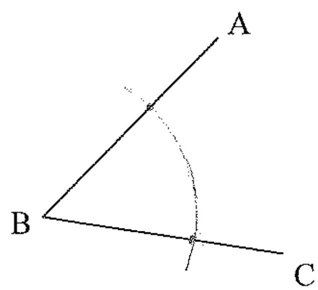
Honors Geometry
Semester 1 Final Review

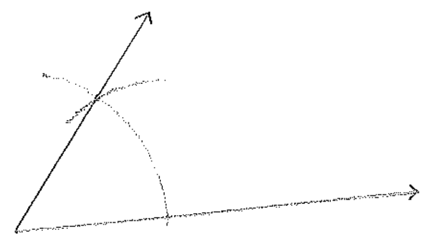
NAME: Key

Unit 1: Target A – Use tools and methods to perform basic geometric constructions

1) Construct an angle that is congruent to $\angle ABC$.

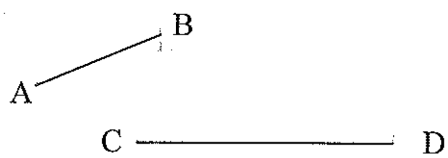
Begin with a working line





2) Construct a line segment whose length is equal to the sum of the lengths of the given line segments.

Given: $\overline{AB}$ and $\overline{CD}$



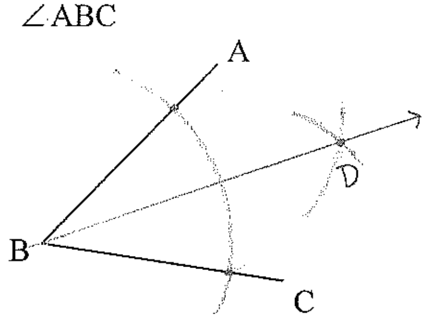
Construct: $\overline{EF}$

Begin with a working line

3) Construct the bisector of the given angle.

Given: $\angle ABC$

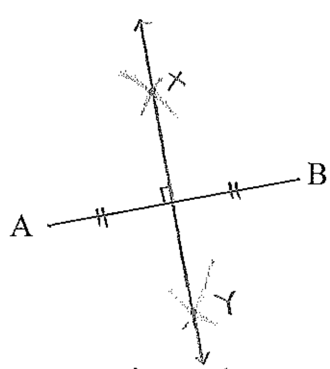
Construct: angle bisector $\overrightarrow{BD}$



4) Construct the perpendicular bisector to the segment given.

a) Given: $\overline{AB}$

Construct: $\perp$ bisector



b) What is true about any point on the perpendicular bisector?

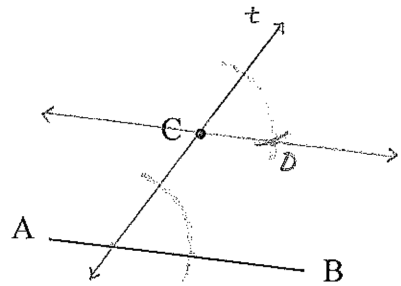
Any pt. is equidistant from endpts. of segment AB; $\overline{AX} \cong \overline{XB}$, for example.
What can we say about $\overline{AY}$ and $\overline{YB}$?

5) Construct a line segment through the given point parallel to the given line segment.

a) Given: $\overline{AB}$ and point C

Construct: $\overline{CD} \parallel \overline{AB}$

Begin by drawing a line through pt. C and intersecting $\overline{AB}$ (I called it line t).



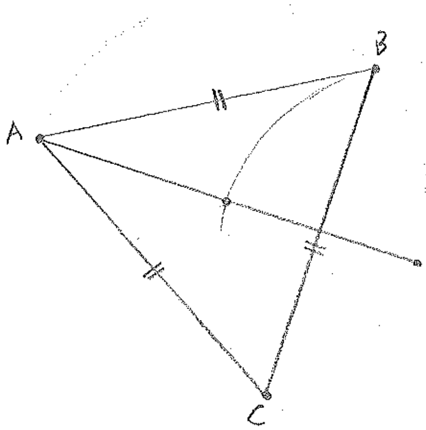
b) Which theorem justifies your construction?

Corresponding $\angle$s $\cong$ $\Rightarrow$ $\parallel$ lines

Unit 1: Target 1B - Construct an equilateral triangle, a square, and a regular hexagon inscribed in a circle, and explain the steps involved

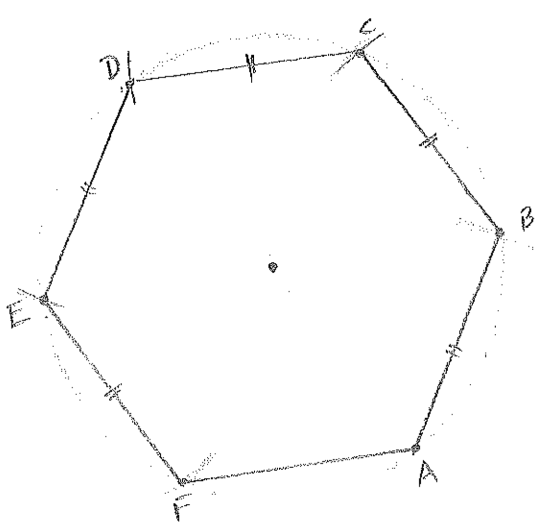
6) Construct an equilateral triangle <u>inscribed in a circle.</u>

$\triangle ABC$ is equilateral



7) Construct a regular hexagon <u>inscribed in a circle.</u>

ABCDEF is a reg. hexagon



Unit 1: Target C – Prove theorems about lines and angles with statements based on the Law of Syllogism

8) Use the conditional statement below to answer questions a-g.

"If the temperature is -45 °F, then it is 77 °F below freezing."

a) Write the converse of the conditional statement:

If the temperature is 77°F below freezing, then it is -45°F.

b) Is the converse T or F? T

c) Explain your reasoning: Freezing point 32°; 32 - 77 = -45

e) Write the contrapositive of the conditional statement:

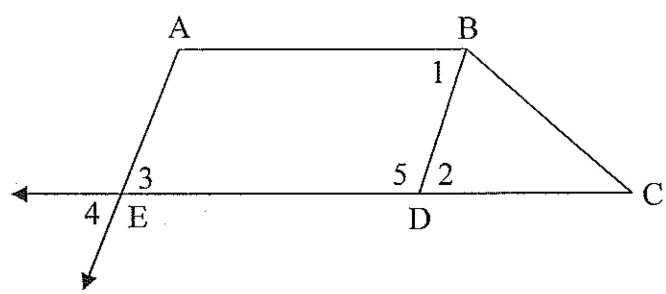
If the temperature is not 77°F below freezing, then it is not -45°F.

f) Is the contrapositive T or F? T

g) Explain your reasoning: The contrapositive of true conditional statement is always true.

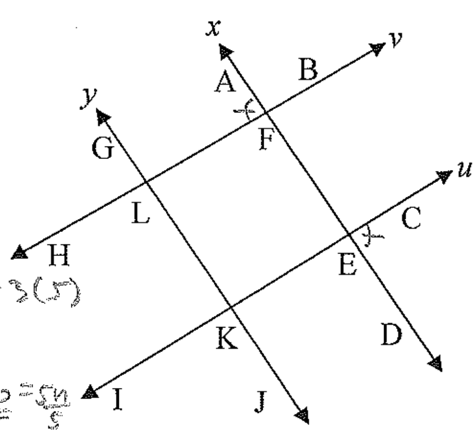
9) Based on the diagram, what is the name given to each of the following angle pairs?

a) Corresponding
b) Alternate Interior
c) Alternate Exterior
d) Same Side Interior
e) Same Side Exterior



∠1 and ∠2 Alternate interior
∠2 and ∠3 Corresponding
∠4 and ∠2 Alternate exterior
∠3 and ∠5 Same-side interior

10) Use the diagram on the right to answer questions a and b.



