

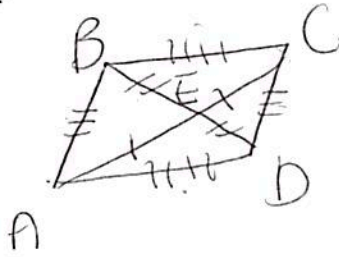
UNIT 4 REVIEW: QUADRILATERALS

| | |
|--|--|
| <p><i>subtract</i></p> <p>What is the <u>difference</u> between the sum of the measures of the interior angles of a regular <u>hexagon</u> and the sum of the measures of the exterior angles of a regular hexagon?</p> <p>sum interior: $180(n-2) = 720$ sum exterior: <u>always</u> 360° $720 - 360 = \boxed{360}$</p> <p>1) 36 2) 72 3) 360 4) 180</p> | <p><i>one interior &</i></p> <p>2. The measure of <u>an interior angle</u> of a regular polygon is 120°. How many sides does the polygon have?</p> <p>1) 5 2) 6 3) 3 4) 4</p> <p>$\frac{180(n-2)}{n} = 120$ GUESS & CHECK - plug in for 'n'</p> |
| <p>3. A parallelogram must be a <u>rectangle</u> if its <u>diagonals</u></p> <p>1) bisect each other. 2) bisect the angles to which they are drawn. 3) are perpendicular to each other. 4) are <u>congruent</u>.</p> | <p>4. Which statements describe the properties of a trapezoid?</p> <p><i>NOT STATED TO BE ISOSCELES!</i></p> <p>1) The bases are parallel. 2) The diagonals are congruent. 3) The opposite angles are congruent. 4) The base angles are congruent.</p> |
| <p>5. Which of the following reasons is valid for proving a quadrilateral is a <u>parallelogram</u>?</p> <p>1) Diagonals bisect angles 2) All sides are congruent 3) One pair of opposite sides are parallel \rightarrow need both 4) One pair of opposite sides are both parallel and congruent</p> | <p>6. Which of the following reasons is NOT valid for proving a parallelogram is a <u>rhombus</u>?</p> <p>1) Diagonals bisect angles ✓ 2) All sides are congruent ✓ 3) Diagonals are congruent \rightarrow rectangle & square 4) Diagonals are perpendicular ✓</p> |
| <p>7. Which statement is <u>false</u>?</p> <p>1) All parallelograms are quadrilaterals. ✓ 2) All rectangles are parallelograms. ✓ 3) All squares are rhombuses. ✓ 4) All rectangles are squares.</p> | <p>8. The diagonals of a quadrilateral are <u>congruent</u> but do not <u>bisect</u> each other. This quadrilateral is</p> <p>1) an isosceles trapezoid 2) a parallelogram 3) a rectangle 4) a rhombus</p> |
| <p>9. Which of the following reasons is valid for proving a parallelogram is a <u>rectangle</u>?</p> <p>1) Diagonals bisect angles 2) Both pairs of opposite sides are congruent 3) Diagonals are congruent 4) Diagonals are perpendicular</p> | <p>10. Which of the following reasons is valid for proving a quadrilateral is a <u>trapezoid</u>?</p> <p>1) Diagonals bisect angles 2) Both pairs of opposite sides are congruent 3) Both pairs of opposite sides are parallel 4) At least one pair of opposite sides are parallel</p> |

11. In parallelogram $ABCD$, diagonals \overline{AC} and \overline{DB} intersect at E . Which is always true?

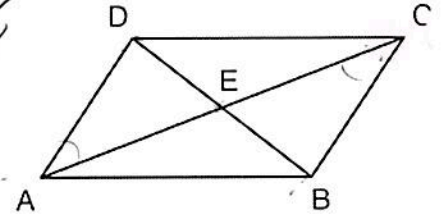
- ~~(1)~~ $\triangle AED$ is isosceles
- ~~(2)~~ $\triangle ABD$ is a right triangle
- ~~(3)~~ $\overline{DB} \cong \overline{AC}$
- (4)** $\triangle ABC \cong \triangle CDA$

by SSS!



