SEGMENTS OF SECANTS THEOREM

If two secant segments share the same endpoint outside a circle, then the **product** of the lengths of one secant segment and its external segment equals the **product** of the lengths of the other secant segment and its external segment.

part · whole = part · whole

Name two secant segments.

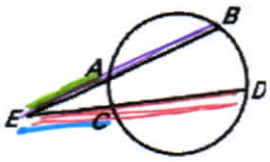
$\overline{EB}$ $\overline{DE}$

What is the external segment of EB?

$\overline{AE}$

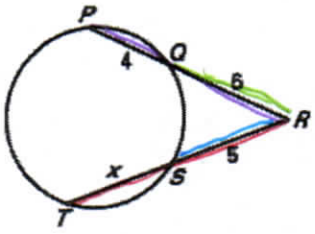
What is the external segment of DE?

$\overline{EC}$



$AE \cdot EB = EC \cdot DE$

4. Find x.



$6(10) = 5(x+5)$

$60 = 5x + 25$

$35 = 5x$

$7 = x$

Are the secant segments equal in length? NO.

10, 12

5. Find x.

$3(x+5) = (x+1)(2x)$

$3x + 15 = 2x^2 + 2x$

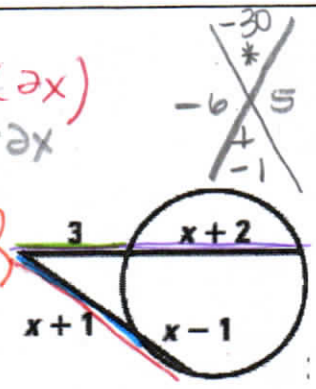
$0 = 2x^2 - x - 15$

$0 = (2x^2 - 6x) + (5x - 15)$

$0 = 2x(x-3) + 5(x-3)$

$0 = (2x+5)(x-3)$

$x = -\frac{5}{2}$ $x = 3$



SEGMENTS OF SECANTS AND TANGENTS THEOREM

If a secant segment and a tangent segment share an endpoint outside a circle, then the **product** of the lengths of the secant segment and its external segment equals **the square of the length of the tangent segment.**

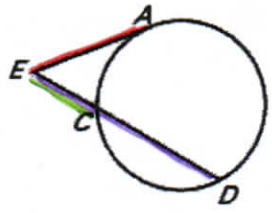
part · whole = part · whole

Same line

What is the tangent segment?

$\overline{AE}$

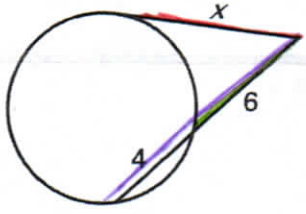
What is the secant segment? $\overline{ED}$



What is the external segment of the secant segment? $\overline{EC}$

$(AE)^2 = \overline{EC} \cdot \overline{ED}$

6. Find x.



$x^2 = 6(10)$

$\sqrt{x^2} = \sqrt{60}$

$\sqrt{4 \cdot 15}$

$x = 2\sqrt{15}$

7. a) Find the length of the secant segment.

18

b) Find the length of the tangent segment.

12

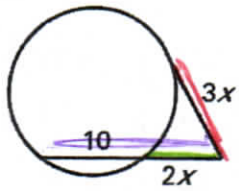
$(3x)^2 = 2x(2x+10)$

$9x^2 = 4x^2 + 20x$

$5x^2 - 20x = 0$

$5x(x-4) = 0$

$x = 0$ $x = 4$

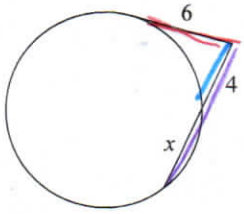


Geometry Name_____ ID: 1

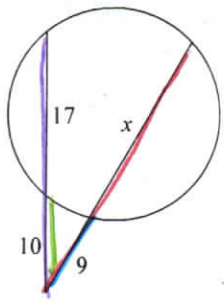
Circle Segments: Secant - Tangent

Date_____ Period____

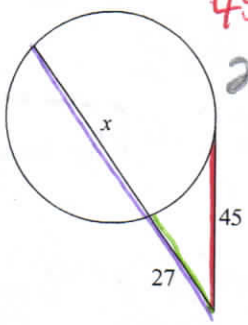
Solve for *x*. Assume that lines which appear tangent are tangent.

1) 

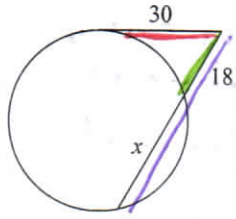
$6^2 = 4(4+x)$
$36 = 16 + 4x$
$20 = 4x$
$5 = x$

2) 

$9(9+x) = 10(27)$
$81 + 9x = 270$
$9x = 189$
$x = 21$

3) 

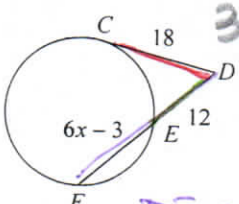
$45^2 = 27(27+x)$
$2025 = 729 + 27x$
$1296 = 27x$
$48 = x$

4) 

$30^2 = 18(18+x)$
$900 = 324 + 18x$
$576 = 18x$
$32 = x$

Find the measure of the line segment indicated. Assume that lines which appear tangent are tangent.

