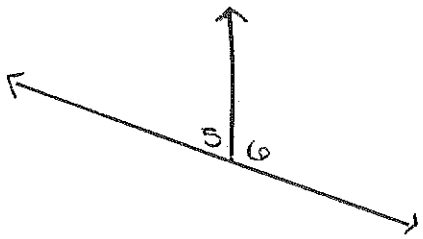
LINEAR PAIR

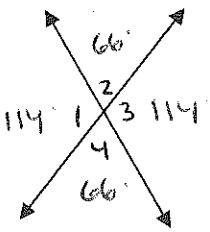
Two adjacent angles are a linear pair if their non common sides are opposite rays

"TWO ANGLES THAT FORM A LINE (180*)"



∠5 and ∠6 are a linear pair

1. Use the figure below. Given one angle measure, find the other three.



$m\angle 1 = 114°$

$m\angle 2 = 66°$

$m\angle 3 = 114°$

$m\angle 4 = 66°$

2. If ∠6 and ∠7 form a linear pair and $m\angle 6 = 106°$, find $m\angle 7$.

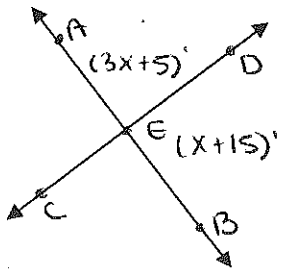
$\angle 6 + \angle 7 = 180°$

$106 + \angle 7 = 180$

$-106 \quad -106$

$\angle 7 = 74°$

3.



Find x:

$3x+5+x+15 = 180$

$4x+20 = 180$

$-20 \quad -20$

$\frac{4x}{4} = \frac{160}{4}$

$x = 40$

Find $m\angle AED$

$3x+5$

$3(40)+5$

$120+5$

$125°$

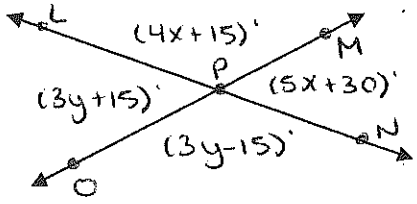
Find $m\angle DEB$

$x+15$

$40+15$

$55°$

4.



Find x:

$4x+15+5x+30 = 180$

$9x+45 = 180$

$-45 \quad -45$

$\frac{9x}{9} = \frac{135}{9}$

$x = 15$

$m\angle LPM$

$4x+15$

$4(15)+15$

$60+15$

$75°$

$m\angle MPN$

$5x+30$

$5(15)+30$

$105°$

Find y:

$3y+15+3y-15 = 180$

$\frac{6y}{6} = \frac{180}{6}$

$y = 30$

$m\angle LPO$

$3y+15$

$3(30)+15$

$90+15$

$105°$

$m\angle OPN$

$3y-15$

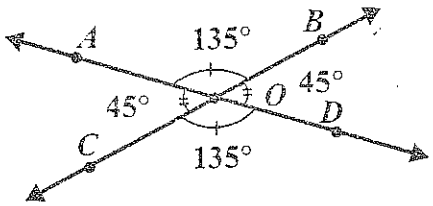
$3(30)-15$

$90-15$

$75°$

VERTICAL ANGLES

When two lines intersect, two pairs of vertical angles are formed. Vertical angles are not adjacent. Vertical angles have the same measure.

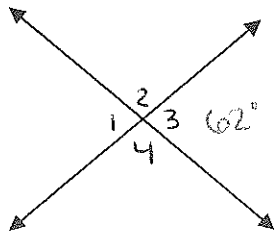


Top ≅ Bottom
Left ≅ Right

Vertical forms an X.

$\angle AOB$ and $\angle COD$ are vertical angles. $\angle AOC$ and $\angle BOD$ are vertical angles. **Vertical angles** are **congruent**. Congruent means they have the same measure.

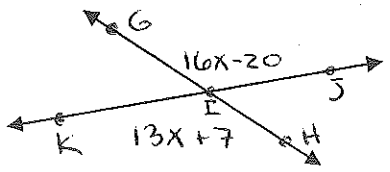
1.



If m<3 is 62°, what is m<1?

62°

2.