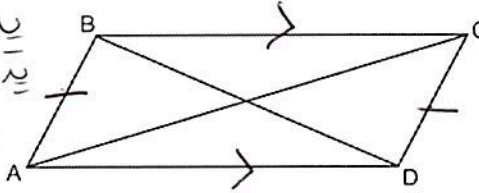
12. In the diagram below, parallelogram $ABCD$ has diagonals \overline{AC} and \overline{BD} that intersect at point E . Which expression is not always true?

- 1) $\angle DAE \cong \angle BCE$ ✓
- 2) $\angle DEC \cong \angle BEA$ ✓
- (3)** $\overline{AC} \cong \overline{DB}$
- 4) $\overline{DE} \cong \overline{EB}$ ✓



13. Quadrilateral $ABCD$ with diagonals \overline{AC} and \overline{BD} is shown in the diagram below. Which information is not enough to prove $ABCD$ is a parallelogram?

- 1) $\overline{AB} \cong \overline{CD}$ and $\overline{AB} \parallel \overline{DC}$ ✓ one side \parallel + \cong
- 2) $\overline{AB} \cong \overline{CD}$ and $\overline{BC} \cong \overline{DA}$ ✓ Both opp. side \cong
- (3)** $\overline{AB} \cong \overline{CD}$ and $\overline{BC} \parallel \overline{AD}$ NOT SAME SIDE!
- 4) $\overline{AB} \parallel \overline{DC}$ and $\overline{BC} \parallel \overline{AD}$ ✓ Both opp. side \parallel

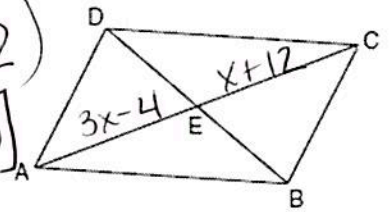


14. In the accompanying diagram of parallelogram $ABCD$, diagonals \overline{AC} and \overline{DB} intersect at E , $AE = 3x - 4$, and $EC = x + 12$. What is the value of AC ?

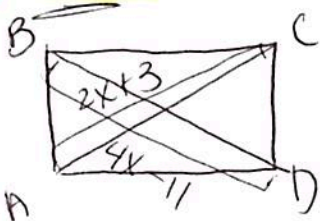
Diagonals Bisect!

$$\begin{aligned} 3x - 4 &= x + 12 \\ -x + 4 &= x + 4 \\ 2x &= 16 \\ x &= 8 \end{aligned}$$

$$\begin{aligned} \overline{AC} &= (3(8) - 4) + ((8) + 12) \\ 20 + 20 &= \boxed{40} \end{aligned}$$



15. In Rectangle $ABCD$, the lengths of diagonal AC and BD are represented by $2x + 3$ and $4x - 11$. Determine the value of x .



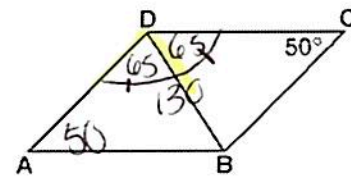
$$\begin{aligned} 2x + 3 &= 4x - 11 \\ -2x + 11 &= -2x + 11 \\ 14 &= 2x \\ \boxed{x = 7} \end{aligned}$$

Diagonals are \cong

16. In the accompanying diagram of rhombus $ABCD$, diagonal \overline{BD} is drawn and $\angle C = 50^\circ$. Determine $m\angle ADB$.

Diagonals bisect opp. \angle 's! + consecutive \angle 's are supp.

