

Unit 7 Review: Polygons

1. Fill out the Venn Diagram. You should abbreviate certain words given the limited space. If a region (ex. square) lies inside another region (ex. Rhombus, rectangle, parallelogram, quadrilateral) then all properties and definitions of the larger region apply to the smaller region (ex. So everything true about a rectangle, rhombus, parallelogram, quadrilateral is true about a square).

Quadrilateral

Definition: polygon with 4 sides

Parallelogram

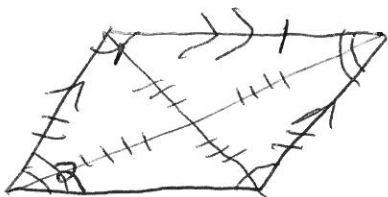
Definition: opposite sides are parallel

Property: opp sides \cong

Property: opp \angle 's \cong

Property: consecutive \angle 's supp

Property: diagonals bisect



$m\angle 1 + m\angle 2 = 180^\circ$

Rhombus

Def: equilateral

Property: diagonals bisect \angle 's of rhombus

Property: diagonals are \perp

Square

Def: ~~regular~~ regular

Rectangle

Def: equiangular

Property: diagonals are \cong

Trapezoid

Definition: exactly one pair of \parallel sides

Property: Consecutive angles are supplementary



$m\angle 1 + m\angle 2 = 180^\circ$

Isosceles Trapezoid

Definition: legs are \cong

Property: diagonals are \cong

Property: base angles are \cong

Kite

Definition: consecutive sides are congruent

Property: diagonals are \perp Property: one pair of ~~diagonals~~ \cong \angle 's

$$(n-2)180$$

2. Know the following formulas for the polygon sum conjecture: sum of the interior angles, sum of the exterior angles, one interior angle of a regular polygon, one exterior angle of a regular polygon.

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

$$\frac{360}{n}$$

360°

3. Given one of the five (number of sides, sum of the interior angles, sum of the exterior angles, one interior angle of a regular polygon and one exterior angle of a regular polygon) know how to find the remaining four in that list. (Note: Given the sum of the exterior angles you can't figure out the number of sides)

Ex: Given: a) $n = 18$, b) sum of the interior angles = 7740° , c) one interior angle of a regular polygon = 165.6° , d) one exterior angle in a regular polygon = 3° .

a) $\text{sum int} = (18-2) \cdot 180$
 $= 2880^\circ$
 $\text{one int} = 2880 / 18$
 $= 160^\circ$

$\text{sum ext} = 360^\circ$
 $\text{one ext} = 180 - 160 = 20^\circ$

b) $7740 = 180n - 360$
 $n = 45$
 $\text{one int} = 7740 / 45 = 172^\circ$
 $\text{sum ext} = 360^\circ$

$\text{one ext} = 180 - 172 = 8^\circ$

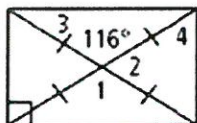
c) $\text{one ext} = 180 - 165.6 = 14.4^\circ$

$\text{sum ext} = 360^\circ$
 $n = 360 / 14.4 = 25$
 $\text{sum int} = 165.6 \times 25 = 4140^\circ$

d) $\text{sum ext} = 360^\circ$
 $n = 360 / 3 = 120$
 $\text{one int} = 180 - 3 = 177^\circ$
 $\text{sum int} = 177 \times 120 = 21240^\circ$

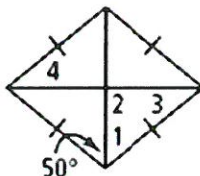
4. What are the names of polygons from $n = 3$ to $n = 12$?

5. In the rectangle below, find the measure of the numbered angle measures



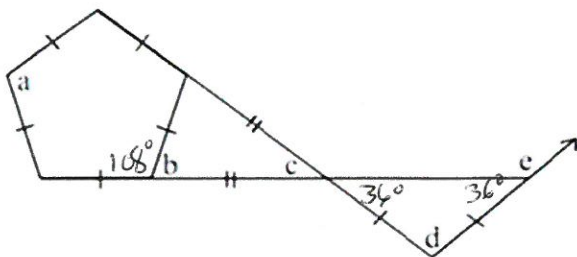
$m\angle 1 = 116^\circ$
 $m\angle 2 = 64^\circ$
 $m\angle 3 = 32^\circ$
 $m\angle 4 = 58^\circ$

In the rhombus below, find the measure of the numbered angles



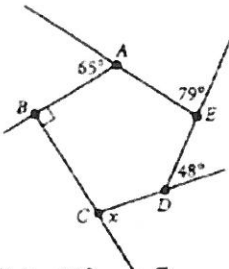
$m\angle 1 = 50^\circ$
 $m\angle 2 = 90^\circ$
 $m\angle 3 = 40^\circ$
 $m\angle 4 = 40^\circ$

6.