Know these
|| lines cut by trans ⇔
① AI ∠s ≅
② AE ∠s ≅
③ Corr. ∠s ≅
④ SSI ∠s supp (add to 180)
⑤ SSE ∠s supp (add to 180)

a) Given: $v \parallel u$
$\angle LFA = (\frac{1}{3}n + 15)°$
$\angle CED = (2n + 5)°$

|| lines ⇒ A.E. ∠s ≅

Find: $\boxed{m\angle FEC}$

$\frac{1}{3}n + 15 = 2n + 5$
$3(\frac{1}{3}n) + 3(15) = 3(2n) + 3(5)$
$n + 45 = 6n + 15$
$-n \quad -n$
$45 = 5n + 15$
$-15 \quad -15$
$\frac{30}{5} = \frac{5n}{5}$
$6 = n$

$\angle CED = 2n + 5$
$= 2(6) + 5$
$= 12 + 5$
$= 17$

$m\angle FEC = 180 - 17 = \boxed{163}$

b) If $y \parallel x$, $\angle BFE = (4r - 7)°$, and $\angle FLK = (2r + 33)°$, then find $m\angle AFL$.

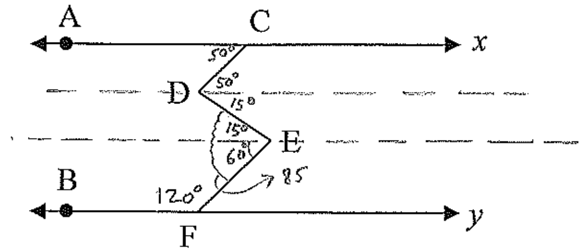
|| lines ⇒ Corr. ∠s ≅

$4r - 7 = 2r + 33$
$-2r \quad -2r$
$2r - 7 = 33$
$+7 \quad +7$
$\frac{2r}{2} = \frac{40}{2}$
$r = 20$

$\angle BFE = 4r - 7$
$= 4(20) - 7$
$= 80 - 7 = 73°$

$\boxed{m\angle AFL = 73}$
(vertical ∠s ≅)

11) Given $x \parallel y$, $\angle BFE = 120^\circ$, $\angle FED = 85^\circ$, and $\angle ACD = 50^\circ$, find the measure of $\boxed{\angle CDE}$.

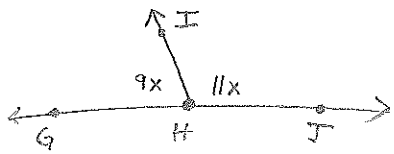


$85 - 60 = 15$

$50 + 15 = \boxed{65^\circ = \angle CDE}$

12) $\angle GHJ$ is a straight angle. $\overrightarrow{HI}$ divides $\angle GHJ$ into two parts. The ratio of the measure of $\angle GHI$ to $\angle JHI$ is 9:11. Draw a diagram and find the measure, in degrees, of the $\boxed{\text{larger}}$ angle.

$\boxed{\text{Larger}} = \angle JHI$



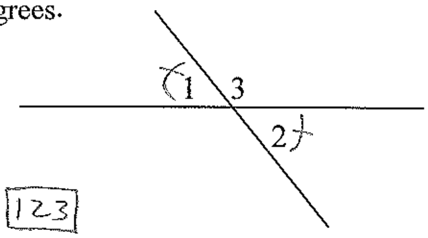
$\angle JHI = 11x = 11(9) = \boxed{99^\circ}$

$9x + 11x = 180$

$\frac{20x}{20} = \frac{180}{20}$

$x = 9$

13) In the diagram, $m\angle 1 = 4x - 3$ and $m\angle 2 = x + 42$. Find $\boxed{m\angle 3}$, in degrees.



Vertical ∠'s are ≅.

$4x - 3 = x + 42$
$-x \quad -x$
$3x - 3 = 42$
$+3 \quad +3$
$3x = 45$

$\frac{3x}{3} = \frac{45}{3}$

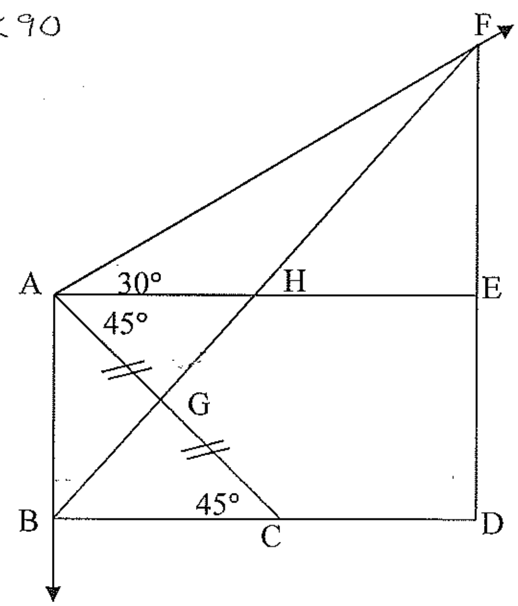
$x = 15$

$m\angle 2 = x + 42$
$= 15 + 42$
$= 57$

$m\angle 3 = 180 - 57 = \boxed{123}$

Unit 2: Target A - Recognize, identify, and define the basic terms of geometry

14) Answer questions a-k by referring to the diagram below.



a) Name a point between G and F. H

b) Is ∠FAC acute? Yes b/c 30+45 = 75 < 90

c) G is the midpoint of what segment? $\overline{AC}$

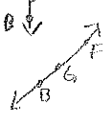
d) Name a point collinear to C and D. B
(on same line)

e) How many different angles have their vertex at A? 6

f) Does ∠BAH and ∠BAE represent the same angle? Yes

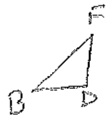
g) $\overleftrightarrow{HE} \cap \overleftrightarrow{GC}$ = A (intersection)

h) $\overrightarrow{AF} \cup \overrightarrow{AB}$ = ∠BAF or ∠FAB (union)



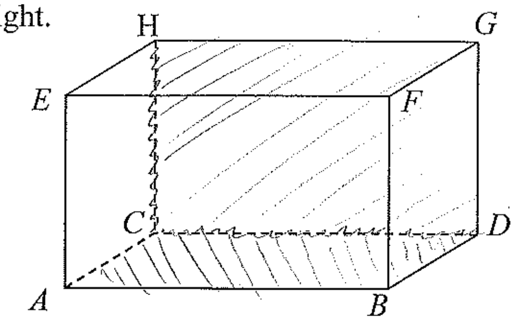
i) $\overrightarrow{BG} \cup \overrightarrow{FB}$ = $\overleftrightarrow{FB}$, ∠BGF, other answers possible

j) $\overline{AF} \cap \overline{BD}$ = ∅ (no intersection)



k) $\overline{BD} \cup \overline{DF} \cup \overline{FB}$ = △BDF

15) Answer questions a and b by referring to the diagram on the right.



a) Name the intersection of segments HC and DC.

C

b) Name the intersection of planes HCDG and ABDC.