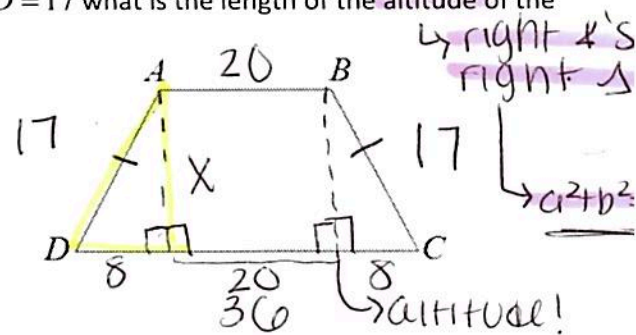
$$\begin{aligned} 180 - 50 &= 130 \\ 130 \div 2 &= \boxed{65^\circ} \end{aligned}$$



17. In isosceles trapezoid $ABCD$, $\overline{AD} \cong \overline{BC}$. If $DC = 36$, $AB = 20$, and $AD = 17$ what is the length of the altitude of the isosceles trapezoid?

legs are \cong

$$\begin{aligned} 36 - 20 &= 16 \div 2 = 8 \\ x^2 + 8^2 &= 17^2 \\ x^2 + 64 &= 289 \\ \sqrt{x^2} &= \sqrt{225} \\ \boxed{x = 15} \end{aligned}$$

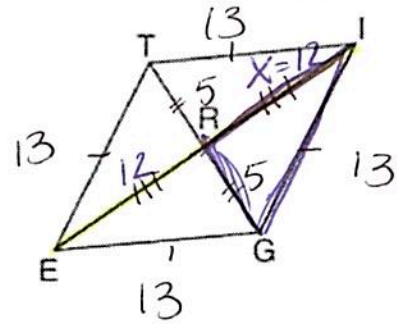


18. In rhombus TIGE, diagonals TG and IE intersect at R. The perimeter of TIGE is 52, and TG = 10. What is the length of diagonal IE?

4 \cong sides!
Diagonals bisect

$$\frac{52}{4} = 13$$

$$12 + 12 = \boxed{24 = IE}$$



$$x^2 + 5^2 = 13^2$$

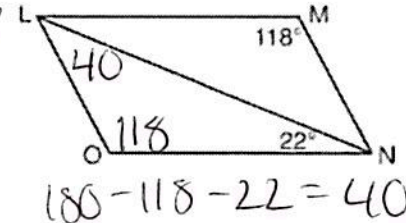
$$x^2 + 25 = 169$$

$$\sqrt{x^2} = \sqrt{144}$$

$$\boxed{x = 12}$$

19. The diagram below shows parallelogram LMNO with diagonal LN, $m\angle M = 118^\circ$, and $m\angle LNO = 22^\circ$. Find $m\angle NLO$ and explain how you found your answer.

$\angle NLO = 40$ b/c opp \angle 's of a \square are \cong and \angle 's in a \triangle sum to 180°



$$180 - 118 - 22 = 40$$

20. A cow crossing sign, in the shape of a square, is to be mounted to a post by placing a bolt through the center, P, of the sign. If AC = 10 inches, what is the exact distance from A to B, in simplest radical form?

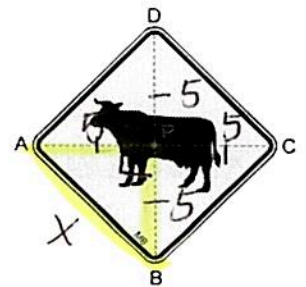
diagonals are \cong & bisect & are \perp

$$5^2 + 5^2 = x^2$$

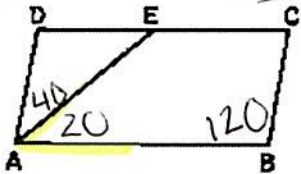
$$25 + 25 = x^2$$

$$\sqrt{50} = \sqrt{x^2}$$

$$\boxed{5\sqrt{2} = x}$$



21. In the diagram below, Parallelogram ABCD has $m\angle B = 120$ and $\angle DAE = 40$. What is the measure of $\angle BAE$? Explain.



consecutive \angle 's are supp.!

$$180 - 120 = 60$$

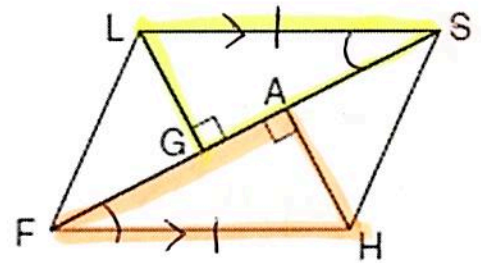
$$60 - 40 = 20$$

$$\boxed{\angle BAE = 20^\circ}$$

22. Given: Parallelogram $FLSH$, diagonal \overline{FGAS} , $\overline{LG} \perp \overline{FS}$, $\overline{HA} \perp \overline{FS}$.