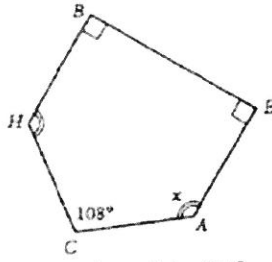
a = 108°
b = 72°
c = 36°
d = 108°
e = 144°

7. Find x.



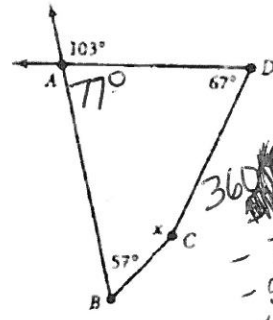
$$x = 360 - 90 - 48 - 79 - 65$$

$$x = 78^\circ$$



$$540 - 90 - 90 - 108 = 252$$

$$x = 252 \div 2 = 126^\circ$$



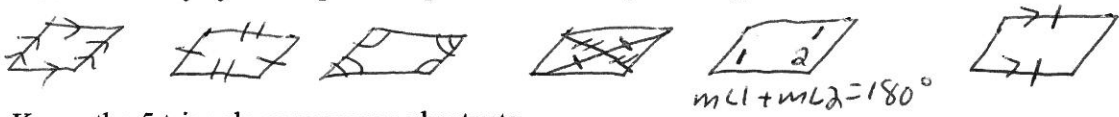
$$360 - 103 - 77 - 57 - 67$$

$$x = 159^\circ$$

8. Classify the quadrilateral with the most specific name.

- a) A(2,2) B(4,-1) C(1,-8) D(-1,-5) $m_{AB} = -3/2 = m_{CD}$ / $m_{BC} = 7/3 = m_{AD}$ / ~~parallelogram~~ Parallelogram
- b) P(5, 1) Q(9, 6) R(5, 11) S(1, 6) $m_{PQ} = 5/4 = m_{RS}$ / $m_{QR} = -5/4 = m_{SP}$ / $PQ = RS = QR = SP = \sqrt{41}$ / Rhombus
- c) W(-4, 3) X(0, 6) Y(3, 2) Z(-1, -1) $m_{WX} = 3/4 = m_{YZ}$ / $m_{XY} = -4/3 = m_{ZW}$ / $WX = YZ = XY = ZW = 5$ / $WX \perp XY$ / Square
- d) J(5, 2) K(1, 9) L(-3, 2) M(1, -5) $m_{JK} = -7/4 = m_{LM}$ / $m_{KL} = 7/4 = m_{JM}$ / $JK = LM = KL = JM = \sqrt{65}$ / Rhombus
- e) H(1, 9) J(4, 2) K(5, 2) L(8, 9) $m_{JK} = 0 = m_{HL}$ / $m_{HJ} \neq m_{KL}$ / $HJ = \sqrt{58}$ / Isosceles Trapezoid

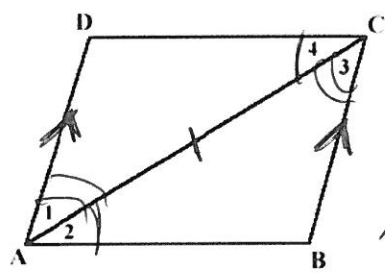
9. Know the 6 ways you can prove a quadrilateral is a parallelogram.



10. Know the 5 triangle congruence shortcuts.

SSS SAS AAS ASA HL

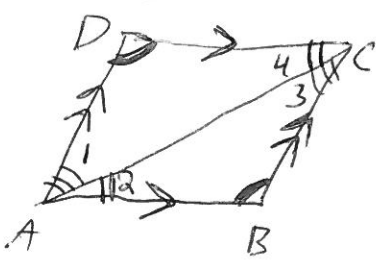
11. Given: AD || BC and Angle 2 = Angle 4, Prove ABCD is a parallelogram.