$\overleftrightarrow{CD}$ (it must be a line)

Unit 2: Target B - Use graph paper and/or technology to transform objects
Unit 2: Target C - Know and distinguish between rigid and non-rigid transformations
Unit 2: Target D - Define and construct reflections, translations, and rotations and describe each of their important properties

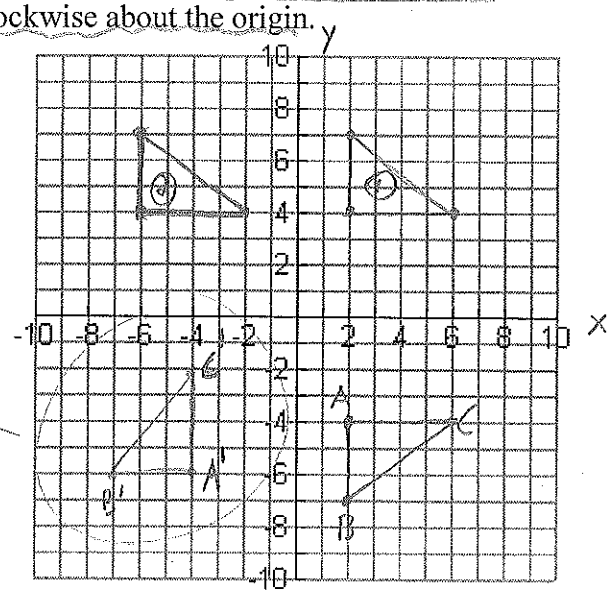
16) Graph ΔABC with vertices A (2, -4), B (2, -7), and C (6, -4). Create triangle A'B'C' by reflecting ΔABC over the *x*-axis, translating it horizontally -8, and then rotating it 90 degrees counter-clockwise about the origin.

Final Answer:

A'(-4, -6)

B'(-7, -6)

C'(-4, -2)



Recall rotation rules:

① Rotation 90° clockwise about the origin:
$(x, y) \rightarrow (y, -x)$

② Rotation 90° counterclockwise about the origin:
$(x, y) \rightarrow (-y, x)$

③ Rotation 180° clockwise or counterclockwise about origin:
$(x, y) \rightarrow (-x, -y)$

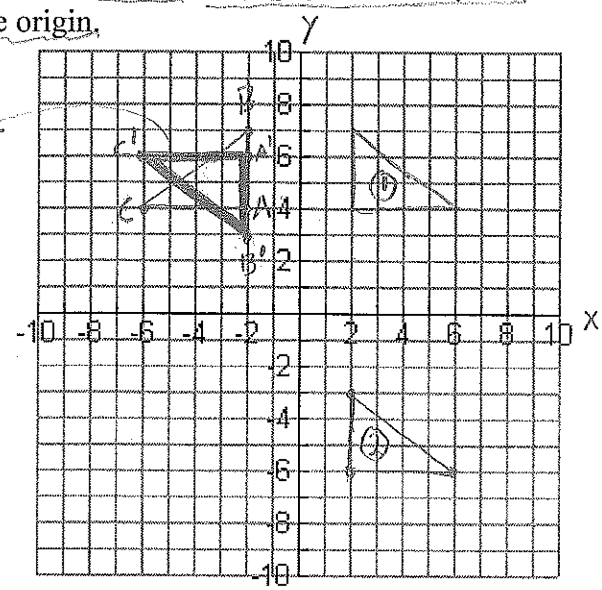
17) Graph ΔABC with vertices A (-2, 4), B (-2, 7), and C (-6, 4). Create triangle A'B'C' by reflecting ΔABC over the *y*-axis, translating it vertically -10, and then rotating it 180 degrees clockwise about the origin.

Final Answer:
(darker Δ)

A'(-2, 6)

B'(-2, 3)

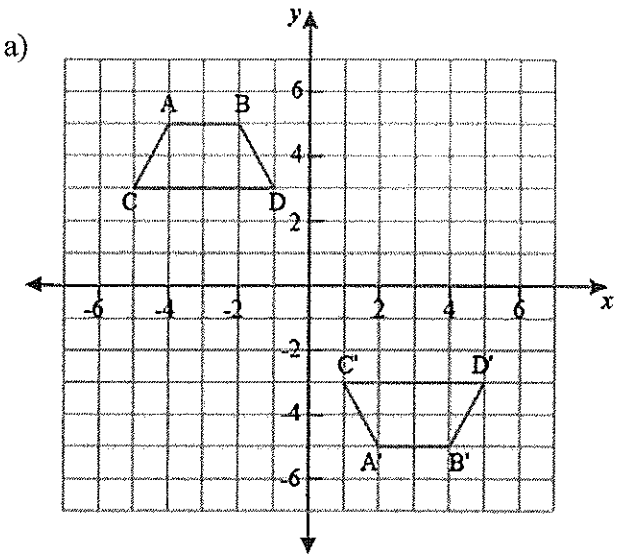
C'(-6, 6)



Unit 2: Target E - Predict and/or verify the sequence of transformations that will map a figure onto another

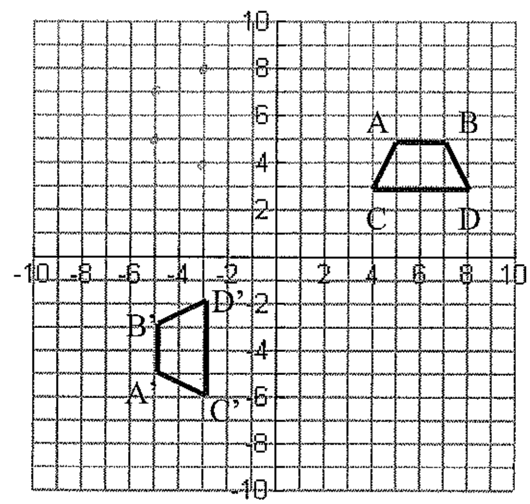
18) For questions a and b, write the transformation or transformations that will map trapezoid ABDC onto trapezoid A'B'D'C'. (answers may vary)

a)



One possibility: Translation of 6 to the left and then a reflection over x-axis.

b)

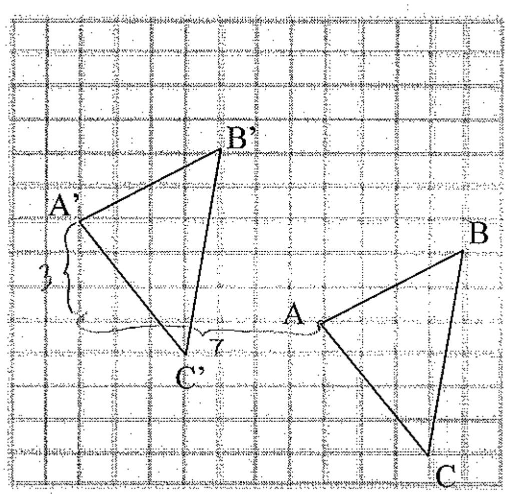


One possibility: 90° rotation counterclockwise about the origin and then a vertical translation of −10.

