Your Name
Mrs. Theo
9/27/2021

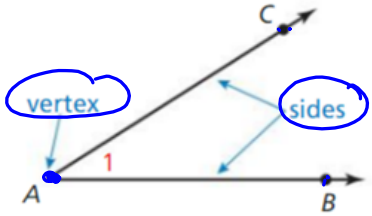
1.2 Angles Labeling, Measuring, and Addition Postulate

Notes

Angle

Naming Angles

An ***angle*** is a set of points consisting of two different rays that have the same endpoint, called the ***vertex***. The rays are the ***sides*** of the angle.



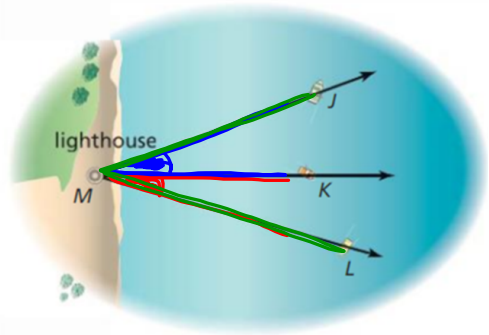
1. $\angle CAB$
2. $\angle BAC$

3 letters — In order, middle letter always the vertex

3. $\angle A$ — Single letter, always the vertex (if only angle there)
4. $\angle 1$ — Not always an option, only use if it is already in the diagram

EXAMPLE 1 **Naming Angles**

A lighthouse keeper measures the angles formed by the lighthouse at point M and three boats. Name all the angles in the diagram.



Adjacent Angles – angles next each other sharing a side

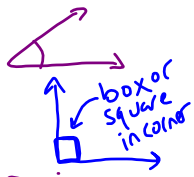
$\angle JMK$ or $\angle KMJ$

$\angle KML$ or $\angle LMK$

$\angle JML$ or $\angle LMJ$

Classifications

Acute: $0^\circ < Acute < 90^\circ$ babies are cute b/c they are small



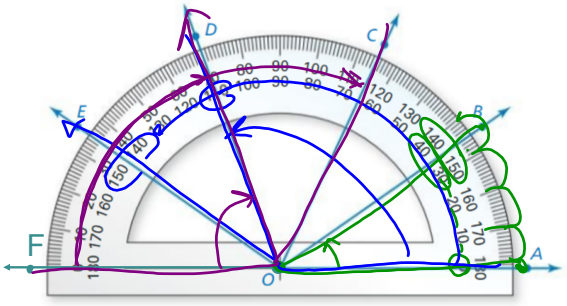
Right: 90°

Obtuse: $90^\circ < Obtuse < 180^\circ$

Straight: 180° Straight line

EXAMPLE 2 Measuring and Classifying Angles

Use the protractor to find the measure of each angle. Then, classify each angle as acute, right, obtuse, or straight.

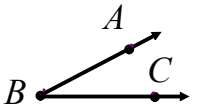


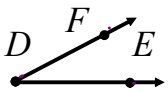
"measure of"

a. m∠ AOB = acute 35°
b. m∠ AOC = 65° acute
c. m∠ AOD = 110° obtuse
d. m∠ AOE = 145° obtuse
e. m∠ AOF = 180° straight
f. m∠ FOD = 70° acute
g. m∠ FOC = 115° obtuse

Congruent Angles

Angles that have the same degree measure are called ***congruent angles***.
You can express this in 3 different ways:





1. "The measure of angle ABC is equal to the measure of angle of EDF"

if actual # value then =

$$m\angle ABC = m\angle EDF$$

$m\angle ABC = 75^\circ$

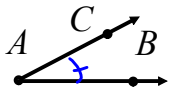
2. "Angle ABC is congruent to angle EDF."

