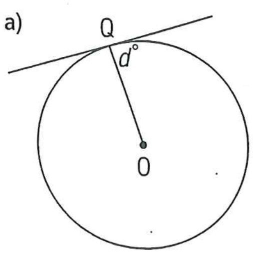


4. Point Q is a point of tangency. Point O is the centre of each circle. What is each value of $d°$?

a)



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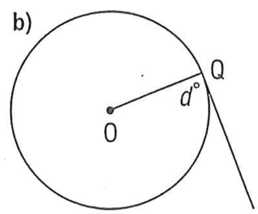
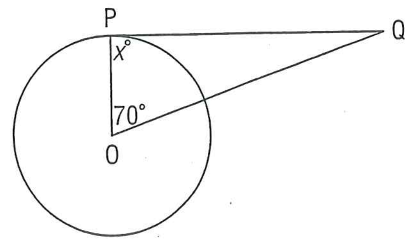


5. Point P is a point of tangency and O is the centre of each circle. Determine each value of $x°$.

a)



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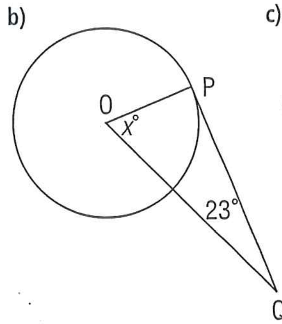

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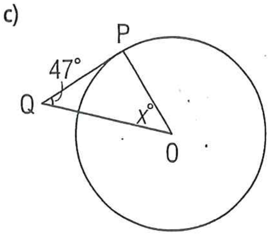
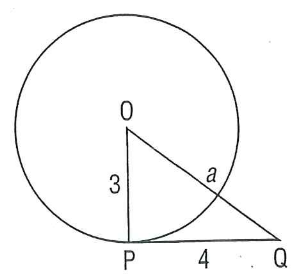


6. Point P is a point of tangency and O is the centre of each circle. Determine each value of a.

a)



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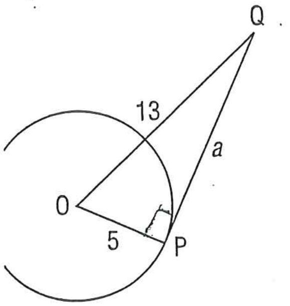

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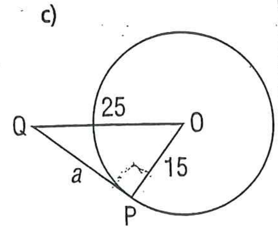
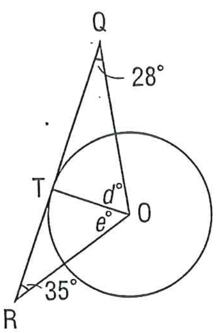


Apply

7. Point T is a point of tangency and O is the centre of each circle. Determine each value of $d°$ and $e°$.

a)



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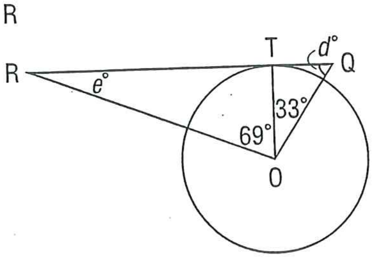
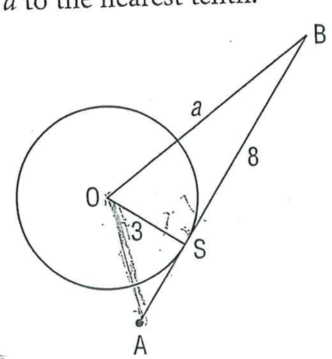
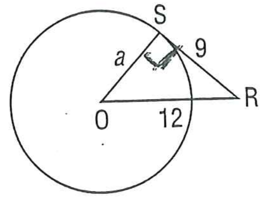


8. Point S is a point of tangency and O is the centre of each circle. Determine each value of a to the nearest tenth.

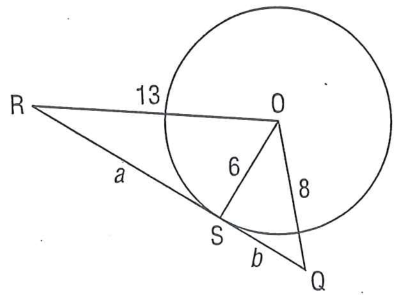
a)



b)

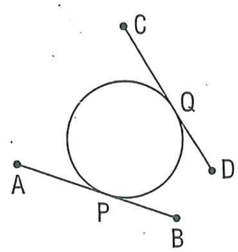


9. Point S is a point of tangency and O is the centre of the circle. Determine the values of a and b to the nearest tenth.

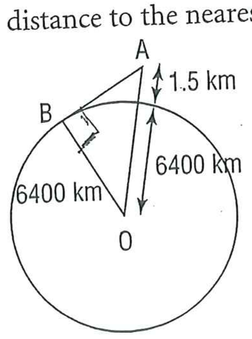


10. Look around the classroom or think of what you might see outside the classroom. Provide an example to illustrate that the tangent to a circle is perpendicular to the radius at the point of tangency.

