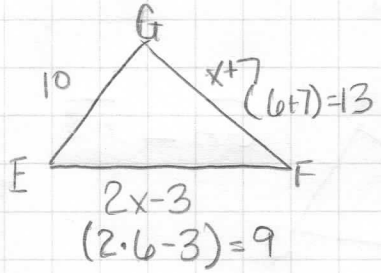
H. Geometry HW Assigned 8/22/17
Due 8/23/17

P 144-147

1. If the perimeter of $\triangle EFG$ is 32, is $\triangle EFG$ scalene, isosceles, or equilateral?

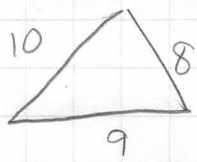



$10 + x + 7 + 2x - 3 = 32$
$14 + 3x = 32$
$3x = 18$
$x = 6$

$\triangle EFG$ is scalene

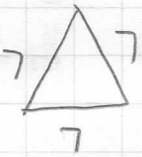
2. Classify each triangle as scalene, isosceles, or obtuse.

(a)



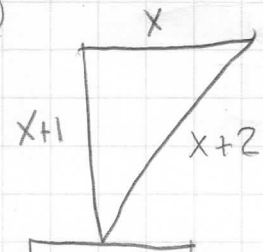

Scalene

(c)



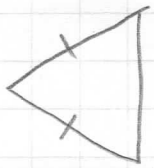

equilateral

(e)



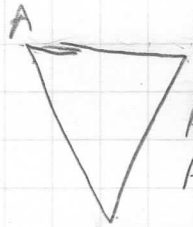

scalene

(b)



isosceles

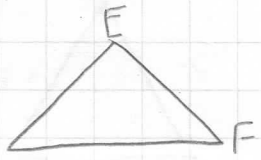
(d)




AB > AC
AC > BC

Scalene

(f)




$DE \cong DF$
$EF \cong DE$

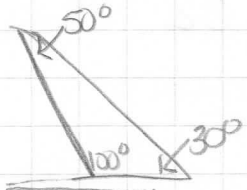
isosceles

3. Classify each Triangle as acute, right, or obtuse

(a)

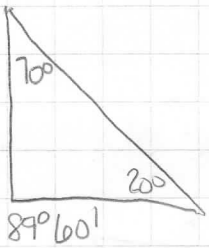
Right

(b)



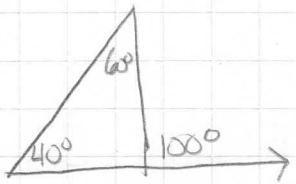

obtuse

(c)




right

(d)



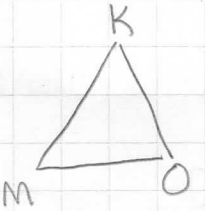

acute

(e)


$\overline{GH} \perp \overline{HJ}$

right

(f)



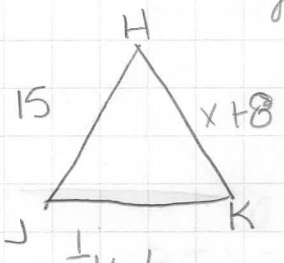

$\frac{1}{2}\angle K = 30°$ ($\angle K = 60°$)

$\frac{1}{3}\angle M = 20°$ ($\angle M = 60°$)

$\frac{1}{4}\angle O = 15°$ ($\angle O = 60°$)

Acute

6. If $\triangle HJK$ is equilateral, what are the values of x and y?




$x+8=15$

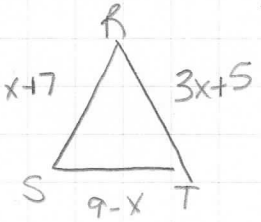
$x=7$

$\frac{1}{3}y-6=15$

$\frac{1}{3}y=21$

$y=63$

10. In $\triangle RST$, $RS=x+7$, $RT=3x+5$ and $ST=9-x$, if $\triangle RST$ is isosceles, is it also equilateral?




if $x+7=3x+5$

$2=2x$

$1=x$ and $RS=8$

$RT=8$

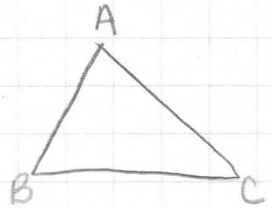
does $ST=8$ also?