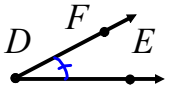
$\angle ABC = 75$ needs m

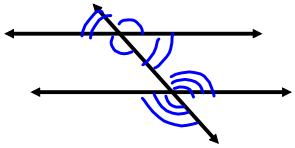
not talking about values — no m!

$$\angle ABC \cong \angle EDF$$

3. You can use "tick marks" OR "arcs" to show congruence.

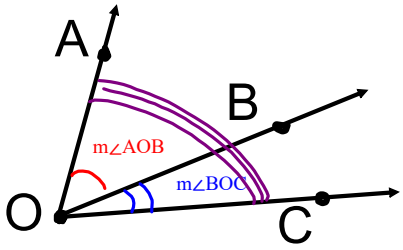






Angle Addition Postulate (2 parts)

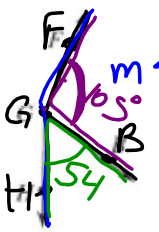
- if B is in the interior of ∠AOC , then
  $m\angle AOB + m\angle BOC = m\angle AOC$.
- If $m\angle AOB + m\angle BOC = m\angle AOC$, then
  B is in the interior of AOC



In other words:

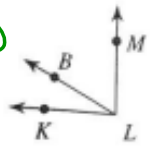
The smaller/inside angles add up to equal the bigger/entire angle

1) Find $m\angle FGH$ if $m\angle FGB = 105°$ and $m\angle BGH = 54°$.

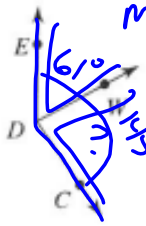


Whole = Part + Part
$m\angle FGH = m\angle FGB + m\angle HGB$
$m\angle FGH = 105 + 54$
$m\angle FGH = 159°$

2) Find $m\angle KLM$ if $m\angle KLB = 26°$ and $m\angle BLM = 60°$.

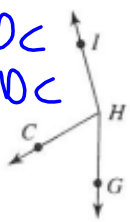


3) Find $m\angle WDC$ if $m\angle EDC = 145°$ and $m\angle EDW = 61°$.

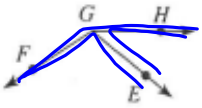


$m\angle EDC = m\angle EDW + m\angle WDC$
$145 = 61 + m\angle WDC$
$-61 \quad -61$
$84° = m\angle WDC$

4) $m\angle GHC = 60°$ and $m\angle CHI = 104°$. Find $m\angle GHI$.



5) $m\angle HGF = 16x + 4$, $m\angle EGF = 110°$, and $m\angle HGE = 3x + 11$. Find x.



27+11
38°

Whole = Part + Part

$m\angle HGF = m\angle HGE + m\angle EGF$

$16x+4 = 3x+11 + 110$

$16x+4 = 3x+121$

$-3x \quad -3x$

$13x+4 = 121$

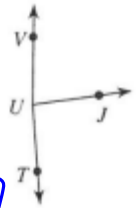
$13x = 117$

$\frac{13x}{13} = \frac{117}{13}$

$x = 9$

6) $m\angle VUT = 175°$, $m\angle VUJ = 17x - 3$, and $m\angle JUT = 17x + 8$. Find x.

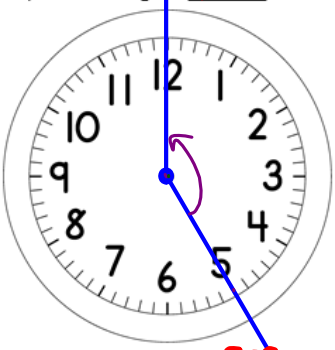
and m< VUJ



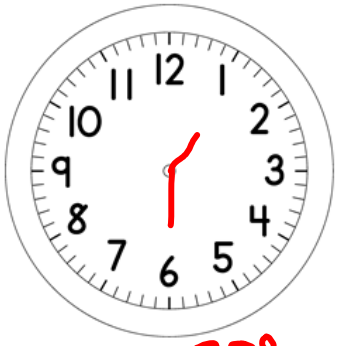
Clock Problems. For each time listed below, draw the hour and minute hands. Then, find the smallest angle formed by the two hands of the clock. Space has been left for you to show any necessary work.

Note: Smallest angle means the shortest distance. So, none of your angles should be larger than 180°.

