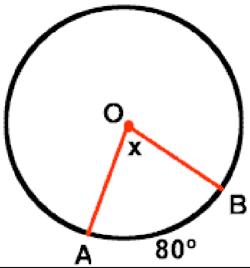
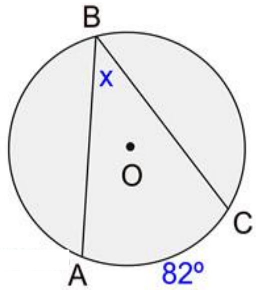
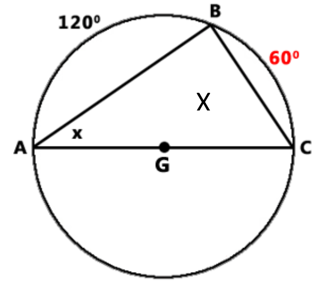
PCFU: Angles and Tangents (F12-F14) Name: ________________________________

Answers with explanations.

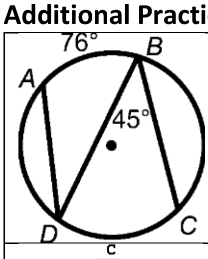
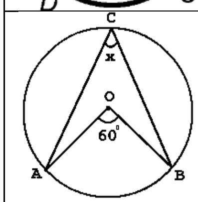
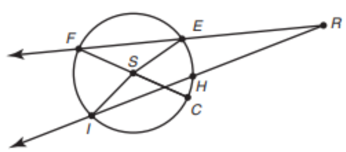
1) 

2) 

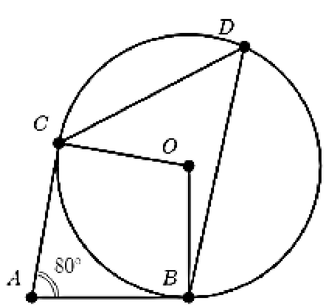
3) 

$\angle AOB$= 80° because this angle has its vertex at the center which means it is a central angle. The angle and the intercepted arc will have the same measure.	$\angle ABC$ = 41° because this angle has its vertex on the circle and both sides of the angle are chords. This is an inscribed angle which means it will be half of the measure of its intercepted arc. Half of 82° is 41°.	$\angle ABC$ = 90° because the angle is an inscribed angle so its measure is half of the intercepted arc's measure. To find the intercepted arc measure, I added the known arcs together to get 180°. The total circle measures 360°. 360°-180° = 180°. Half of 180°=90°.

Additional Practice:

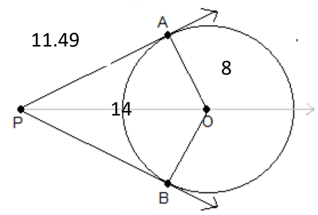
	1) Find $m\angle ADB$.	2) Find $m\widehat{DC}$.
	3) Find $m\angle ACB$.	
Use circle *S* to answer each question. Explain your reasoning. 	4) Suppose that m$\angle CSI = 124°$. What is m $\widehat{FI}$? 5) What one piece of information would be enough for you to find m$\widehat{EC}$? Explain.	

Answers with explanations.



1) Find the measure of $\widehat{CB}$. **Answer:** **m$\widehat{CB}$= 100°**
$\angle CAB$ is a circumscribed angle. That means that m$\angle CAB$ + m$\widehat{CB}$= 180°, or that the circumscribed angle and the intercepted arc are supplementary. Since I know m$\angle CAB = 80°$, I can conclude that m$\widehat{CB}$= 100°.

2) Find the measure of $\angle CDB$. **Answer:** **m$\angle CDB = 50°$**
$\angle CDB$ is an inscribed angle with $\widehat{CB}$ as its intercepted arc. That means that m$\angle CDB$ is one-half m$\widehat{CB}$. So $\frac{1}{2} \cdot 100° = 50°$



3) Given $m\overline{PO}$ = 14 cm, and the area of circle O is $64\pi cm^2$, find the perimeter of quadrilateral PAOB.

<u>Answer:</u> The perimeter of PAOB is approximately 38.98cm.

I know this because tangent $\overline{PA}$ forms a right angle with the radius $\overline{OA}$. That makes ΔAPO a right triangle with a hypotenuse of 14 cm. To find the measure of $\overline{PA}$ I will use the Pythagorean Theorem. The shortest leg in the right triangle is $\overline{OA}$ and that is the radius of circle O. Since I am given the area of circle O, I can use that to find the radius. I know that $A = \pi r^2$ is the formula for the area of a circle. If the area is 64π then we can write $64\pi = \pi r^2$. That means $r^2 = 64$ and so r = 8. Now I have the hypotenuse and one leg of a right triangle so I can find the other with $a^2+b^2=c^2$:

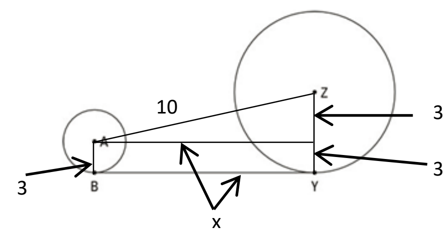
$8^2 + (m\overline{PA})^2 = 14^2 \rightarrow 64 + (m\overline{PA})^2 = 196 \rightarrow (m\overline{PA})^2 = 132 \rightarrow$
$(m\overline{PA}) = \sqrt{132} \approx 11.49$ cm. ΔAPO ≅ ΔBPO so the corresponding parts are equal in measure. That means the perimeter would be 11.49 + 11.49 + 8 + 8 = 38.98cm.

4) Given the radius of circle A is 3 in., the radius of circle B is 6 in., and the length of $\overline{AZ}$ is 10 inches, find the length of $\overline{BY}$ to the nearest tenth of an inch.

<u>Answer:</u> $m\overline{BY} \approx 9.5$ inches

First I drew in the radii which I know are perpendicular to the tangent line at the point of tangency. Then I drew in the segment between A and Z. At this point I realized I had a shape that could be split into two shapes: a right triangle and a rectangle. So I drew in the parallel line I needed to form the rectangle. After labelling the parts that I knew I realized I could use the Pythagorean Theorem to find the value of x which represented the length of $\overline{BY}$.

$a^2+b^2=c^2 \rightarrow x^2+3^2=10^2 \rightarrow x^2+9=100 \rightarrow x^2=91 \rightarrow x=\sqrt{91} \approx 9.5$ inches.



Additional Practice:

1)

a) Find the measure of $\widehat{BC}$.

b) Identify the inscribed angle and its measure.

c) Identify the central angle and its measure.

d) Identify the circumscribed angle and its measure.

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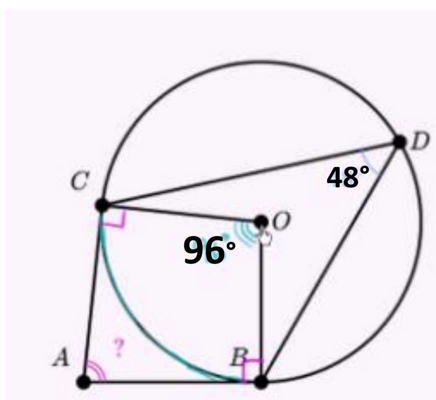

2) Draw in $\overline{AO}$ above. This creates two right triangles: ΔAOB and ΔAOC. If the radius of circle O is 9 cm and the length of $\overline{AO}$ is 12 cm, find the perimeter of quadrilateral COBA. (Hint: Use the Pythagorean Theorem to find the missing sides of the right triangle.)

3) Find the length of $\overline{BY}$. Refer to original Progress Check problem #4 above if you need a hint.