$9-1=8$ so, yes then $\triangle RST$ is equilateral

(12) Given $AB = x+3 = 5$
$AC = 3x+2 = 8$
$BC = 2x+3 = 7$
perimeter of $\Delta ABC$ is 20

No sides are equal therefore $\Delta ABC$ is scalene

show that $\Delta ABC$ is scalene

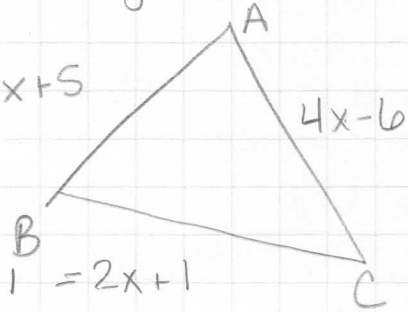



$x+3+3x+2+2x+3=20$
$6x+8=20$
$6x=12$
$x=2$

(13) IN CLASS EXAMPLE

The average of the lengths of the sides of $\Delta ABC$ is 14.

How much longer than the average is the longest side?




$11 = 6+5 = x+5$

$4x-6 = 4\cdot6-6 = 18$

$13 = 2\cdot6+1 = 2x+1$

$$\frac{(x+5)+(4x-6)+(2x+1)}{3} = 14$$

$x+5+4x-6+2x+1=42$

$7x=42$

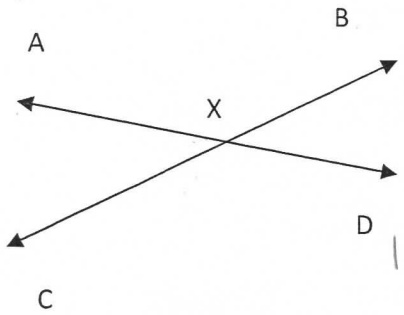
$x=6$

the longest side is 4 units longer than the average

Honors Geometry HW Assigned 8/23/17
Due 8/24/17

## Homework

1.

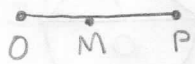



Prove $\angle AXC \cong \angle BXD$

| Statement | reason |
|---|---|
| 1. $\angle CXB$ & $\angle AXD$ are straight lines | assumed from figure |
| 2. $\angle CXB$ and $\angle AXD$ equal $180°$ | def. of straight angle |
| 3. $\angle AXC + \angle AXB = 180°$ | def of suppl. angles |
| 4. $\angle AXB + \angle BXD = 180°$ | def of suppl. angles |
| 5. $\angle AXC = 180° - \angle AXB$<br>$\angle BXD = 180° - \angle AXB$ | Subtraction |
| 6. $\angle AXC = \angle BXD$ | Euclid C.N.1 |

2. (GFEC page 32, #6. Determine of M is the midpoint of $\overline{OP}$, then write a 2 column proof showing your determination.)

Given: $\overline{OM} = x+8$
$\overline{MP} = 2x-6$
$\overline{OP} = 44$




determination of length of $\overline{OM}$ & $\overline{MP}$

$*\ x+8+2x-6=44$
$3x+2=44$
$3x+2-2=44-2$
$3x=42$
$\frac{3x}{3}=\frac{42}{3}$
$\boxed{x=14}$

Substitution $(14)+8=OM$
$22=OM$
$2(14)-6=MP$
$28-6=MP$
$22=MP$

| Statement | reason |
|---|---|
| If M is midpoint of $\overline{OP}$, then $\overline{OM} \cong \overline{MP}$ | def. of midpoint |
| $x=14$ | algebra* (see algebraic proof) |
| $\overline{MP}=22$ & $\overline{OM}=22$<br>$\therefore MP=OM$ | Substitution of 14 for x<br>CN1 |

3. (GFEC page 33, #10)

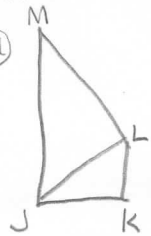
Incorrect reason: If a ray divides an angle into two* angles, the ray bisects the angle

Correct reason: If a ray divides an angle into two congruent angles, the ray bisects the angle.

4. (GFEC page 64, #2)

Which angles can be proved to be right angles?