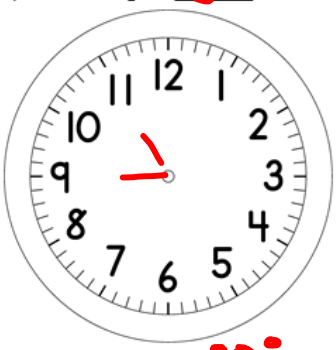
1.) 5:00 Angle = 150°



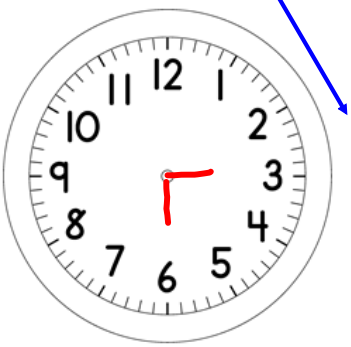
2.) 1:30 Angle = 150°



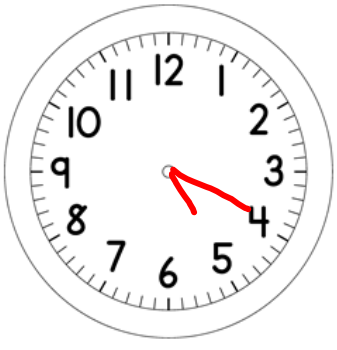
3.) 11:45 Angle = 60°



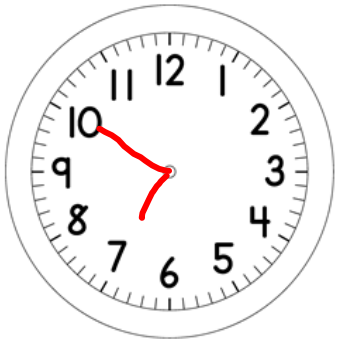
4.) 6:15 Angle = 90°



5.) 5:20 Angle = 30°

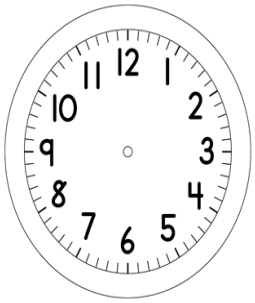


6.) 7:50 Angle = 90°

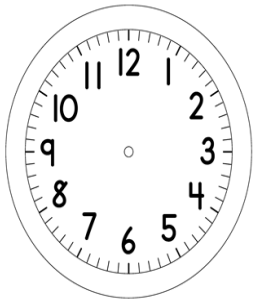


Draw the hands of a clock (hour and minute) given each time.

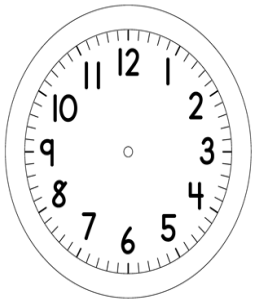
1.) 3:15



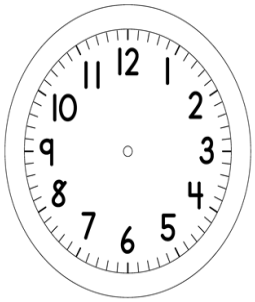
2.) 1:20



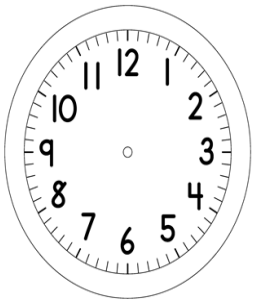
3.) 10:38



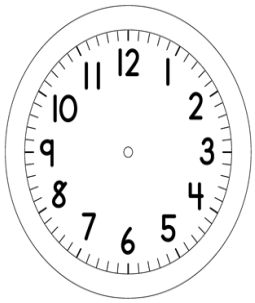
4.) 6:48



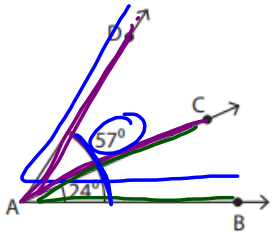
5.) 7:30



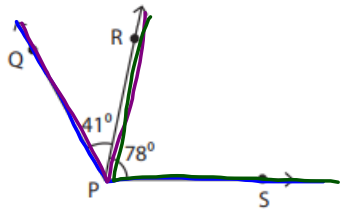
6.) 6:58



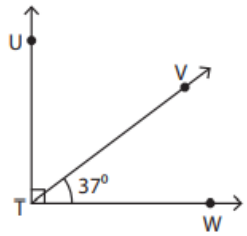
1)



