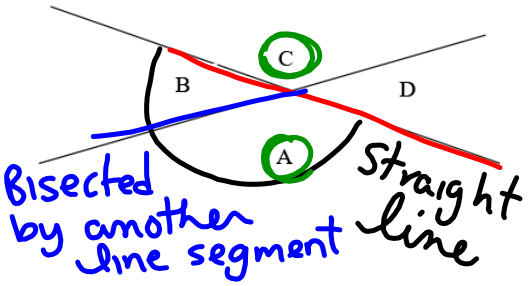
13.2: Angle Properties of Intersecting Lines

Intersecting Lines:

For ANY two lines that intersect, but NOT at 90°, let's discover their properties

Measure the angles and record below



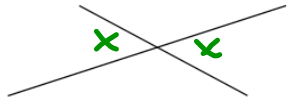
Now, let's measure and add some angles to discover some common properties:

Angle Measurement	Adding some	Discoveries
$\angle a =$ 145	$\angle a + \angle b =$ 180	straight lines will always add to 180°
$\angle b =$ 35	$\angle c + \angle b =$ 180	
$\angle c =$ 145	$\angle c + \angle d =$ 180	
$\angle d =$ 35	$\angle a + \angle d =$ 180	

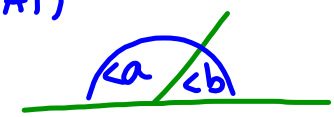
Rules:

1) Opposite Angles Theorem (OAT)

equal to each other



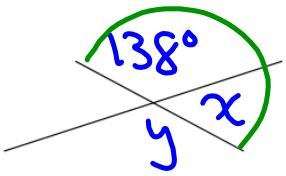
2) Supplementary Angles Theorem (SAT)



Supp $\angle a + \angle b = 180°$

Example: Find the angle asked for

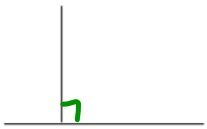
$180 - 138 = x$
$42 = x$
} due to Supp.



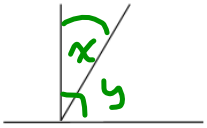
$y = 138°$ } due to opp. ∠'s

Perpendicular Lines:

Lines that intersect at 90°



What if we now drew a line through the 90 angle? Could you tell me the missing part?



$x = 30°$

$y = 60°$

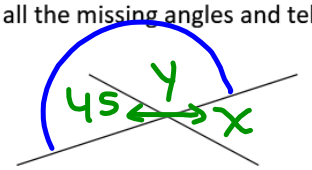
Excellent,
this is the final rule of the day:

3) Complementary Angles Theorem (CAT)

$\angle x + \angle y = 90°$

Find all the missing angles and tell me what rule you used:

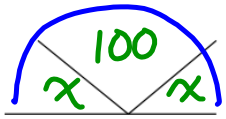
1)



$x = 45°$ — opp ∠'s (OAT)

$y = 180 - 45 = 135°$) supp ∠'s

2)



$x + 100 + x = 180$

$2x + 100 = 180 - 100$

$\frac{2x}{2} = \frac{80}{2}$

$x = 40$

WORK:
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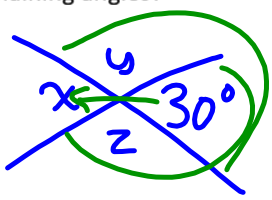
3) Two intersecting lines form 30°, what are the remaining angles?



$z = 180 - 30 = 150°$) supp ∠'s

$\therefore y = 150$) supp ∠'s

$x = 30°$) OAT