Honors Geometry: 1.4 Perimeter and Area in the Coordinate Plane

Directions: Please answer these questions on a separate piece of paper.

1. The lines $y_1 = 2x - 6$, $y_2 = -3x + 4$, $y_3 = -\frac{1}{2}x + 4$ are the sides of a right triangle.

a) Use slopes to determine which sides are perpendicular. *y_1 & y_3*

b) Find the vertices of the triangle. *(2,-2) (0,4) (4,2)*

c) Find the perimeter and area of the triangle. *$A = 10$, $P = 4\sqrt{5} + 2\sqrt{10}$*

2. Plot the points Q(-1,2), U(3,2), A(-1,-2), D(3,-2).

a) Find the perimeter and area of the square. *$P = A = 16$*

b) Connect the midpoints of the sides of the given square to make a quadrilateral. Is this quadrilateral a square? Explain your reasoning, *(1,2) (-1,0) (1,-2) (3,0)*

c) Compare the perimeter and area of the quadrilateral you made in parts (a) and (b). *→ Area, Half, Perimeter, More than Half*
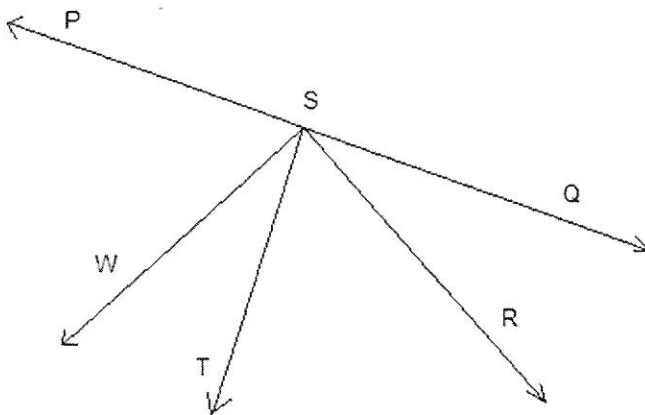
3. Solve for x. $\frac{x+1}{2} = 4x - 3$. *$X = 1$* → *Can't be proven*

4. What is the difference between a postulate and theorem? → *Can be proven* 5. $|x - 4| = 5$ *$X = 9, -1$*

6. Find the measure of angle WST.

$\overline{ST} \perp \overline{PQ}$
$\angle QSR = 2x + 5$
$\angle RST = 5x - 6$
$\angle WST = 3x - 9$

$2x+5 + 5x - 6 = 90$
$7x - 1 = 90$
$7x = 91$
$\frac{7x}{7} = \frac{91}{7}$
$X = 13$
↳ $3(13) - 9 = \boxed{30°}$

7. Your aunt decides she would like to install a rectangular swimming pool in your backyard which has dimensions of 20ft by 15ft. Instead of hiring a professional, she assigns you to the job because she knows with your prodigious math skills, you could handle it. Also, it will save her a ton of money. She requests a 3-foot edge around each side of the pool. Draw a diagram of this situation in a coordinate plane. What is the perimeter and area of the largest swimming pool that will fit? *$P = 2(9) + 2(14) = 46$* ← → *$A = 9 \times 14 = \boxed{126}$*
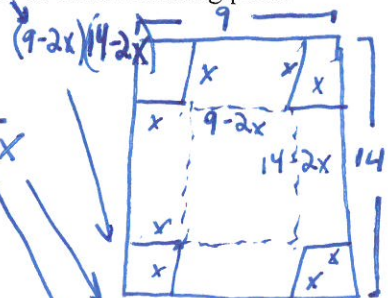
8. Referring to the previous problem, your aunt now doesn't know if a 3 foot edge is the right amount. Come up with an expression in terms of x, where x is the length of the edge, for the perimeter and area of the swimming pool.

9. **$\overline{AP}$ is six more than twice as long as $\overline{PK}$**

If $\overline{AK}$ is 72 cm. long, how long is $\overline{AP}$?

