Sol HW 7.5

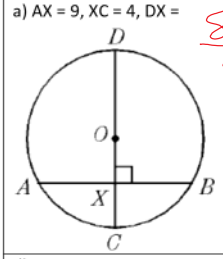
June 3, 2016 10:24 AM

Name: Key Date:

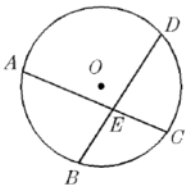
Math 9 Enriched: Assignment 7.5 Intersecting Chords, Secants, and Tangents in Circles

1. Find the length of the missing sides for each of the following:

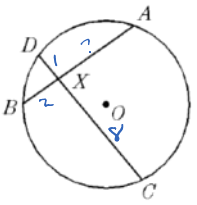
a) AX = 9, XC = 4, DX = $\frac{81}{4}$



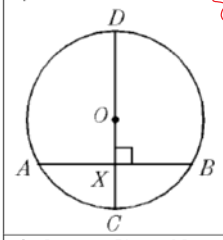
b) AE = 8, EC = 3, BE = ED = ? $2\sqrt{6}$



c) DX = 1, BX = 2, DC = 9, BA = 4

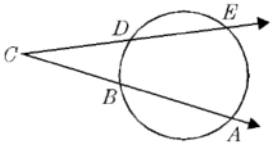


d) OX = CX = 4cm. AB = $8\sqrt{3}$

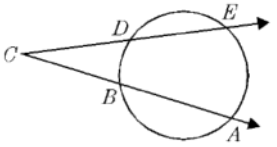


e) CD = 8, DE = 12, CB = 10, BA = x
Find the value of "x"

$x = 6$

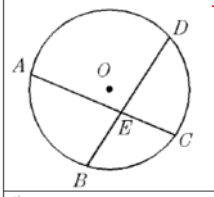


f)



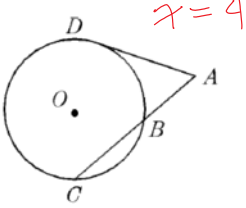
g) AE = $x + 4$, ED = x, BE = $x - 1$, EC = $x - 2$. *Solve for "x"*

$x = \frac{8}{3}$



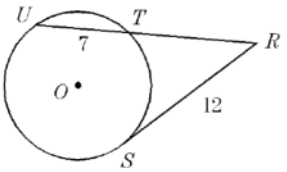
h) AD is a tangent, AD = 6, AC = 9, What is AB?

$x = 4$



i) TR = ?

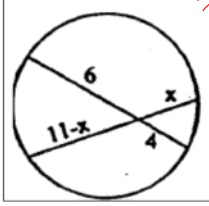
$x = 9$



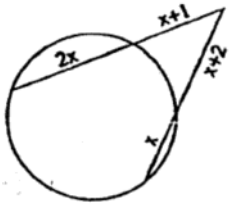
j) x =

$x_1 = 3$

$x_2 = 8$

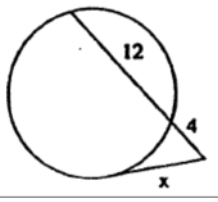


k) x = 3



l) x =

$x = 8$

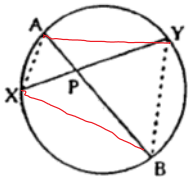


12×12
9×16

$12^2 = x(x+7)$
$0 = x^2 + 7x - 144$
$0 = (x-9)(x+16)$
$x = 9, x = -16$

$x^2 = 4(16)$
$x = 8$

2. Prove the following equation: $PA \bullet PB = PX \bullet PY$.



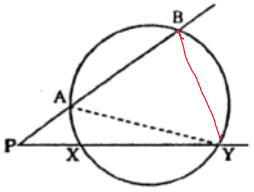
$\angle APX = \angle YPB \quad \angle AYX = \angle APX$

$\angle YAB = \angle YXB$

$\triangle APX \sim BPY$

$\frac{AP}{PY} = \frac{PX}{PB}$ $\therefore PA \cdot PB = PY \cdot PX$

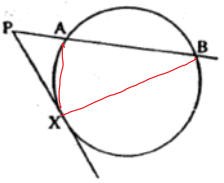
3. Prove the following equaton: $PA \bullet PB = PX \bullet PY$



$\angle PAX = \angle BYP \quad \therefore \triangle PAX \sim \triangle PYB$

$\frac{PA}{PX} = \frac{PY}{PB}$ $PA \cdot PB = PX \cdot PY$

4. Prove the following equation: $PA \bullet PB = (PX)^2$

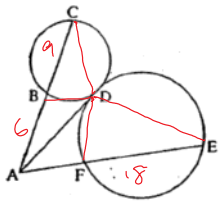


$\angle AXP = \angle PBX$

$\triangle PAX \sim \triangle PXB$

$\frac{PA}{PX} = \frac{PX}{PB}$ $PA \cdot PB = (PX)^2$

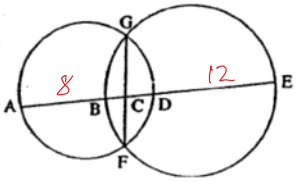
5. AB = 6, BC = 9, and AE = 18. Find AF:



$(AB)(AC) = (AD)^2 \therefore AD = 3\sqrt{10}$

$(AF)(AE) = (AD)^2 \therefore AF = 5$

6. AB = 8, BD = 7, and DE = 12. Find the lenght of BC.



$BC = x \therefore CD = 7 - x$

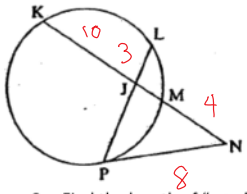
$(AC)(CD) = (GC)(CF) = (BC)(CE)$

$(8+x)(7-x) = (x)(19-x)$

$56 + x - x^2 = 19x - x^2$

$x = \frac{28}{9}$

7. Given that JK = 10, JL = 3, MN = 4, and PN = 8. Find the length of JP.

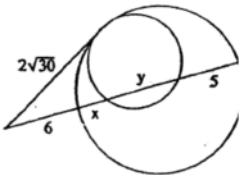


$JP = x \quad JM = Y$

$(14+y)4 = 8^2 \quad Y = 2$

$(KJ)(JM) = (LJ)(JP) \quad JP = \frac{20}{3}$

8. Find the length of "x + y"

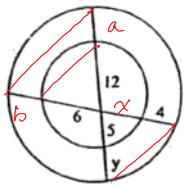


$(2\sqrt{30})^2 = 6(11+x+y)$

$120 = 66 + 6(x+y)$

$x+y = 9$

9. For the two concentric circles shown, find the value of "y" to 2 decimal places.

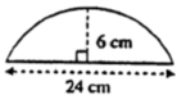


$12 \cdot 5 = 6 \cdot x \; ; \; x = 10$

$\frac{x+4}{12} = \frac{y+5}{6}$

$y = 2$

10. Part of a circular plate has the measurements given on the diagram. Show two or more ways to calculate the radius of the plate.



$12^2 = 6(r+r-6)$

$144 = 12r - 36$

$r = 15$

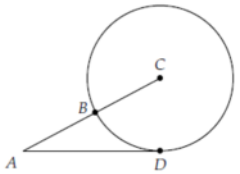
$r^2 = (r-6)^2 + 12^2$

$r^2 = r^2 - 12r + 36 + 144$

$r = 15$

11. In the diagram, C is the centre of the circle and AD is tangent to the circle at D. AC is a straight line. If AD = 10, and AB = 7, what is the length of "BC"?

a) $\frac{\sqrt{151}-7}{2}$ b) $\sqrt{14}$ c) $\frac{51}{14}$ d) $\frac{\sqrt{51}}{2}$ e) $\frac{7}{2}$



$BC = CD = x$

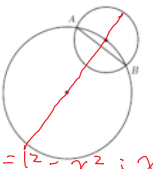
$(7+x)^2 = 10^2 + x^2$

$x^2 + 14x + 49 = x^2 + 100$

$x = \frac{51}{14}$

12. Two circle are shown in the diagram. The larger circle has radius 2, an d the smaller circle has radius 1 and its centre is on the circumference of the larger circle. What is the length of chord AB?

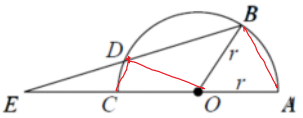
a) $\frac{\sqrt{15}}{2}$ b) $\frac{5\sqrt{34}}{17}$ c) 2 d) 1.5 e) $\frac{15}{8}$



$0=P=x$; $PD=1-x$ $\frac{AB}{2}=y$

$(4-x)x=y^2-(1-x)(1+x)$; $4x-x^2=12-x^2$; $x=\frac{1}{4}$ $y=\frac{\sqrt{15}}{2}$

13. In the diagram, O is the centre of the circle with radius "r". ED = "r" and $\angle DEC = k \times \angle BOA$. What is the value of "k"?



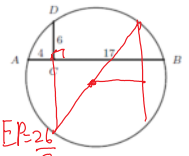
$BDO=x$; $\angle DBO=x$ $\therefore \angle BOD=180-2x$

$\angle EDO=180-x$ $\therefore \angle DEO=\angle DOE=\frac{x}{2}$

$\angle BOA=\frac{3}{2}x$ $\angle DEC=\frac{1}{3}\angle BOA$ $k=\frac{1}{3}$

14. In the circle shown, line segment CD is perpendicular to the chord AB. Further $AC = 4$, $CD = 6$, and $BC = 17$. What is the radius of the circle?

a) $\frac{65}{6}$ b) 11 c) $\frac{21}{2}$ d) $\frac{\sqrt{513}}{2}$ e) 13



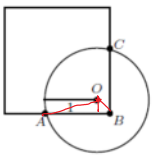
$(DC)(CF)=(AC)(BC)$; $CF=\frac{34}{3}$ $ER=\frac{26}{3}$

$OP=\frac{21}{2}-4=\frac{13}{2}$; $OE=\frac{65}{6}$

15. A circle of radius 1 has centre near one vertex of a square in such a way that $AB = BC = "a"$. What is the value of "a" for which the distance OB is equal to ½?

(A) $\frac{\sqrt{3}-1}{2}$ (B) $\frac{\sqrt{7}+1}{2\sqrt{2}}$ (C) $\frac{\sqrt{3}+1}{2}$

(D) $\frac{\sqrt{7}+1}{\sqrt{2}}$ (E) $\frac{\sqrt{7}-1}{2\sqrt{2}}$



$AB=CB$; $\angle DBA=45°$

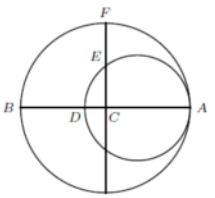
$OP \perp AB$; $OP=PB=\frac{1}{2\sqrt{2}}$

$OA=1$; $AP=\frac{\sqrt{2}}{2\sqrt{2}}$

16. Two circle are tangent to each other at "A" and the centre of the larger circle is at "C". The lines AB and FC are perpendicular diameters of the larger circle. If BD = 9cm and FE = 5cm, the what is the radius of the smaller circle?

(a) 14 (b) 18 (c) $19\frac{1}{2}$

(d) $20\frac{1}{2}$ (e) 21



$AC=R$; $R(R-9)=(R-5)^2$

$R^2-9R=R^2-10R+25$

$R=25$

$r=\frac{25+(25-9)}{2}$ $r=\frac{41}{2}$ $(20\frac{1}{2})$