2)



3)



m∠CAD = 33°

Big = Small + Small

m∠DAB = m∠CAD + m∠CAB

57° = m∠CAD + 24°

−24 −24

33° = m∠CAD

m∠QPS = 119°

∠QPS ≅ ∠QPR + ∠RPS

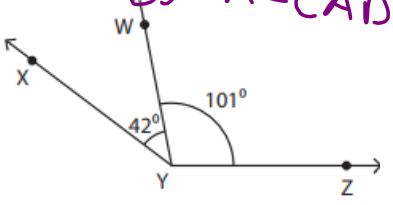
m∠QPS = 41° + 78°

m∠QPS = 119

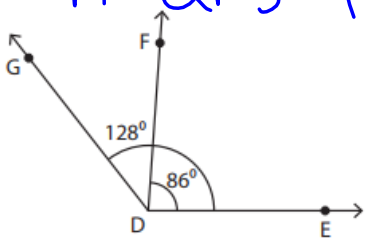
m∠UTV = 53°

90 = x + 37

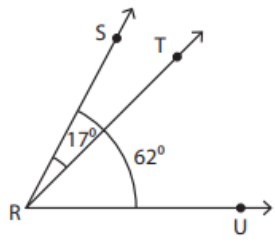
4)



5)



6)



m∠XYZ = 143°

x = 42

m∠FDG = 42

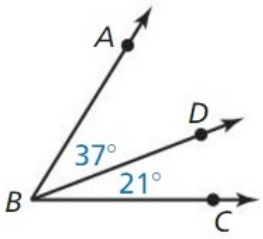
128 = x + 86

m∠TRU = 45°

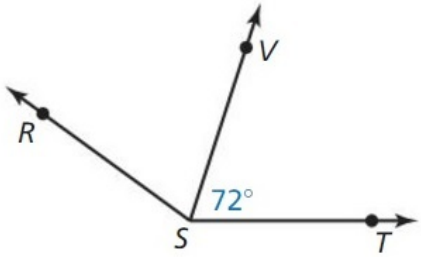
62 = 17 + x

In Exercises 21–24, find the indicated angle measure.

21. Find $m\angle ABC$.



23. $m\angle RST = 114°$. Find $m\angle RSV$.



1.5 Multi-day assignment

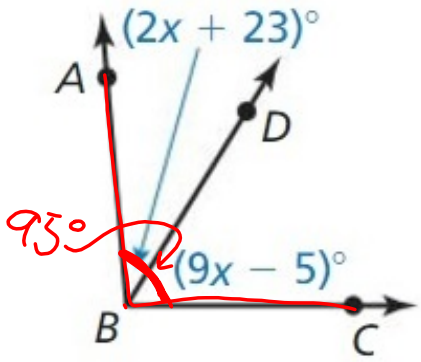
Suggested HW pacing (All of 1.5 due Fri 10/1)

1.5 p.43

- Mon 9/27 - #Clock and angle problem worksheet
- Tues 9/28 - #25,27, 29, 34,38,48,49,54
- Wed 9/29 - #Discus past test
- Thu 9/30 - Angle Adventures!
- Fri 10/1 - 10.5 Due | 1.5 Quiz

In Exercises 25–30, find the indicated angle measures.
(See Example 4.)

25. $m\angle ABC = 95°$. Find $m\angle ABD$ and $m\angle DBC$.



$m\angle ABC = m\angle ABD + m\angle DBC$
$95 = 2x + 23 + 9x - 5$
$95 = 11x + 18$
$-18 \quad -18$
$77 = 11x$
$\frac{77}{11} = \frac{11x}{11}$
$7 = x$