(a) Given: $\overline{JM} \perp \overline{JK}$




$\angle MJK$

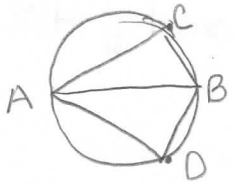
(b) Given: $\overrightarrow{RO} \perp \overrightarrow{PN}$


$\angle RON$
$\angle ROP$

(c) Given: $\overline{OT} \perp \overline{SW}$


None

5. (GFEC page 64, #7)



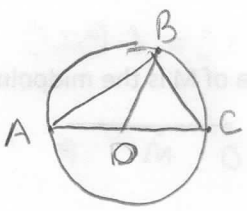

Given: $\angle ACB = 90°$ Prove $\angle C \cong \angle D$
$\overline{AD} \perp \overline{BD}$

| Statement | Reason |
|---|---|
| $\angle ACB = 90°$ | Given |
| $\overline{AD} \perp \overline{BD}$ | Given |
| $\angle D$ is a right angle | Def. of $\perp$ |
| $\angle D$ is $90°$ | Def of rt $\angle$ |
| $\angle D \cong \angle ACB$ | CN 1. |

6. Write a definition here for the word "oblique" found within problem #9 on page 65 of your textbook.

Two lines that intersect and are not perpendicular are said to be oblique.

7. (GFEC page 65, number 14. Find all measures of all angles.)




Given: $\overline{AB} \perp \overline{BC}$ so $\angle ABC = 90°$

$\angle ABO = 2x+y$
$\angle OBC = 6x+8$
$\angle ABO + \angle OBC = \angle ABC = 90°$
$2x+y+6x+8 = 90°$ *

$\angle AOB = (23y+90)$
$\angle BOC = (4x+4)$
$\angle AOB + \angle BOC = 180°$ Straight lines can be assumed
$23y+90+4x+4 = 180$ **

* $8x+y = 82$

** $4x+23y = 86$ ← multiply by $-2$

$-8x-46y = -172$

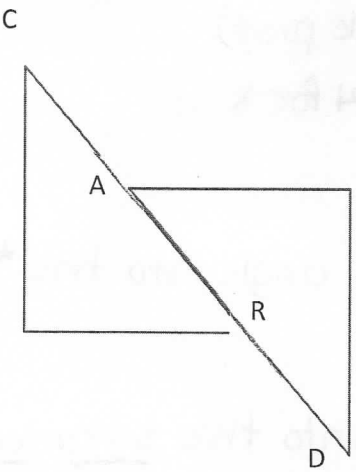
$-45y = -90$

$y = 2$

$8x+(2) = 82$
$8x+2-2 = 82-2$
$8x = 80$
$x = 10$

$\angle ABO = 2(10)+(2) = 22°$
$\angle OBC = 6(10)+8 = 68°$
$\angle AOB = 23(2)+90 = 136°$
$\angle BOC = 4(10)+4 = 44°$

8.




Given: $\overline{CR} \cong \overline{AD}$

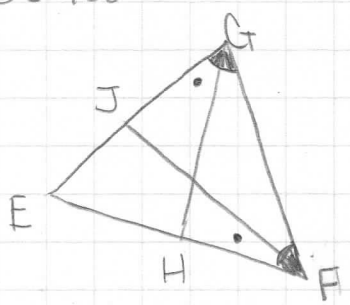
What can you deduce about $\overline{CA}$ and $\overline{RD}$ ?

$\overline{CA} \cong \overline{RD}$

Honors Geometry HW Assigned 8/24/17 Due 8/25/17

Pg 106-108

(10)



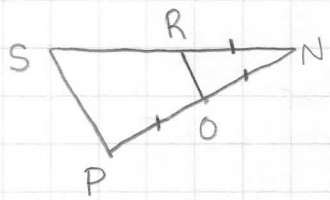

Given: $\angle EGF \cong \angle EFG$

$\angle EGH \cong \angle EFJ$

Prove: $\angle HGF \cong \angle JFG$

| Statement | Reason |
|---|---|
| $\angle EGF \cong \angle EFG$<br>$\angle EGH \cong \angle EFJ$ | Given |
| $\angle EGF - \angle EGH \cong \angle EFG - \angle EFJ$ | CN 3 |
| $\therefore \angle HGF \cong \angle JFG$ | |

(23)