Unit 2: Target F - Define congruence and determine if two figures are congruent by using transformations and rigid motions

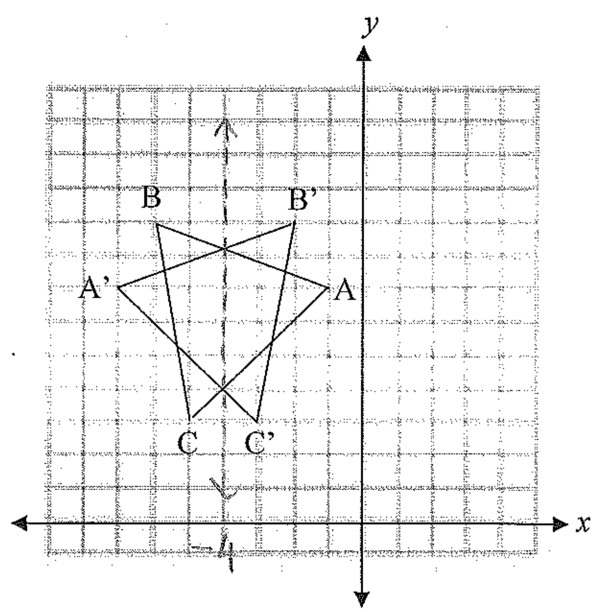
19) For questions a and b, determine the type of transformation from ΔABC to ΔA'B'C'.

a)



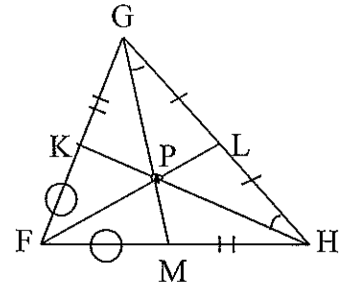
Translation of 3 down and 7 to the right

b)



Reflection over x=-4 line

20) Use the diagram on the right to complete each correspondence.



a) ΔGFP ≅ Δ HFP

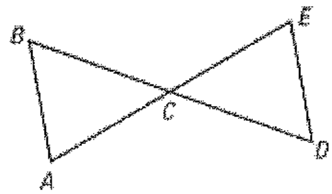
b) ΔFGM ≅ Δ FHK

c) ΔHFL ≅ Δ GFL

Unit 3: Target A - Identify corresponding sides and corresponding angles in congruent triangles, and explain why they are congruent

21) Use the given information to answer questions a-d.

Given: ΔBCA≅ΔECD



a) Which segment is congruent to segment AC? $\overline{DC}$

b) Which segment is congruent to segment DE? $\overline{AB}$

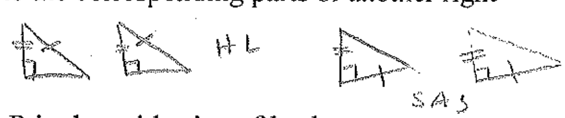
c) Which angle is congruent to ∠ABC? ∠DEC

d) Which angle is congruent to ∠ECD? ∠BCA

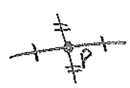
22) Answer *Always, Sometimes,* or *Never*. Draw a diagram to help you answer each question.

a) If two sides of a right triangle are congruent to the corresponding parts of another right triangle, then the triangles are congruent.

Always!

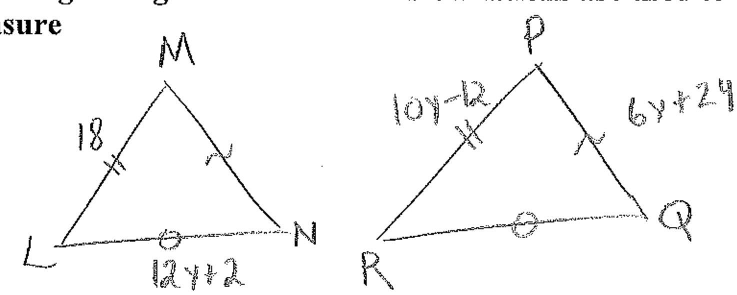


b) If two segments intersect at point P, then P is the midpoint of both segments.

Yes  , No  ⟹ Sometimes

Unit 3: Target B - Understand triangle congruence when transformations are used to preserve distance and angle measure

23) Given: $\Delta LMN \cong \Delta RPQ$
LM = 18
RP = 10*y* - 12
LN = 12*y* + 2
PQ = 6y + 24



Draw and label the diagram. Then, find the value of y and the perimeter of ΔLMN.

$\overline{LM} \cong \overline{RP}$ by CPCTC

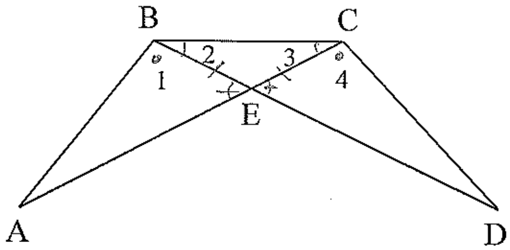
$18 = 10y - 12$
$+12 \qquad +12$

$\frac{30}{10} = \frac{10y}{10}$ $\boxed{3 = y}$

$MN = PQ = 6y + 24 = 6(3) + 24 = 18 + 24 = 42$
$LM = 18$
$LN = 12y + 2 = 12(3) + 2 = 38$
Perimeter$_{\Delta LMN}$ = $MN + LM + LN = 42 + 18 + 38 = \underline{98}$

Unit 3: Target C - Know and utilize the sufficient conditions to prove that triangles are congruent

Use the diagram below to answer multiple-choice questions 24 – 26.



24) If $\triangle BEC$ is isosceles with base BC, which of the following must be given in order to prove $\triangle BAE \cong \triangle CDE$ by ASA?

Isosc $\Rightarrow$ $\overline{BE} \cong \overline{CE}$
Vertical ∠'s ≅ $\Rightarrow$ $\angle BEA \cong \angle CED$

Need $\angle 1 \cong \angle 4$

a) $\angle 2 \cong \angle 3$
b) $\overline{AB} \cong \overline{CD}$
c) $\overline{AE} \cong \overline{ED}$
d) $\angle 1 \cong \angle 4$
e) Not possible

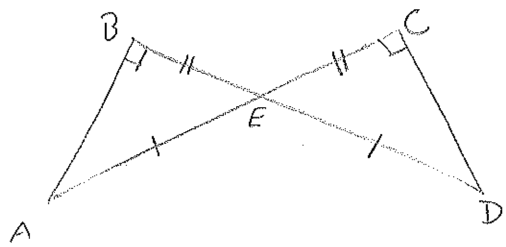
25) You are given $\overline{AB} \cong \overline{CD}$ and $\overline{AC} \cong \overline{BD}$. In order to prove the pair of overlapping triangles congruent, what additional fact must we use?

a) Vertical angles are congruent.
b) The reflexive property of segments
c) The addition property of segments
d) If sides, then angles
e) None of these

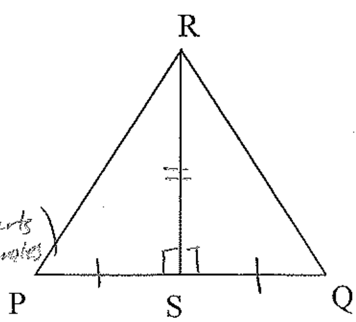
Need $\overline{BC} \cong \overline{BC}$ for SSS.

26) Given $\overline{AE} \cong \overline{ED}$ and $\overline{BE} \cong \overline{CE}$, what additional given is required in order to prove $\triangle ABE \cong \triangle DCE$ by HL?

a) $\angle 1 \cong \angle 4$
b) $\overline{AB} \cong \overline{CD}$
c) $\angle 1$ and $\angle 4$ are right angles.
d) $\overline{BD} \perp \overline{AC}$
e) None of these



27) Given: $\overline{PQ} \perp \overline{RS}$ and S is the midpoint of segment PQ.



a) Why is $\triangle PRS \cong \triangle QRS$? SAS

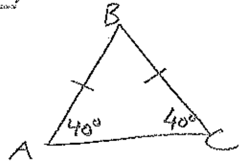
b) Why is $\angle P \cong \angle Q$? CPCTC (Corresponding Parts of Congruent triangles Congruent)

c) Does $\overrightarrow{RS}$ bisect $\angle PRQ$? Why?

Yes, because $\angle PRS \cong \angle QRS$ by CPCTC. ∴ $\overrightarrow{RS}$ bisects $\angle PRQ$.

Unit 3: Target E - Prove various theorems about triangles

28) Find the vertex angle of an isosceles triangle if the measure of its base angle is 40°. Draw a diagram.