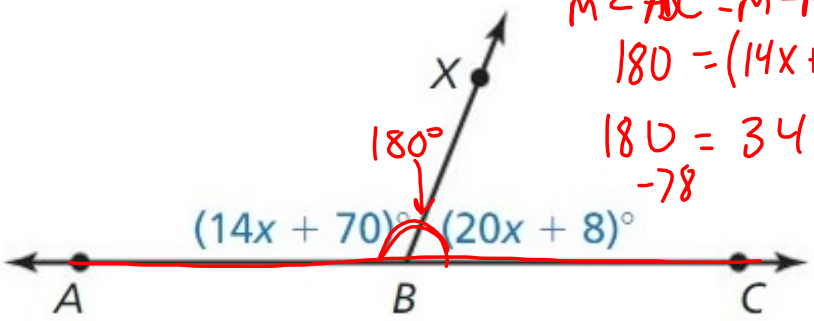
$m\angle ABD = 2(7) + 23$
$m\angle ABD = 37°$

$m\angle DBC = 9(7) - 5$
$m\angle DBC = 58°$

In Exercises 25–30, find the indicated angle measures.
(See Example 4.)

$180°$

28. $\angle ABC$ is a straight angle. Find $m\angle ABX$ and $m\angle CBX$.



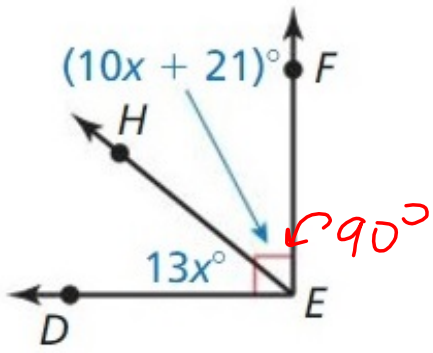
$m\angle ABC = m\angle ABX + m\angle XBC$
$180 = (14x + 70) + (20x + 8)$
$180 = 34x + 78$
$-78 \quad -78$
$102 = 34x$
$\frac{102}{34} = \frac{34x}{34}$
$3 = x$

$m\angle ABX = 14(3) + 70$
$m\angle ABX = 112°$

$m\angle CBX = 20(3) + 8$
$m\angle CBX = 68°$

In Exercises 25–30, find the indicated angle measures. *(See Example 4.)*

30. Find $m\angle DEH$ and $m\angle FEH$.



90°

$m\angle DEF = m\angle DEH + m\angle FEH$

$90 = 13x + 10x + 21$

$90 = 23x + 21$

$-21 \quad -21$

$\frac{69}{23} = \frac{23x}{23}$

$3 = x$

$m\angle DEH = 13(3)$

$m\angle DEH = 39^\circ$

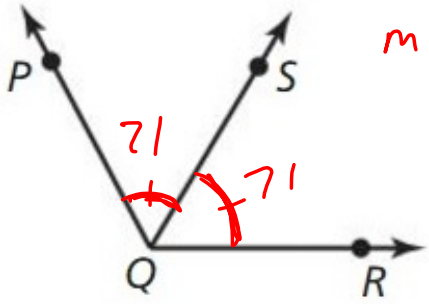
$m\angle FEH = 10(3) + 21$

$m\angle FEH = 51^\circ$

In Exercises 33–36, $\overrightarrow{QS}$ bisects $\angle PQR$. Use the diagram and the given angle measure to find the indicated angle measures. *(See Example 5.)*

$m\angle PQS = m\angle SQR$

$m\angle PQS = 71^\circ$



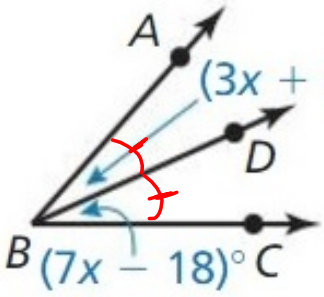
34. $m\angle RQS = 71^\circ$. Find $m\angle PQS$ and $m\angle PQR$.

In Exercises 37–40, $\overrightarrow{BD}$ bisects $\angle ABC$. Find $m\angle ABD$, $m\angle CBD$, and $m\angle ABC$.

cut into 2 equal parts

$\angle ABC$ cut into 2 equal angles

38.



so...

$\angle ABD \cong \angle DBC$

$3x+6 = 7x-18$

$6 = 4x-18$

$24 = 4x$

$6 = x$

$m\angle ABD = 24°$

$m\angle CBD = 24°$

$m\angle ABC = m\angle ABD + m\angle CBD$

$= 24 + 24$

$m\angle ABC = 48°$