A — *$2x + 6$* — *P* — *X* — *K*

↳ 9-2x
9-2x
14-2x
14-2x
46-8x

(9-2x)(14-2x)

x 9-2x
14-2x 14

P = 46 - 8x
A = (9-2x)(14-2x)

② 2x+6+x = 72
3x + 6 = 72
3x = 66
$\frac{3x}{3} = \frac{66}{3}$
x = 22

10. *$\overline{BM} \cong \overline{PV}; \overline{BP} \cong \overline{MV}$*
$BM = 3x - 12$ = 219
$MV = 2y - 8$ = 66
$PV = 5y - 34$ = 219
$BP = x - 3$ = 66
Find the perimeter of BMVP

$P = 570$

B — *$3x + 2$* — M

$x - 3$ *$3y - 8$*

$5y + 34$ V
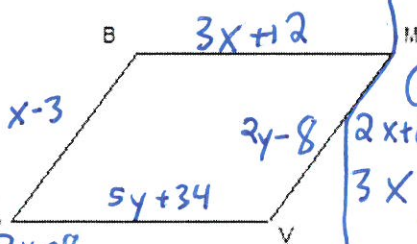
$3x + 12 = 5y + 34$
$3x - 5y = 22$
+ $-3x + 6y = 15$
$y = 37$
→ *$3x - 5(37) = 22$*
x = 69

$x - 3 = 2y - 8$
$x - 2y = -5$
$\times -3$

$3x - 5(37) = 22$
x = 69

11. $\overline{BM} \cong \overline{PV}; \overline{BP} \cong \overline{MV}$

   $BM = 3x - 12$

   $MV = 2y - 8$

   $PV = 5y - 34$

   $BP = x - 3$

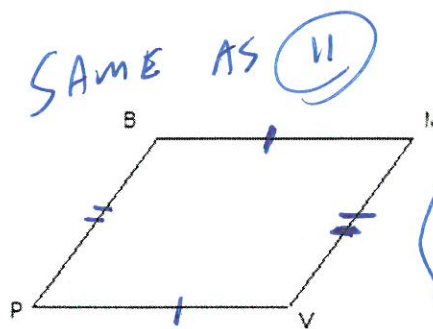   **Find the perimeter of BMVP**

SAME AS ⑪

$3x + 12 = 5y + 34$

$3x - 5y = 22$

$2y - 8 = x - 3$

$-x + 2y = 5 \,(\times 3)$

$-3x + 6y =$

$3x - 5y = 22$

12. Find the midpoint between the points (3/4, -2/7) and (5/3, -5/3) $\rightarrow \left(\dfrac{29}{24}, \dfrac{-41}{42} \right)$

13. Solve for x. $\dfrac{x+1}{2} = 4x - 3$ *Same as 3*

14. Find the area and perimeter of a triangle with vertices C (-5, 2), A(11, 2) and (15, -7). $A = 72$
trapezoid $P = 25 + \sqrt{481}$

15. Find the area and perimeter of the rectangle with vertices S (-3, 4), C(1, 4), E(-3, -2), V(3, -2).
   30 $16 + 2\sqrt{10}$

16. Sketch two lines that intersect a plane at one point. *(Bottom Right Corner)*

⑫ $\left(\dfrac{3 \cdot \frac{3}{4} + \frac{5}{3} \cdot \frac{4}{4} \qquad 3 \cdot \frac{-2}{7} + \frac{-5}{3} \cdot \frac{7}{7}}{2} \; , \; \dfrac{}{2} \right) = \left(\dfrac{\frac{9+20}{12} \cdot 12 \qquad \frac{-6-35}{21} \cdot 21}{2 \cdot 12} \; \dfrac{}{2 \cdot 21} \right)$

$= \left(\dfrac{29}{24} , \dfrac{-41}{42} \right)$

⑭

$A = 72$

$P = 16 + 9 + \sqrt{481} = 25 + \sqrt{481}$

$(-5, 2)$ C   16   A (11, 2)

9    $\sqrt{481}$ 9

20   (15, -7) L

⑯

⑮   S (-3, 4)   C (1, 4) $A = \frac{1}{2}(4+6)6$

6    $\sqrt{40}$ $= 30$

E $(3, -2)$ $P = 4 + 6 + 6 + \sqrt{40}$

$(-3, -2)$ 2 $= 16 + 2\sqrt{10}$