$\angle B$ is vertex angle

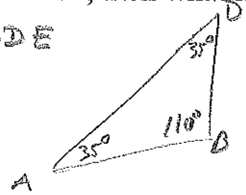
$\angle A \cong \angle C$ b/c △ ⇒ △

$180 - 40 - 40 = \boxed{100°}$

29) $\overline{DE}$ bisects $\angle ADB$ in circle B. If $\angle B = 110^\circ$, then what is the $m\angle BDE$?

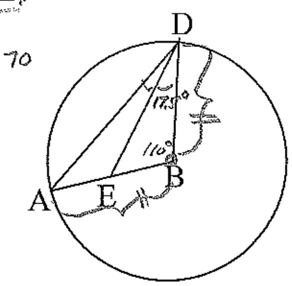
$\overline{DE}$ bis $\angle ADB \Rightarrow \angle ADE \cong \angle BDE$

⊙B $\Rightarrow \overline{AB} \cong \overline{DB}$ (radii ≅)



$180 - 110 = 70$

$\frac{70}{2} = 35$

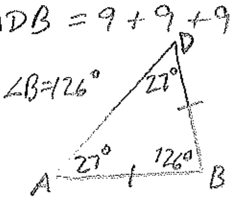


$m\angle BDE = \frac{35}{2} = \boxed{17.5}$

30) $\overrightarrow{DE}$ and $\overrightarrow{DC}$ trisect ∠ADB in circle B. ∠ADE = 9°. Find $m\angle DCB$.

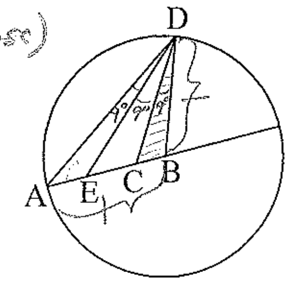
$\angle ADB = 9 + 9 + 9 = 27° \Rightarrow \angle DAB = 27°$ (△ABD isosc)

∴ $\angle B = 126°$



∴ $m\angle DCB = 180 - 126 - 9$

$= \boxed{45}$



Unit 4: Target A – Use theorems, postulates, and/or definitions to prove theorems about parallelograms

Questions 31-33 are multiple choice.

31) Which of the following quadrilaterals have congruent diagonals?

a) Parallelogram and Rectangle
b) Square and Rhombus
c) Kite and Isosceles Trapezoid
d) Rectangle and Square
e) None of these

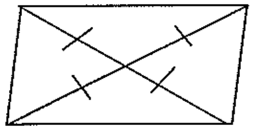
32) Which of the following quadrilaterals have perpendicular diagonals?

a) Parallelogram and Kite
b) Rectangle and Rhombus
c) Square and Rhombus
d) Rectangle and Kite
e) None of these

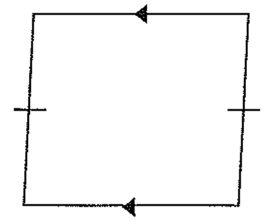
33) Name a quadrilateral with congruent diagonals and both pairs of opposite sides congruent.

a) Kite
b) Parallelogram
c) Rectangle
d) Trapezoid
e) Rhombus

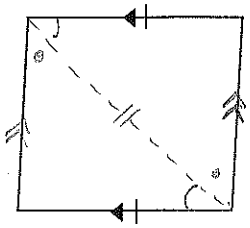
34) What is the most descriptive name? Explain your reasoning.

a) 

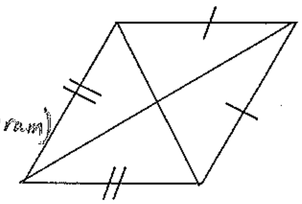
Rectangle
($\cong$ diagonals)

b) 

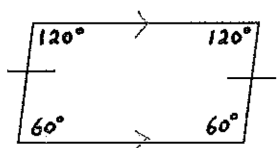
Isosceles Trapezoid
(by definition)

c) 

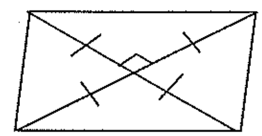
Parallelogram
(see methods for proving quad is ||-gram)
or
|| lines $\Rightarrow$ AI $\angle$s $\cong$
Reflexive prop
Δs $\cong$ by SAS
$\circ\angle$s $\cong$ by CPCTC
AI $\angle$s $\cong$ $\Rightarrow$ || lines

d) 

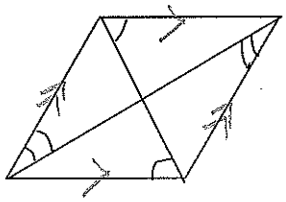
Kite (by definition)

e) 

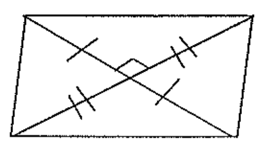
Isosceles
Trapezoid
(SSI $\angle$s supp $\Rightarrow$ || lines)

f) 

Square
($\cong$ and $\perp$ diagonals)

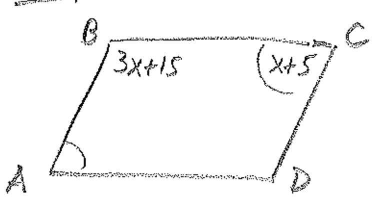
g) 

Parallelogram
(Alt int $\angle$s $\cong$
$\Rightarrow$ || lines)

h) 

Rhombus
(diag $\perp$ bisectors)

35) *ABCD* is a parallelogram. Given $\angle B = (3x+15)°$ and $\angle C = (x+5)°$, find the measure of $\angle A$. Draw a diagram.



$\angle A \cong \angle C$
(opp. $\angle$s $\cong$)

$\angle B + \angle C = 180$ (Consecutive $\angle$s supplementary)

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

$4x+20=180$
$-20 \quad -20$

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

$x=40$

$\angle C = x+5$
$=40+5$
$=45°$

$\therefore \boxed{\angle A = 45°}$

36) In the diagram, *PQRS* is a rhombus. Given $\angle STP = (3x+15)°$ and $\angle 1 = (2x-3)°$, find the measure of $\angle SRQ$ and $\angle PQR$.

$\angle STP = 90°$

$3x+15=90$
$-15 \quad -15$

$\frac{3x}{3}=\frac{75}{3}$

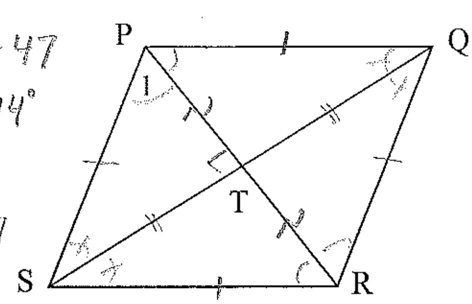
$x=25$

$\angle 1 = 2x-3 = 2(25)-3 = 47$

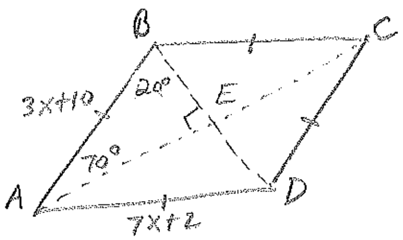
$\therefore \angle SPQ = 47+47 = 94°$

$\therefore \boxed{\angle SRQ = 94°}$

$\therefore \boxed{\angle PQR = 180-94 = 86°}$



37) Given: ABCD is a rhombus
AB = $3x + 10$
AD = $7x + 2$
$\angle ABD = 10x$



$3x + 10 = 7x + 2$
$-3x \quad -3x$
$10 = 4x + 2$
$-2 \quad -2$
$\frac{8}{4} = \frac{4x}{4}$
$2 = x$

Draw a diagram and find $m\angle CAD$.