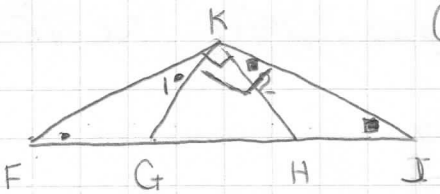

Given: O is midpoint of $\overline{NP}$

$\overline{RN} \cong \overline{PO}$

Prove $\overline{RN} \cong \overline{NO}$

| Statement | Reason |
|---|---|
| $\overline{RN} \cong \overline{PO}$ | Given |
| O is midpoint of $\overline{NP}$ | Given |
| O bisects $\overline{NP}$ | def of midpoint |
| $\overline{PO} \cong \overline{NO}$ | def of bisector |
| $\overline{RN} \cong \overline{NO}$ | CN 1 |

(24)

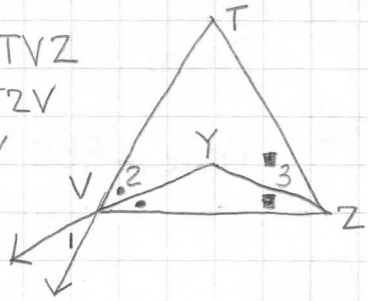



Given: $\angle F \cong \angle 1$
$\angle J \cong \angle 2$
$\overline{FK} \perp \overline{KH}$
$\overline{GK} \perp \overline{KJ}$

Prove: $\angle F = \angle J$

| Statement | Reason |
|---|---|
| $\angle F \cong \angle 1$ & $\angle J \cong \angle 2$ | Given |
| $\overline{FK} \perp \overline{KH}$ | Given |
| $\angle FKH$ is a rt. $\angle$ | def of $\perp$ |
| $\overline{GK} \perp \overline{KJ}$ | Given |
| $\angle GKJ$ is a rt $\angle$ | def of $\perp$ |
| $\angle FKH$ & $\angle GKJ = 90°$ | def of rt. $\angle$ |
| $90° - \angle GKH = \angle 1$<br>$90° - \angle GKH = \angle 2$ | Substitution of $90°$ for $\angle FKH$ & $\angle GKJ$ |
| $\angle 1 = \angle 2$ | CN1 |
| $\therefore \angle F \cong \angle J$ | |

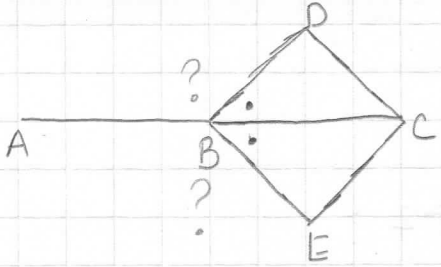
(25) Given: $\overrightarrow{VY}$ bisects $\angle TVZ$
$\overrightarrow{ZY}$ bisects $\angle TZV$
$\angle TVZ \cong \angle TZV$




Prove $\angle 3 \cong \angle 1$

| Statement | Reason |
|---|---|
| $\angle TVZ \cong \angle TZV$ | Given |
| $\overrightarrow{VY}$ bisects $\angle TVZ$<br>$\overrightarrow{ZY}$ bisects $\angle TZV$ | Given |
| $\angle 2 = \frac{1}{2} \angle TVZ$<br>$\angle 3 = \frac{1}{2} \angle TZV$ | Def of $\angle$ bisector |
| $\frac{1}{2} \angle TVZ \cong \frac{1}{2} \angle TZV$ | Multiplication prop of = |
| $\angle 3 \cong \angle 2$ | Substitution |
| $\angle 2 + \angle V \cong 180°$<br>$\angle 1 + \angle V \cong 180°$ | Def of straight $\angle$ (straight lines may be assumed) |
| $\angle 2 \cong 180° - \angle V$<br>$\angle 1 \cong 180° - \angle V$ | Subtraction prop of = |
| $\angle 2 \cong \angle 1$ | CN I |
| $\therefore \angle 3 \cong \angle 1$ | CN I |

(26)