S	R
AD BC	Given
$\angle 2 \cong \angle 4$	Given
$\angle 1 \cong \angle 3$	A.I.A
$AC \cong AC$	Reflexive Property

$\triangle DCA \cong \triangle BAC$ / ASA
 $AD \cong BC$ / CPCTC
 ABCD is a \square / opp sides \cong & ||
 converse.

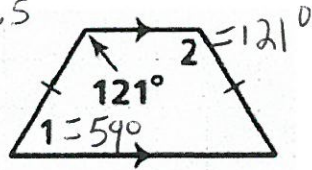
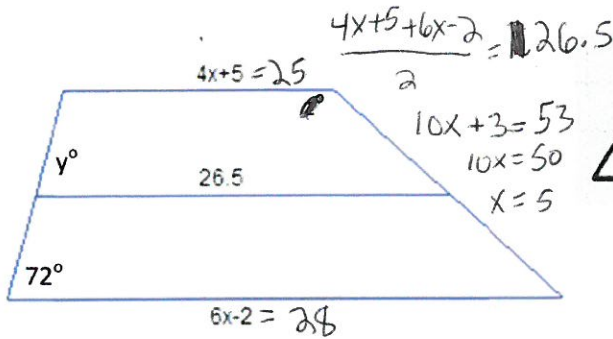
12. Using the same picture, Given: Angle B = Angle D and AB || DC, Prove ABCD is a parallelogram.



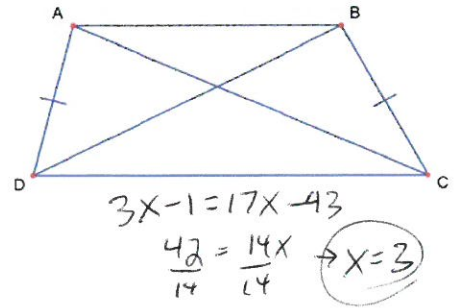
S	R
AB DC	Given
$\angle B \cong \angle D$	Given
$\angle 2 \cong \angle 4$	A.I.A
$\angle 1 \cong \angle 3$	Supp. to \cong \angle 's

AD || CB / A.I.A converse
 ABCD is a \square / Def of \square

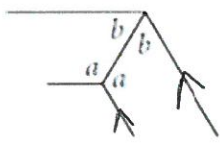
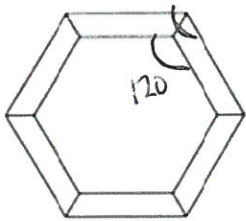
13. Find the indicated measures.



$AC = 3x - 1, BD = 17x - 43$



14. A regular hexagonal frame is cut as shown below. At what angles should a and b be cut?



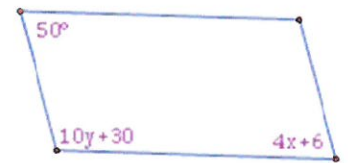
$2b = 120^\circ$
 $b = 60^\circ$
 $a = 180^\circ - 60^\circ = 120^\circ$

15. Explain why a parallelogram with one right angle must be a rectangle.

Since opp \angle 's are \cong at least two will be 90° .
 Consecutive \angle 's are supplementary. Since $180^\circ - 90^\circ = 90^\circ$.
 All 4 angles are \cong .

16. Solve for x and y.

$10y + 30 = 130$
 $10y = 100$
 $y = 10$
 $4x + 6 = 30$
 $4x = 24$
 $x = 6$

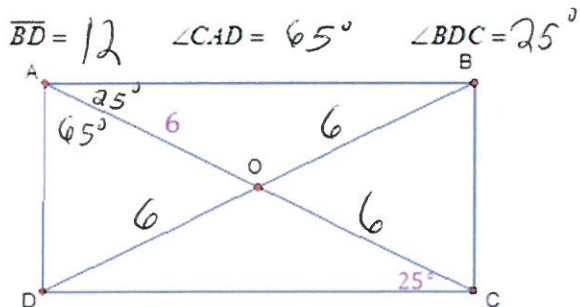


Solve each equation.

17. $2x^2 - 22x - 52 = 0$
 $(2x - 26)(x + 2) = 0$
 $x = 13 \quad x = -2$

18. $2x^2 - x - 12 = 0$
 ~~$(2x - 4)(x + 3) = 0$~~
 $x = \frac{1 \pm \sqrt{1 - 4(2)(-12)}}{2(2)} = \frac{1 \pm \sqrt{97}}{4}$

19) ABCD is a rectangle
 Find the following measurements



20) WXYZ is an isosceles trapezoid
 Find the following measurements