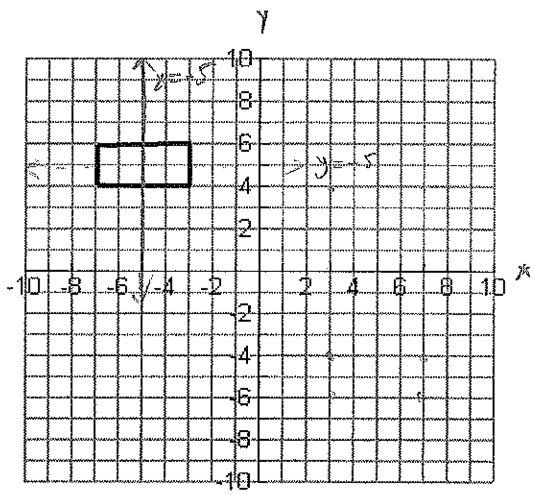
$\angle ABD = 10x = 10(2) = 20°$

$\angle BAE = 180 - 90 - 20 = 70°$ $\therefore$ $\angle CAD = 70°$

(diagonals bisect opposite $\angle$s)

Unit 4: Target B – Describe and illustrate how a rectangle and isosceles trapezoid are mapped onto themselves using transformations

38) Which of the following will map the rectangle onto itself? Circle ALL that apply.



a) reflection over $y = -5$ YES

b) reflection over $x = -5$ YES

c) reflection over y-axis, followed by translation of left 6 NO

d) reflection over x-axis, followed by translation of up 10 YES

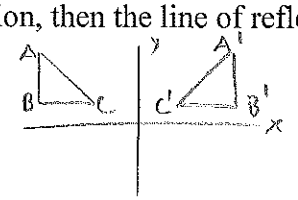
e) rotation of 180 degrees about the origin, followed by translation of left 10 and up 10 YES

Unit 4: Target C – Determine lines of reflection, symmetry and degrees of rotational symmetry in regular polygons

39) Given ΔABC is transformed onto $\Delta A'B'C'$, determine if the statement is *True* or *False*.

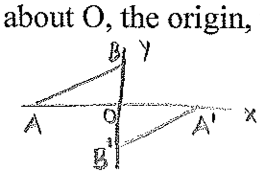
Draw a diagram to help you answer each question.

a) If the transformation is a reflection, then the line of reflection is the perpendicular bisector of segment AC'.



False

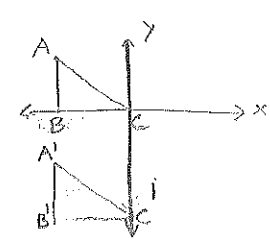
b) If the transformation is a rotation about O, the origin, then the angle of rotation can be measured by $\angle BOB'$.



$\angle BOB' = 180°$

True

c) If the transformation is a translation, then **B'B**||**C'C** .



True

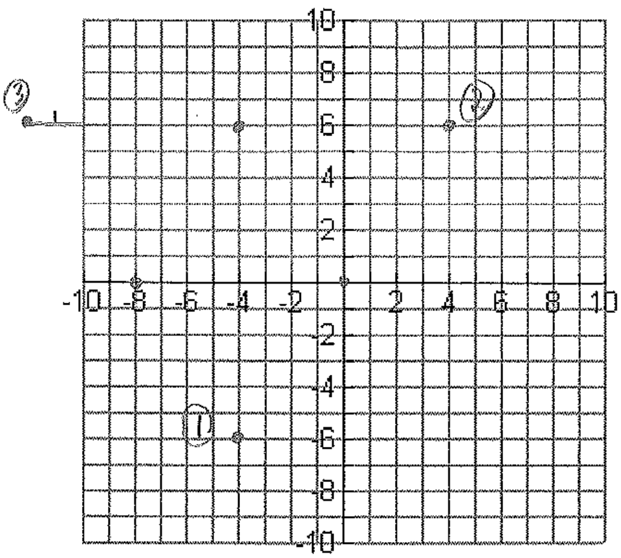
Unit 5: Target A - Represent the vertices of a figure in the coordinate plane using variables

40) Three vertices of the parallelogram are (0, 0), (-8, 0), and (-4, 6). Find three possible coordinates of the fourth vertex.

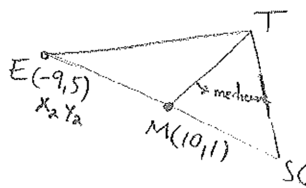
1) (-4 , -6)

2) (4 , 6)

3) (-12 , 6)



41) Given: ΔEST is on the coordinate plane, M is the intersection of the median from T to segment ES, E = (-9, 5), and M = (10, 1). Find the coordinates of S.



midpt $= \left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right)$

midpt $\overline{ES} = M = (10,1) = \left(\frac{x_1+(-9)}{2}, \frac{y_1+5}{2}\right)$

$(2)\cdot 10 = \frac{x_1-9}{2}(2)$

$20 = x_1 - 9$

$+9 \quad +9$

$29 = x_1$ and

$(2)\cdot 1 = \frac{y_1+5}{2}(2)$

$2 = y_1 + 5$

$-5 \quad -5$

$-3 = y_1$

$\boxed{\therefore S(29,-3)}$

42) For questions a-c, write the equation of the line satisfying the set of conditions:

$y = mx+b$

m – slope

b – y-int

∥ lines ⇒ slopes =

⊥ lines ⇒ slopes opp. rec. of each other

× prod = −1

a) perpendicular to $y = -\frac{1}{8}x + 5$ and containing point (0, -2)

Slope of line ⊥ to slope $-\frac{1}{8}$ is 8

$y = mx+b$

$-2 = 8(0) + b$

$-2 = b$

∴ The equation is $\boxed{y = 8x - 2}$

b) perpendicular to $y = \frac{2}{3}x - 7$ and passing through (6, 0)

Slope of line ⊥ to slope $\frac{2}{3}$ is $-\frac{3}{2}$

$-\frac{3}{2}\cdot\frac{6}{1} = -\frac{18}{2} = -9$

$y = mx+b$

$0 = -\frac{3}{2}(6) + b$

$0 = -9 + b$

$+9 \quad +9$

$9 = b$

∴ The equation is $\boxed{y = -\frac{3}{2}x + 9}$

c) parallel to $y = 5x + 11$ and passing through ($\frac{1}{8}$, 2)

Slope of line ∥ to slope 5 is 5.

$y = mx+b$

$2 = 5\cdot\frac{1}{8} + b$ mult. all terms by 8.

$2 = \frac{5}{8} + b$

$8\cdot 2 = 8\cdot\frac{5}{8} + 8\cdot b$

$16 = 5 + 8b$

$-5 \quad -5$

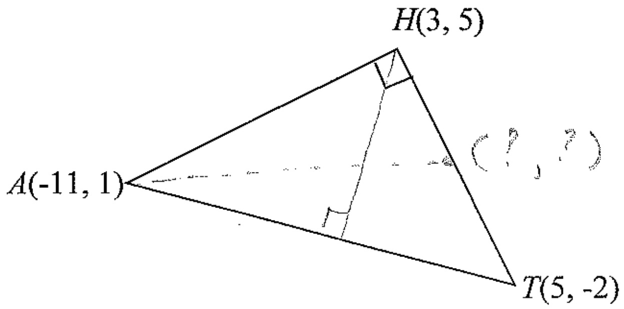
$\frac{11}{8} = \frac{8b}{8}$

$b = \frac{11}{8}$

∴ The equation is $\boxed{y = 5x + \frac{11}{8}}$

Unit 5: Target B - Use coordinates and the proper tools to prove or disprove properties or claims about a figure

Use the diagram below to answer questions 43 and 44.