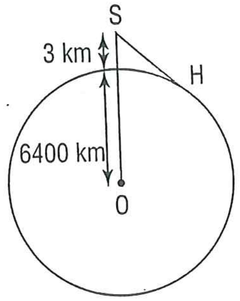
11. Both AB and CD are tangents to a circle at P and Q. Use what you know about tangents and radii to explain how to locate the centre of the circle. Justify your strategy.



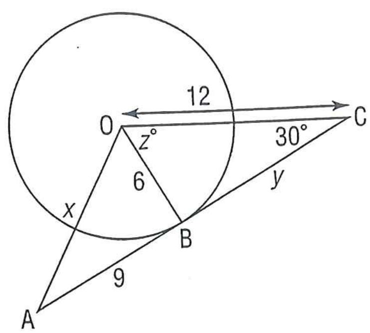
12. A small aircraft, A, is cruising at an altitude of 1.5 km. The radius of Earth is approximately 6400 km. How far is the plane from the horizon at B? Calculate this distance to the nearest kilometre.



13. A skydiver, S, jumps from a plane at an altitude of 3 km. The radius of Earth is approximately 6400 km. How far is the horizon, H, from the skydiver when she leaves the plane? Calculate this distance to the nearest kilometre.



14. Point O is the centre of the circle. Point B is a point of tangency. Determine the values of x, y, and $z°$. Give the answers to the nearest tenth where necessary. Justify the strategies you used.



15. **Assessment Focus**

a) From any point outside a circle, how many tangents do you think you can draw to the circle?
Explain your reasoning.

b) Construct a circle. Choose a point outside the circle. Check your answer to part a. How do you know you have drawn as many tangents as you can?

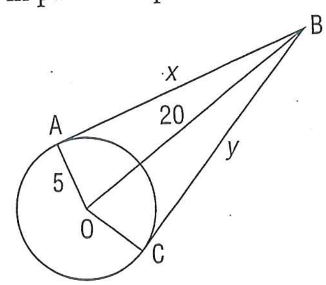
c) How do you know that the lines you have drawn are tangents?

Show your work.

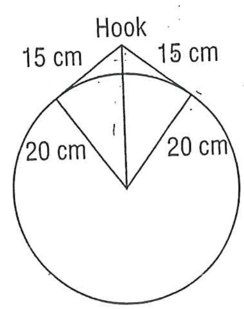
16. a) Construct a circle and draw two radii. Draw a tangent from the endpoint of each radius so the two tangents intersect at point N. Measure the distance from N to each point of tangency.
What do you notice?

b) Compare your answer to part a with that of your classmates. How do the lengths of two tangents drawn to a circle from the same point outside the circle appear to be related?

c) Points A and C are points of tangency and O is the centre of the circle. Calculate the values of x and y to the nearest tenth. Do the answers confirm your conclusions in part b? Explain.



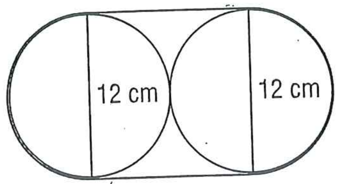
17. A circular mirror with radius 20 cm hangs by a wire from a hook. The wire is 30 cm long and is a tangent to the mirror in two places. How far above the top of the mirror is the hook? How do you know?



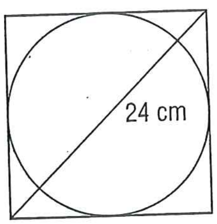
18. A communications satellite orbits Earth at an altitude of about 600 km. What distance from the satellite is the farthest point on Earth's surface that could receive its signal? Justify the strategy you used.

Take It Further

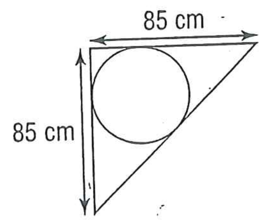
19. Two cylindrical rods are bound with a strap. Each rod has diameter 12 cm. How long is the strap? Give the answer to the nearest tenth of a centimetre. (The circumference C of a circle with diameter d is given by $C = \pi d$.)



20. What is the radius of the largest circle that can be cut from a square piece of paper whose diagonal is 24 cm long?



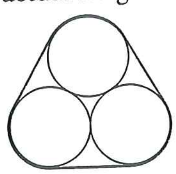
21. A cylindrical pipe touches a wall and the ceiling of a room. The pipe is supported by a brace. The ends of the brace are 85 cm from the wall and ceiling. Apply what you discovered in question 16. What is the diameter of the pipe? Give the answer to the nearest centimetre.



22. Each of 3 logs has diameter 1 m.

a) What is the minimum length of strap needed to wrap the logs?

b) Would this minimum length be the actual length of strap used? Explain.



Reflect

What do you know about a tangent and a radius in a circle? How can you use this property? Include examples in your explanation.

Math Link

Literacy

Sometimes a conversation goes off topic when the subject being discussed makes one person think of a related idea. For example, a discussion about Olympic athletes may prompt someone to think of and describe her exercise plan. When this happens, we say the discussion has "gone off on a tangent." How does this everyday occurrence relate to the meaning of the word "tangent" in math?