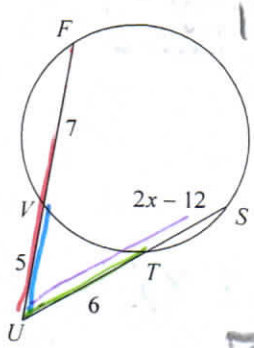
5) Find *DF*



$18^2 = 12(6x+9)$
$324 = 72x + 108$
$216 = 72x$
$3 = x$

$DF = 6x + 9$
$= 6(3) + 9$
$= 18 + 9$
$DF = 27$

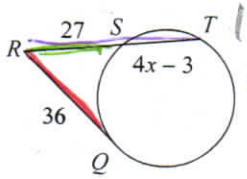
6) Find *ST*



$6(2x-6) = 5(12)$
$12x - 36 = 60$
$12x = 96$
$x = 8$

$ST = 2x - 12$
$= 2(8) - 12$
$= 16 - 12$
$ST = 4$

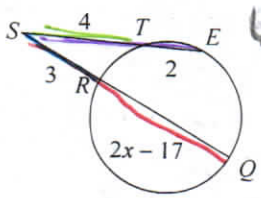
7) Find *RT*



$36^2 = 27(4x+24)$
$1296 = 108x + 648$
$648 = 108x$
$6 = x$

$RT = 4x + 24$
$= 4(6) + 24$
$= 24 + 24$
$RT = 48$

8) Find *QR*

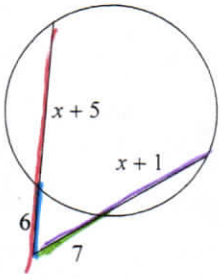


$3(2x-14) = 4(6)$
$6x - 42 = 24$
$6x = 66$
$x = 11$

$QR = 2x - 17$
$= 2(11) - 17$
$= 22 - 17$
$QR = 5$

Solve for x. Assume that lines which appear tangent are tangent.

9)

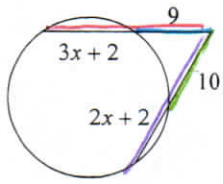


$6(x+11) = 7(x+8)$

$6x + 66 = 7x + 56$

$10 = x$

10)



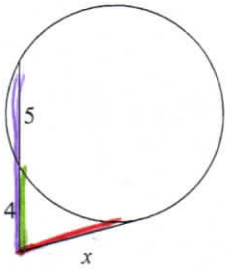
$9(3x+11) = 10(2x+12)$

$27x + 99 = 20x + 120$

$7x = 21$

$x = 3$

11)



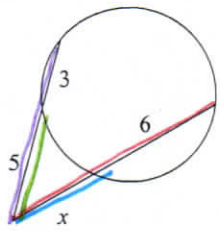
$x^2 = 4(9)$

$\sqrt{x^2} = \sqrt{36}$

$x = \pm 6$

$x = 6$

12)



$x(x+6) = 5(8)$

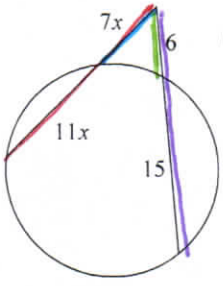
$x^2 + 6x = 40$

$x^2 + 6x - 40 = 0$

$(x+10)(x-4) = 0$

$x = -10$ $x = 4$

13)



$7x(18x) = 6(21)$

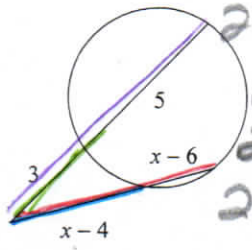
$126x^2 = 126$

$\sqrt{x^2} = \sqrt{1}$

$x = \pm 1$

$x = 1$

14)



$(x-4)(2x-10) = 3(8)$

$2x^2 - 10x - 8x + 40 = 24$

$2x^2 - 18x + 16 = 0$

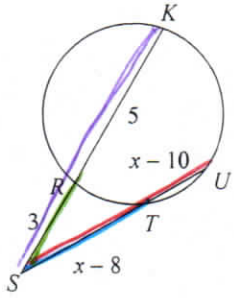
$2(x^2 - 9x + 8) = 0$

$2(x-8)(x-1) = 0$

$x = 8$ $x = 1$

Find the measure of the line segment indicated. Assume that lines which appear tangent are tangent.

15) Find TS



$(x-8)(2x-18) = 3(8)$

$2x^2 - 18x - 16x + 144 = 24$

$2x^2 - 34x + 120 = 0$

$2(x^2 - 17x + 60) = 0$

$2(x-12)(x-5) = 0$

$x = 12$ $x = 5$

$TS = x - 8$

$= 12 - 8$

$TS = 4$