43) Find the slope of the altitude from H to segment AT.

Find slope of $\overline{AT}$ first $\quad m = \dfrac{y_2 - y_1}{x_2 - x_1}$

$(-11, 1) \quad (5, -2)$
$x_1 \; y_1 \quad x_2 \; y_2$

$= \dfrac{-2 - 1}{5 - (-11)}$

$= \dfrac{-3}{16}$

$\dfrac{-3}{16} \rightarrow -\dfrac{16}{-3}$

$\therefore$ Slope of altitude is $\boxed{\dfrac{16}{3}}$

44) Find the coordinates where the median from A intersects segment HT.

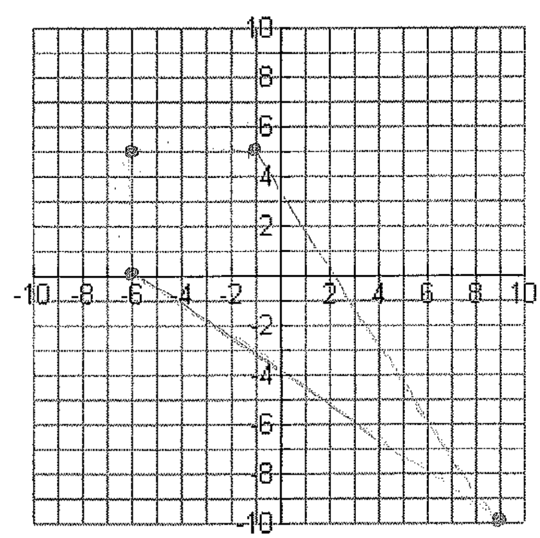
midpt $= \left(\dfrac{x_1 + x_2}{2}, \dfrac{y_1 + y_2}{2} \right)$ $\quad (3, 5) \quad (5, -2)$
$x_1 \; y_1 \quad x_2 \; y_2$

$= \left(\dfrac{3+5}{2}, \dfrac{5+(-2)}{2} \right)$

$= \left(\dfrac{8}{2}, \dfrac{3}{2} \right) = \boxed{\left(4, \dfrac{3}{2}\right)}$

45) What is the most precise name for a quadrilateral with vertices (-6, 5), (-1, 5), (-6, 0) and (9, -10)?

$\boxed{\text{Kite}}$

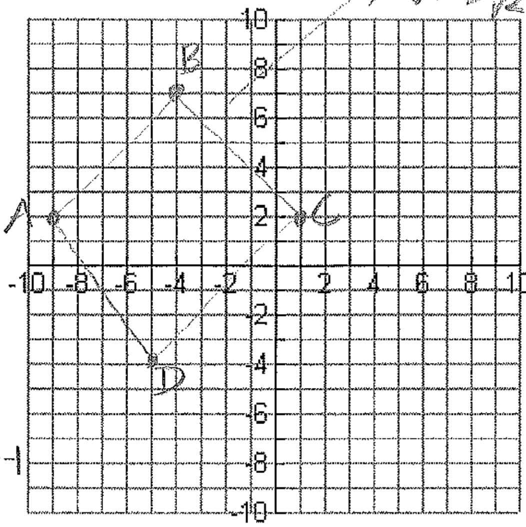


Unit 5: Target C - Translate a line on the coordinate plane to produce its image and/or a perpendicular

Unit 5: Target D - Use slope to show that translated lines are parallel or perpendicular

Given: A(-9, 2), B(-4, 7), C(1, 2), D(-5, -4)

→ or $\frac{RISE}{RUN}$



46) Is $\overleftrightarrow{AB}$ parallel to $\overleftrightarrow{DC}$?

$A(\overset{x_1}{-9},\overset{y_1}{2})\ B(\overset{x_2}{-4},\overset{y_2}{7})$

$m\overline{AB} = \frac{y_2-y_1}{x_2-x_1} = \frac{7-2}{-4-(-9)} = \frac{5}{-4+9} = \frac{5}{5} = 1$

$D(\overset{x_1}{-5},\overset{y_1}{-4})\ C(\overset{x_2}{1},\overset{y_2}{2})$

$m\overline{DC} = \frac{2-(-4)}{1-(-5)} = \frac{6}{6} = 1$

$\boxed{\text{Slopes} = \Rightarrow \overleftrightarrow{AB} \parallel \overleftrightarrow{DC} \text{ yes}}$

47) Is $\overleftrightarrow{AD}$ parallel to $\overleftrightarrow{BC}$?

$A(\overset{x_1}{-9},\overset{y_1}{2})\ D(\overset{x_2}{-5},\overset{y_2}{-4})$

$m\overleftrightarrow{AD} = \frac{y_2-y_1}{x_2-x_1} = \frac{-4-2}{-5-(-9)} = \frac{-6}{4} = \boxed{\frac{-3}{2}}$

$B(\overset{x_1}{-4},\overset{y_1}{7})\ C(\overset{x_2}{1},\overset{y_2}{2})$

$m\overleftrightarrow{BC} = \frac{y_2-y_1}{x_2-x_1} = \frac{2-7}{1-(-4)} = \frac{-5}{5} = -1$

$-\frac{3}{2} \neq -1 \therefore \overleftrightarrow{AD} \not\parallel \overleftrightarrow{BC}$

Unit 5: Target E - Compute the perimeter and/or the area of various polygons using coordinates and distance formula

48) Simplify the radical.

a) $\sqrt{20}$ — $\sqrt{4}\sqrt{5}$ — $\boxed{2\sqrt{5}}$

b) $\sqrt{48}$ — $\sqrt{16}\sqrt{3}$ — $\boxed{4\sqrt{3}}$

c) $\sqrt{80}$ — $\sqrt{16}\sqrt{5}$ — $\boxed{4\sqrt{5}}$

Perfect Squares

$\sqrt{4}=2$

$\sqrt{9}=3$

$\sqrt{16}=4$

$\sqrt{25}=5$

$\sqrt{36}=6$

$\sqrt{49}=7$

$\sqrt{64}=8$

$\sqrt{81}=9$

$\sqrt{100}=10$

49) Find the perimeter and area of the square with vertices (-7, 0), (0, 7), (7, 0), and (0, -7) in simplest radical form.

$(\overset{x_1}{0},\overset{y_1}{7})$ $(\overset{x_2}{7},\overset{y_2}{0})$

$d = \sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$

$= \sqrt{(7-0)^2+(0-7)^2}$

$= \sqrt{(7)^2+(-7)^2}$

$= \sqrt{49+49} = \sqrt{98} = 7\sqrt{2}$

$\sqrt{98} = \sqrt{49}\sqrt{2} = 7\sqrt{2}$

Perimeter: $4 \cdot 7\sqrt{5} = \boxed{28\sqrt{2} \text{ units}}$

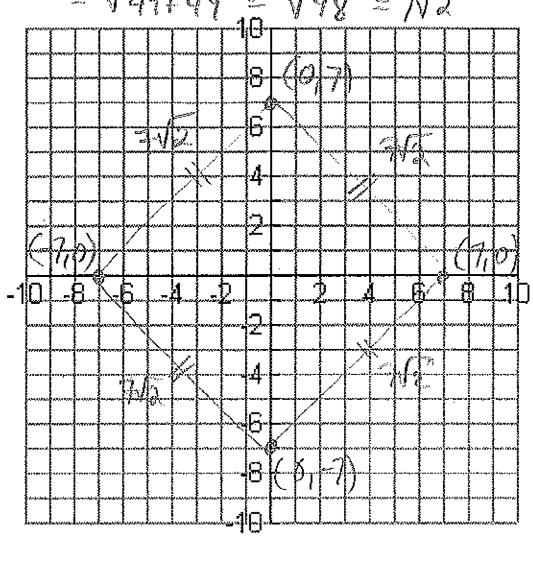
Area: $A = s^2 \Rightarrow A = (7\sqrt{2})^2$

$= (7\sqrt{2})(7\sqrt{2})$

$= 49\sqrt{4}$

$= 49 \cdot 2$

$= \boxed{98 \text{ units}^2}$



50) Find the perimeter of the hexagon. Leave your answer in simplest radical form.