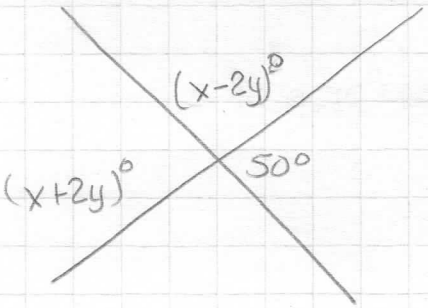



Given: $\overrightarrow{BC}$ bisects $\angle DBE$

Prove $\angle ABD \cong \angle ABE$

| Statement | Reason |
|---|---|
| $\overrightarrow{BC}$ bisects $\angle DBE$ | Given |
| $\angle DBC \cong \angle CBE$ | Def of $\angle$ bisector |
| $\angle ABD + \angle DBC \cong 180°$<br>$\angle ABE + \angle CBE \cong 180°$ | Def of straight $\angle$<br>(straight lines can be assumed) |
| $\angle ABD \cong 180° - \angle DBC$<br>$\angle ABE \cong 180 - \angle CBE$ | Subtration prop of = |
| $\angle ABE \cong 180° - \angle DBC$ | Substitution |
| $\therefore \angle ABD \cong \angle ABE$ | CN1 |

(31) By how much does x exceed y?




$x - 2y + 50 = 180$

$x - 2y + x + 2y = 180°$

$2x = 180°$

$\boxed{x = 90°}$

$(90) - 2y + 50 = 180$

$-2y + 140 = 180$

$-2y = 40$

$\boxed{y = -20°}$

x exceeds y by 110°

$90° - (-20°) = 110°$

**Honors Geometry PRACTICE TEST 1**

Name: _____ Date: _____

True-False. Clearly indicate whether each statement is true or false.

F 1. Points that do not lie on the same line are called noncollinear.

F 2. Right angles may be assumed from a diagram.

T 3. Relative segment sizes may not be assumed from a diagram.

T 4. A right angle has no supplement.

T 5. An equilateral triangle is also isosceles.

T 6. The legs of a right triangle compose its right angle.

Answer each statement with Always (A), Sometimes (S), or Never (N)

A 7. If segments are congruent, their lengths are equal.

A 8. The three sides of an equilateral triangle are the same length.

A 9. An obtuse angle has a supplement, but not a complement.

A 10. Congruent angles have the same measure.

N 11. A scalene triangle may have two congruent sides.

A 12. The legs of an isosceles triangle are congruent.

13. A 608-cm steel rod is cut into two sections having a ratio of 34: 42. Find the resulting length of each section:

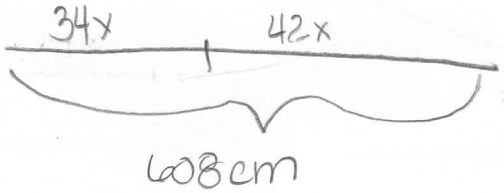
Section 1: 272cm

Section 2: 336cm

$34x + 42x = 608$

$76x = 608$

$x = 8$



. Degrees-Minutes-Seconds (D-M-S).

a.) Convert $36\frac{7}{16}°$ to D-M-S: a.) $36° 26' 15''$

b.) Convert 37° 50' to degrees: b.) $37.5°$

$\left(\frac{7}{16}\right)\left(\frac{60}{1}\right) = \frac{105}{4} = 26\frac{1}{4}'$ $\left(\frac{1}{4}\right)\left(\frac{60}{1}\right) = 15''$

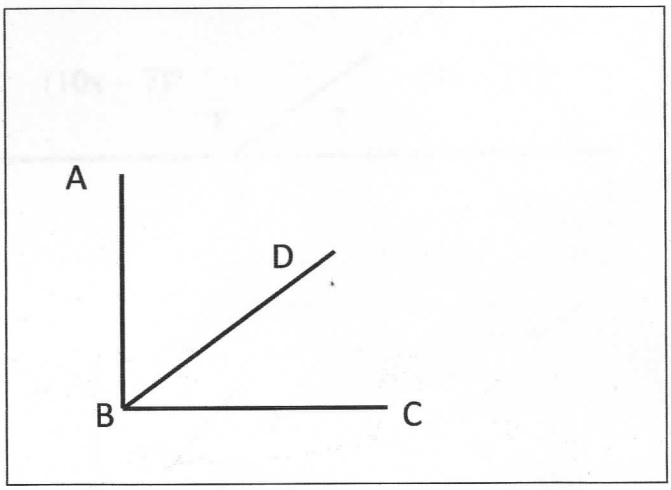
$50' = \frac{50}{60} = \frac{5}{6}$

15. If m∠ ABC = 90° and m∠ DBC = 35° 12' 42",

find m∠ ABD:

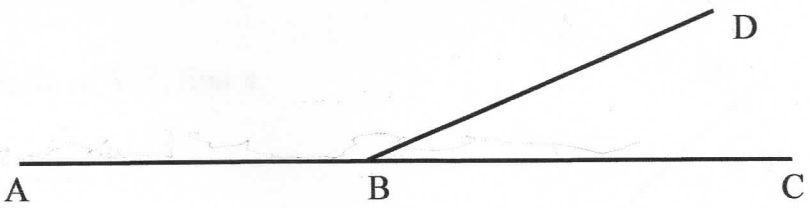
m∠ ABD = $54° 47' 18''$

$89° 59' 60''$
$- 35° 12' 42''$
$54° 47' 18''$




16. If m∠ ABC = 180° and m∠ ABD = 152° 37' 29",
find m∠ DBC:
m∠ DBC = $27° 22' 31''$

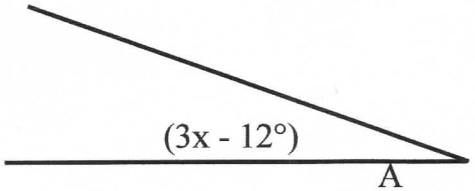
$179° 59' 60''$
$- 152° 37' 29''$
$27° 22' 31''$




17. ∠ A is acute, give the following:

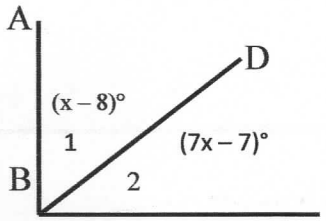
a.) Restrictions on m∠ A: $0 < A < 90$

b.) Restrictions on x: $4 < x < 34$




$0° < 3x - 12 < 90°$
$12° < 3x < 102° \rightarrow 4° < x < 34°$

18. If m∠ ABC = 90° find x as well as m∠ 1 and m ∠ 2:




x = $13\frac{1}{8}° = 13° 7' 30''$

m∠ 1 = $5\frac{1}{8}° = 5° 7' 30''$

m∠ 2 = $84\frac{7}{8}° = 84° 52' 30''$

$x - 8 + 7x - 7 = 90$

$8x - 15 = 90$

$8x = 105$

$x = \frac{105}{8}$

$x = 13\frac{1}{8}$

$m\angle 2 = 90° - m\angle 1$

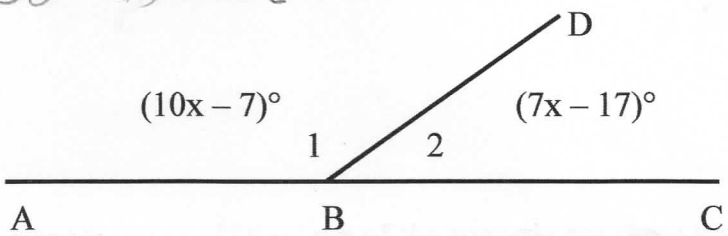
$89° 59' 60''$

$- \quad 5° 7' 30''$

$84° 52' 30''$

$(\frac{1}{8})(\frac{60}{1}) = \frac{15}{2} = 7\frac{1}{2}'$ $(\frac{1}{2})(\frac{60}{1}) = 30''$

19. Find x as well as m∠ 1 and m∠ 2:




x = 12

m∠1 = 113° $[10(12) - 7] = 120° - 7$

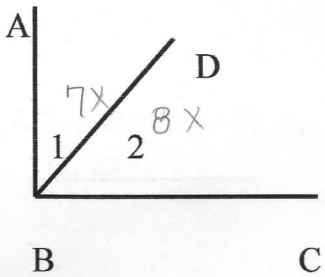
m∠ 2 = 67°

$10x - 7 + 7x - 17 = 180$

$17x - 24 = 180$

$17x = 204 \quad x = 12$

20. ∠ ABC is a right angle. If m ∠ 1 and m∠ 2 are in a ratio of 7 : 8, find x as well as m∠ 1 and m∠ 2:




x = 6°

m∠ 1 = 42°

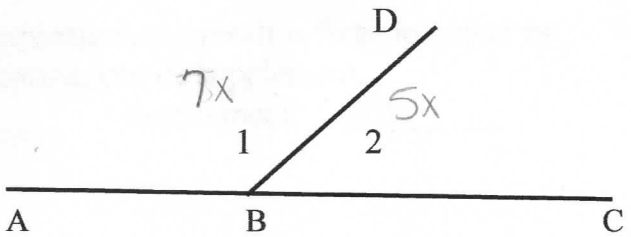
vm∠ 2 = 48°

$7x + 8x = 90°$

$15x = 90°$

$x = 6°$

21. If m∠ 1 and m∠ 2 are in a ratio of 5: 7, find x as well as m∠ 1 and m ∠2:




x = 15°

m∠ 1 = 105°

m∠ 2 = 75°

$7x + 5x = 180°$

$12x = 180°$

$x = 15°$

2. The length and width of a rectangle are integer values. If the length of the figure is five less than double the width, and if its perimeter is 536 mm, find the dimensions of the polygon.
Dimensions of rectangle ABCD: W=91 mm L=177mm

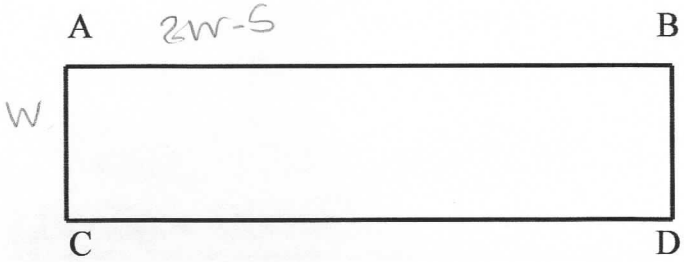
$2(2w-5)+2w=536mm$

$4w-10+2w=536mm$

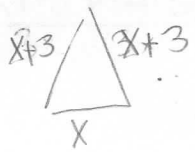
$6w=546mm$

$w=91$

$L=177\,mm$




23.. The side lengths of an isosceles triangle are integer value. If the legs of the triangle are three units longer than its base and if the perimeter of the polygon is 339 cm, find the dimensions of the figure.
Dimensions of ABC: Legs: 114 cm
Base: 111 cm




$339=3x+6$

$333=3x$ $\quad 111=x$

24. Given the diagram as shown, with $PQ = x^2 + 6$, $QR = 2 + 5x$, and $PR = 22$ cm, find x, PQ, and QR:
x: 2cm PQ: 10 cm QR: 12 cm


$x^2+6+2+5x=22$ $\quad x^2+5x-14=0$

$(x+7)(x-2)=0$ $\quad x=2$

25. If an angle measure is decreased by double its complement, the result is forty less than its supplement. Find the measure of the angle, its complement, and its supplement.
Angle: $80^\circ$ Complement: $10^\circ$ Supplement: $100^\circ$

$x-2(90-x)=180-x-40$

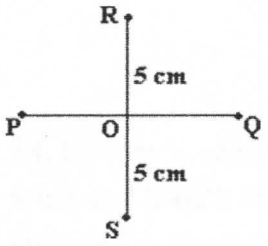
$x-180+2x=140-x$

$3x-180=140-x$

$4x=320$

$x=80^\circ$

5. Which of the following is true for the figure?




a. PO ≅ OQ
b. RO ≅ OQ
c. OP ≅ OR
(d.) RO ≅ OS

26. $r^4 - 13r^2 + 36 =$ $(r^2-4)(r^2-9) = (r+2)(r-2)(r+3)(r-3)$

27. $a^2 + 36a - 117 =$ $(a+39)(a-3)$

28. $605a^2 - 980z^2 =$ $5(121a^2-196z^2) = 5(11a+14z)(11a+14z)$

29. $c^2 - 25c + 144 =$ $(c-9)(c-16)$

30. $m^2 - 4m - 32 =$ $(m+4)(m-8)$

31. The sum of the supplement and the complement of an angle is 130 degrees. Find the measure of the angle.

$180^\circ - x + 90^\circ - x = 130^\circ$

$270^\circ - 2x = 130^\circ$

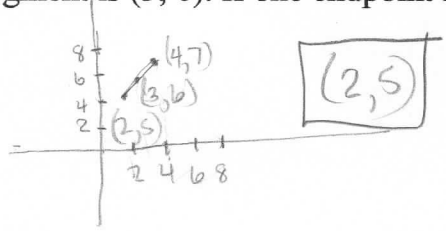
$-2x = -140^\circ$

$\boxed{x = 70^\circ}$

32. The midpoint of a segment is (3, 6). If one endpoint is (4, 7), what is the other endpoint?

| | | |
|---|---|---|
| midpoint | 3 | 6 |
| − endpoint | −x | −y |
| distance | 1 | 1 |

