Polygons #3 Name KEY

1. Give two properties of a rectangle that is NOT true for all parallelograms.
   - 90° INTERIOR $\not\cong$
   - DIAGONALS $\cong$
2. Give two properties of a rhombus that is NOT true for all parallelograms
   - ALL SIDES $\cong$
   - DIAGONALS $\perp$
3. The sum of the measures of a convex polygon is 22,320 degrees. How many sides does it have?

$180(n-2) = 22,320$

$n-2 = 124$

$n = 126$

126 SIDES

4. The measure of an interior angle of a regular polygon is 174 degrees. How many sides does it have?

$\frac{180(n-2)}{n} = 174$

$180(n-2) = 174n$

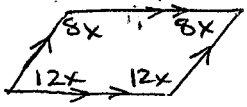
$180n - 360 = 174n$

$6n = 360$

$n = 60$

60 SIDES

5. The consecutive angles of a parallelogram are in the ratio of 12:8. Find the measures of the four angles of the parallelogram.



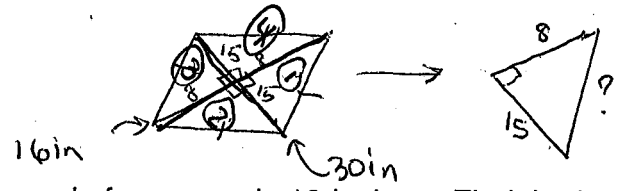
$12x + 8x + 12x + 8x = 360$

$40x = 360$

$x = 9$

72° & 108°

6. The diagonals of a rhombus are 30 inches and 16 inches. Find the length of one side.



$a^2 + b^2 = c^2$

$8^2 + 15^2 = c^2$

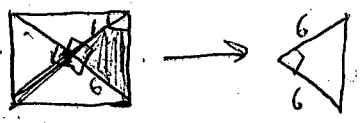
$64 + 225 = c^2$

$289 = c^2$

$\pm 17 = c$

17 in

7. The diagonal of a square is 12 inches. Find the length of one side.



$a^2 + b^2 = c^2$

$6^2 + 6^2 = c^2$

$72 = c^2$

$\pm\sqrt{72} = \pm 6\sqrt{2}$

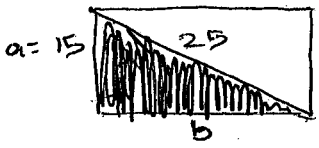
$6\sqrt{2}$ in

or

≈ 8.49 in

correct to nearest 100

8. The diagonal of a rectangle is 25 inches and one side is 15 inches. Find the other side.



$a^2 + b^2 = c^2$

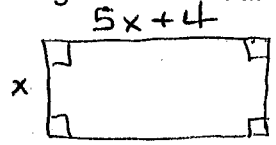
$15^2 + b^2 = 25^2$

$b^2 = 400$

$b = \pm 20$

20 in

9. One side of a rectangle is four more than five times the other. The perimeter of the rectangle is 44m. Find the lengths of the four sides.



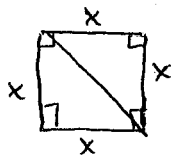
$2x + 2(5x+4) = 44$

$2x + 10x + 8 = 44$

$12x = 36 \rightarrow x = 3$

3m x 19m

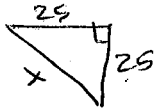
10. The perimeter of a square is 100 m. Find the length of a side. Find the length of the diagonal.



$4x = 100$

$x = 25$

25 m



$a^2 + b^2 = c^2$

$25^2 + 25^2 = x^2$

$1250 = x^2$

$\pm 25\sqrt{2} = x$

$25\sqrt{2}$ m

or ≈ 35.36 m

correct to 100th

11. Write Always, Sometimes, or Never

ALWAYS A. As the number of sides of a convex polygon increases, the number of exterior angles increases.

NEVER B. As the number of sides of a convex polygon increases, the sum of the measures of the exterior angles increases.

ALWAYS C. As the number of sides of an equiangular polygon doubles, the measure of each exterior angle is halved. $n \to 2n$ $\frac{360}{n} \to \frac{360}{2n}$

# OF SIDES	INT. ∠	EXT ∠
3	60	120
6	120	60

4	90	90
8	135	45

5	108	72
10	144	36

12. What is the name of the convex polygon whose sum of its interior angles measure nine times that of the measure of each exterior angle of a regular hexagon.

$180(n-2) = 9\left(\frac{360}{6}\right)$

$180(n-2) = 540$

$n-2 = 3 \quad n = 5$

PENTAGON

13. What is the name of the convex polygon if the ratio of the measure of an interior angle to the measure of an exterior angle is 7 to 2?

$\frac{\text{interior}}{\text{exterior}} = \frac{7}{2}$ $7x + 2x = 180$ $9x = 180$ $x = 20$

$140° + 40°$

NONAGON

$\frac{360}{n} = 40 \quad n = 9$

14. If the measure of an interior angle of a regular polygon is 162 degrees, how many sides does the polygon have?

$\frac{180(n-2)}{n} = 162$ $n = 20$

$180n - 360 = 162n$

$18n = 360$

20 SIDES

15. If the sum of the measures of a convex polygon is 1620 degrees, find the number of sides of the polygon.

$180(n-2) = 1620$

$n - 2 = 9$

$n = 11$

11 SIDES

16. If a regular polygon has 4567 sides, what is the sum of the exterior angles?

360°

17. If a polygon has 1952 diagonals, how many sides does it have?

64 sides

NSPIRE EXTRA CREDIT *

2. $\frac{n(n-3)}{2} = 1952 \cdot 2$

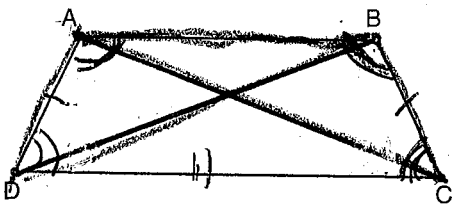
$n(n-3) = 3904$

$n^2 - 3n - 3904 = 0$

$n = \frac{3 \pm \sqrt{9 - 4(1)(-3904)}}{2} = \frac{3 \pm 125}{2} = -61, 64$

18. Prove: If the trapezoid is isosceles, then the diagonals are congruent.

* MATH STAR PROBLEM *



STATEMENT	JUSTIFICATION
① $\overline{AD} \cong \overline{BC}$, $\overline{AB} \parallel \overline{DC}$	GIVEN, DEF ISOC TRAPEZOID
② $\angle ADC \cong \angle DCB$	BASE ∠s ARE ≅
③ $\overline{DC} \cong \overline{CD}$	REFLEXIVE PROP.
④ $\triangle ADC \cong \triangle BCD$	SAS
⑤ $\overline{AC} \cong \overline{DB}$	CPCTC