$(\overset{x_1}{0},\overset{y_1}{6})$ $(\overset{x_2}{2},\overset{y_2}{0})$

$d = \sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$

$= \sqrt{(2-0)^2+(0-6)^2}$

$= \sqrt{2^2+(-6)^2}$

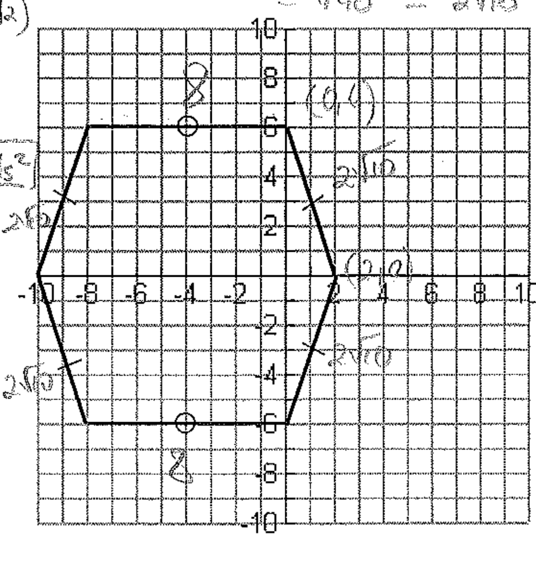
$= \sqrt{4+36}$

$= \sqrt{40} = 2\sqrt{10}$

$\sqrt{40} = \sqrt{4}\cdot\sqrt{10} = 2\sqrt{10}$

$\therefore$ Perimeter: $8+8+2\sqrt{10}+2\sqrt{10}+2\sqrt{10}+2\sqrt{10}$

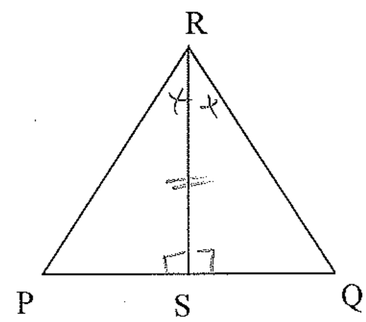
$\boxed{= 16+8\sqrt{10} \text{ units}}$



Write a two-column proof for problems 51-54.

51) Given: $\overrightarrow{RS}$ bisects $\angle PRQ$
$\overline{PQ} \perp \overline{RS}$

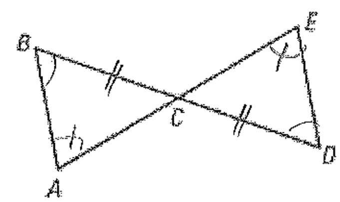
Prove: $\triangle PRS \cong \triangle QRS$



Statement	Reasons
① $\overrightarrow{RS}$ bisects $\angle PRQ$	① Given
② $\angle PRS \cong \angle QRS$	② Def. of bisection
③ $\overline{PQ} \perp \overline{RS}$	③ Given
④ $\angle PSR$, $\angle QSR$ rt. $\angle$s	④ Def. of $\perp$
⑤ $\angle PSR \cong \angle QSR$	⑤ Rt. $\angle$s $\cong$
⑥ $\overline{RS} \cong \overline{RS}$	⑥ Reflexive prop. of segments
⑦ $\triangle PRS \cong \triangle QRS$	⑦ ASA (2, 6, 5)

* 52) Given: $\overline{BA} \parallel \overline{ED}$
C is the midpoint of $\overline{BD}$

Prove: $\overline{AC} \cong \overline{EC}$



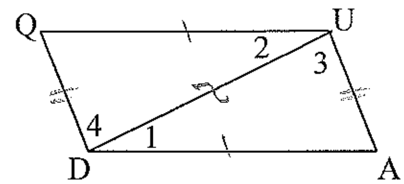
Statement	Reason
① $\overline{BA} \parallel \overline{ED}$	① Given
② $\angle ABC \cong \angle EDC$	② $\parallel$ lines $\Rightarrow$ A.I. $\angle$s $\cong$
③ $\angle BAC \cong \angle DEC$	③ Same as step 2
④ C is midpt of $\overline{BD}$	④ Given
⑤ $\overline{BC} \cong \overline{DC}$	⑤ Def. of midpt.
⑥ $\triangle ABC \cong \triangle EDC$	⑥ AAS (3, 2, 5)
⑦ $\overline{AC} \cong \overline{EC}$	⑦ CPCTC

* Another proof is possible utilizing vertical $\angle$s and ASA.

53) Given: $\overline{DQ} \cong \overline{UA}$

$\overline{AD} \cong \overline{QU}$

Prove: $\overline{QU} \parallel \overline{DA}$



Statement	Reason
① $\overline{DQ} \cong \overline{UA}$, $\overline{AD} \cong \overline{QU}$	① Given
② $\overline{DU} \cong \overline{DU}$	② Reflexive prop. of segments
③ $\triangle UQD \cong \triangle DAU$	③ SSS
④ $\angle 1 \cong \angle 2$	④ CPCTC
⑤ $\overline{QU} \parallel \overline{DA}$	⑤ Alt. int. $\angle$s $\cong \Rightarrow \parallel$ lines

— OR —

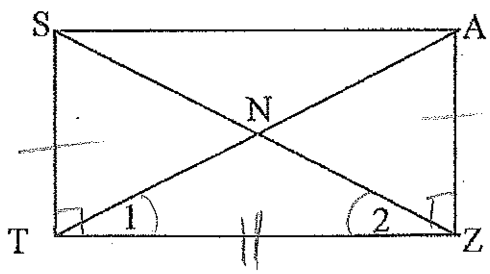
Statement	Reason
① $\overline{DQ} \cong \overline{UA}$, $\overline{AD} \cong \overline{QU}$	① Given
② QUAD is a $\parallel$-gram	② Both pairs of opp. sides $\cong$ in a Quadrilateral $\Rightarrow$ ▱
③ $\overline{QU} \parallel \overline{DA}$	③ ▱ $\Rightarrow$ opp. sides $\parallel$.

54) Given: $\overline{ST} \cong \overline{AZ}$

$\overline{ST} \perp \overline{TZ}$

$\overline{AZ} \perp \overline{TZ}$

Prove: $\triangle TNZ$ is isosceles.



Statement	Reason
① $\overline{ST} \cong \overline{AZ}$	① Given
② $\overline{ST} \perp \overline{TZ}$, $\overline{AZ} \perp \overline{TZ}$	② Given
③ $\angle STZ$ rt. $\angle$, $\angle AZT$ rt. $\angle$	③ Def. of $\perp$.
④ $\angle STZ \cong \angle AZT$	④ Rt. $\angle$'s $\cong$.
⑤ $\overline{TZ} \cong \overline{TZ}$	⑤ Reflexive prop. of segments
⑥ $\triangle STZ \cong \triangle AZT$	⑥ SAS
⑦ $\angle 1 \cong \angle 2$	⑦ CPCTC
⑧ $\triangle TNZ$ isosc.	⑧ If at least 2 $\angle$s of a $\triangle$ are $\cong$, then the $\triangle$ is isosceles.