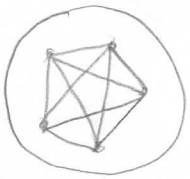
$x = 2 \quad y = 5$




$\boxed{(2,5)}$

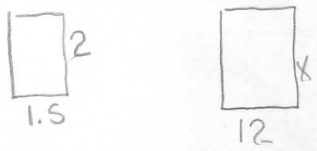
| | | |
|---|---|---|
| End point | 4 | 7 |
| − mid point | −3 | −6 |
| distance | 1 | 1 |

33. Five friends are standing in a circle. How many different line segments can be drawn that connect two friends?



10 segments can be drawn.

34. Sydney's senior picture package includes several sizes of portraits. The smallest photo is a 1.5-inch wide and 2-inch tall rectangle. The largest photo is 12 inches wide and is similar to the smallest photo. How tall is the largest photo?




$\frac{x}{2} = \frac{12}{1.5}$ $1.5x = 24$ $x = 16$ in

35. The rectangle below is made up of 12 congruent (same size) squares. Find the perimeter of the rectangle if the area of the rectangle is equal to 432 square cm ~~cm.~~

| | | | |
|---|---|---|---|
| X | X | X | X |
| X | | | |
| X | | | |

$(4x)(3x) = 432\ cm^2$

$12x^2 = 432\ cm^2$

$x^2 = 36\ cm^2$

$x = 6$ cm

$L = 4x = 24$ cm $W = 3x = 18$ cm

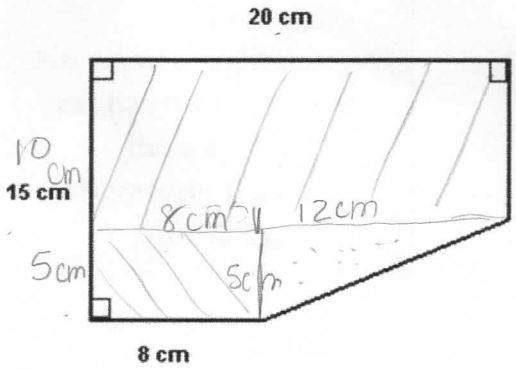
$P = 2L \times 2W$

$= 2(24) + 2(18)$

$= 48 + 36$

$= 84$ cm

36. Find the area of the given shape.




$20\ cm \times 10\ cm = 200\ cm^2$

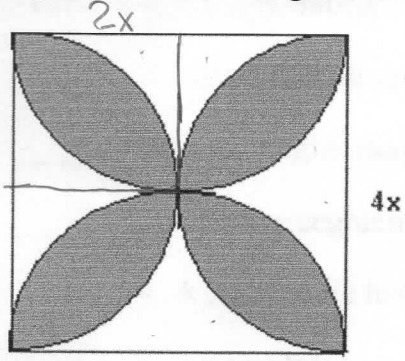
$5\ cm \times 8\ cm = 40\ cm^2$

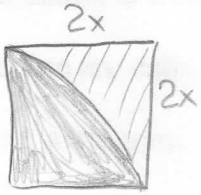
$\frac{1}{2}\ 5\ cm \times 12\ cm = 30\ cm^2$

$270\ cm^2$

Bonus

The shaded region below is the common area to four semicircles whose diameters are the sides of the square with side length 4x. Find the area of the shaded region in terms of x.




Area of square $-\frac{1}{4}$ area of circle

$4x^2 - \left(\frac{1}{4}\right)(\pi)(4x^2)$

$= 4x^2 - \pi x^2$

$x^2(4-\pi)$ ← you have 8 of these

$8x^2(4-\pi)$ if you use 3.14 for $\pi$

$8x^2(4-3.14)$

$= 8x^2(.86)$

$= 6.88x^2$

Theorem:
a cat has nine tails.
Proof:
No cat has eight tails. A cat has one tail more than no cat therefore, a cat has nine tails.