Find x

16x-20 = 13x+7
-13x -13x
3x-20 = 7
+20 +20
3x/3 = 27/3
x=9

m<GIJ

16x-20
16(9)-20
144-20
124°

m<KIH

13x+7
13(9)+7
117+7
124°

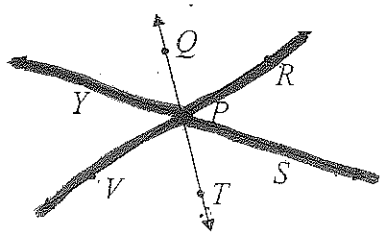
3. If <1 and <2 are vertical angles and m<1 = 2x and m<2 = 234 – 4x, find m<1 and m<2.

m<1 = m<2
2x = 234-4x
+4x +4x
6x/6 = 234/6
x = 39

m<1 = 2x
2(39)
78°

m<2 = 234-4x
234-4(39)
234-156
78°

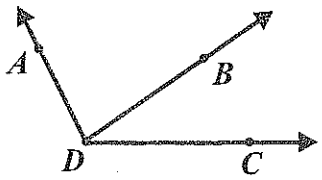
4. Name the second angle in each pair of vertical angles.



1. $\angle YPV$ <RPS
2. $\angle QPR$ <VPT
3. $\angle SPT$ <QPY
4. $\angle VPT$ <QPR
5. $\angle RPT$ <QPV
6. $\angle VPS$ <YPR

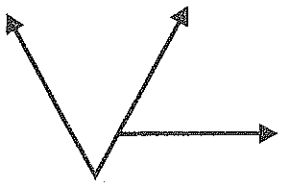
ADJACENT ANGLES

Adjacent angles are two angles that have the same vertex and share one ray. They do not share space inside the angles.



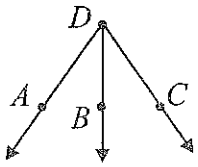
In this diagram, $\angle ADB$ is **adjacent** to $\angle BDC$.

However, $\angle ADB$ is **not adjacent** to $\angle ADC$ because adjacent angles do not share any space inside the angle.

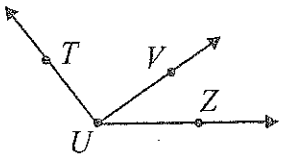


These two angles are **not adjacent.** They share a common ray but do not share the same vertex.

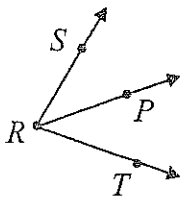
For each diagram below, name the angle that is adjacent to it.

1. 

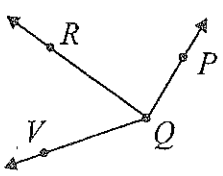
$\angle CDB$ is adjacent to $\angle$ BDA

2. 

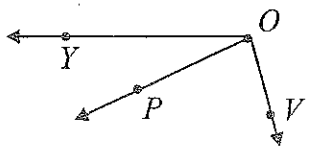
$\angle TUV$ is adjacent to $\angle$ VUZ

3. 

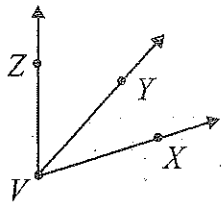
$\angle SRP$ is adjacent to $\angle$ PRT

4. 

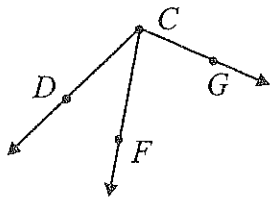
$\angle PQR$ is adjacent to $\angle$ RQV

5. 

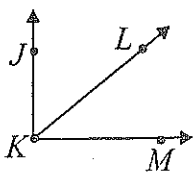
$\angle YOP$ is adjacent to $\angle$ POV

6. 

$\angle XVY$ is adjacent to $\angle$ YVZ

7. 

$\angle DCF$ is adjacent to $\angle$ FCG

8. 

$\angle JKL$ is adjacent to $\angle$ LKM

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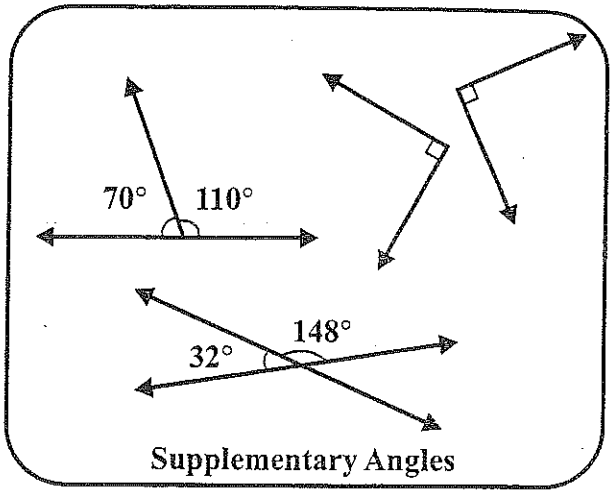
SUPPLEMENTARY ANGLES

* Two angles whose sum is 180°

angle 1 + angle 2 = 180°



Supplementary Angles

1. Given that <P is a supplement of <R and m<R = 36*, find m<P.

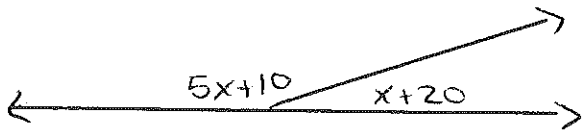
$\angle R + \angle P = 180°$

$36 + \angle P = 180°$

$-36 \quad -36$

$\angle P = 144°$

2. The following angle is supplementary. Find x.



$5x + 10 + x + 20 = 180$

$6x + 30 = 180$

$-30 \quad -30$

$\frac{6x}{6} = \frac{150}{6}$

$x = 25$

3. <T and <S are supplementary. The measure of <T is half the measure of <S. Find m<S.

Define unknown

$\angle S$: x	$120°$
$\angle T$: $\frac{1}{2}x$	$60°$

$\angle T + \angle S = 180°$

$\frac{1}{2}x + x = 180°$

$1.5x = 180°$

$x = 120$

4. m<A and m<B are supplementary. M<A = 2x + 16 and m<B = 3x + 14.

Find x:

$2x + 16 + 3x + 14 = 180$

$5x + 30 = 180$

$-30 \quad -30$

$\frac{5x}{5} = \frac{150}{5}$

$x = 30$

m<A:

$2x + 16$

$2(30) + 16$

$60 + 16$

$76°$

m<B

$3x + 14$

$3(30) + 14$

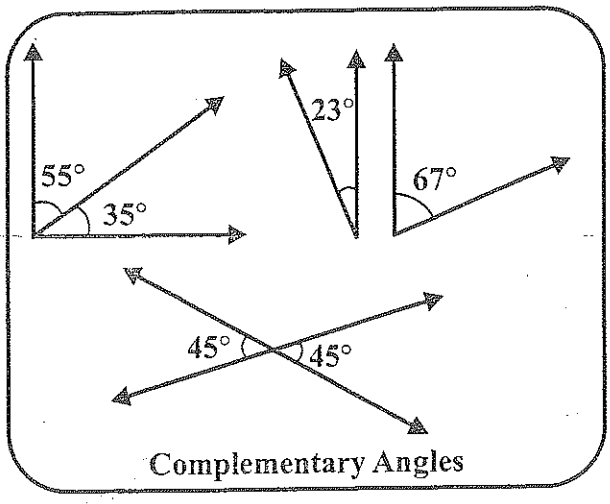
$90 + 14$

$104°$

COMPLEMENTATY ANGLES

* Two angles whose sum is 90°

angle 1 + angle 2 = 90°



1. Given that <A is a complement of <C and m<A = 47*, find m<C.

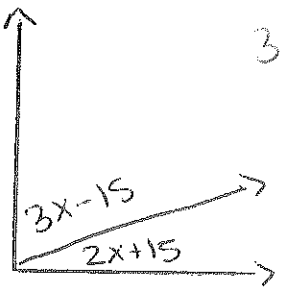
$\angle A + \angle C = 90$

$47 + \angle C = 90$

$-47 \quad -47$

$\angle C = 43$

2. The following angle is complementary. Find x.



$3x - 15 + 2x + 15 = 90$

$\frac{5x}{5} = \frac{90}{5}$

$x = 18$

3. <W and <Z are complementary. The measure of <Z is five times the measure of <W. Find m<W.

Define unknowns

<W	x	15°
<Z	5x	75°

$\angle Z + \angle W = 90$

$5x + x = 90$

$\frac{6x}{6} = \frac{90}{6}$

$x = 15$

4. m<A and m<B are complementary. M<A = 7x + 1 and m<B = 5x – 7.

Find x:

$7x + 1 + 5x - 7 = 90$

$12x - 6 = 90$

$+6 \quad +6$

$\frac{12x}{12} = \frac{96}{12}$

$x = 8$

m<A:

$7x + 1$

$7(8) + 1$

$56 + 1$

57°

m<B

$5x - 7$

$5(8) - 7$

$40 - 7$

33°