Prove: $\triangle LGS \cong \triangle HAF$

Plan: AAS!



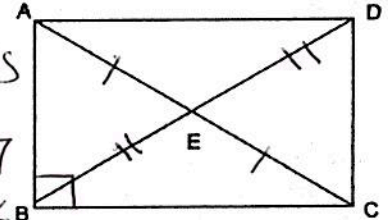
| STATEMENT | REASON |
|--|---|
| 1. Parallelogram $FLSH$, diagonal \overline{FGAS} , $\overline{LG} \perp \overline{FS}$, $\overline{HA} \perp \overline{FS}$. | 1. Given |
| 2. $\triangle LGS \cong \triangle HAF$ ✓ (A) | 2. \perp lines form \cong right \angle 's |
| 3. $\overline{LS} \cong \overline{FH}$ ✓ (S) | 3. Opp. sides of a \square are \cong |
| 4. $\triangle LSF \cong \triangle HFS$ ✓ (A) | 4. Opp. sides of a \square are \parallel so alt. int. \angle 's are \cong |
| 5. $\triangle LGS \cong \triangle HAF$ | 5. AAS \cong AAS |

23. Given: E is the midpoint of \overline{AC}

$$\overline{BE} \cong \overline{ED}$$

$$\overline{AB} \perp \overline{BC}$$

Plan: ① \square b/c diagonals bisect
 ② Rectangle b/c \square with one right \angle



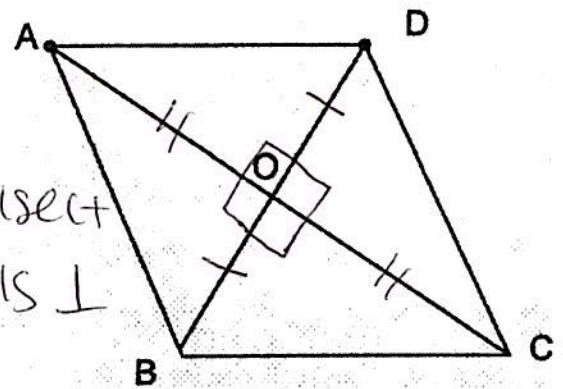
Prove: ABCD is a rectangle.

| STATEMENT | REASON |
|---|---|
| 1. E is the midpoint of \overline{AC} ; $\overline{BE} \cong \overline{ED}$; $\overline{AB} \perp \overline{BC}$ | 1. Given |
| 2. $\overline{AE} \cong \overline{EC}$ | 2. A midpoint creates 2 \cong segments |
| 3. Quadrilateral ABCD is a parallelogram | 3. Diagonals bisect each other |
| 4. $\angle ABC$ is a right angle | 4. \perp lines form right \angle 's |
| 5. Quadrilateral ABCD is a rectangle | 5. A \square with one right \angle is a rectangle |

24. Given: \overline{AO} is the median to \overline{BD}
 O is the midpoint of \overline{AC}
 $\overline{AC} \perp \overline{BD}$

Prove: $ABCD$ is a rhombus

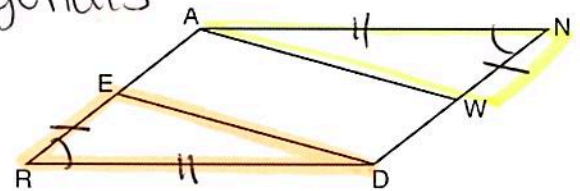
Plan: ① \square bic diagonals bisect
 ② Rhombus bic diagonals \perp



| STATEMENT | REASON |
|--|--|
| 1. \overline{AO} is the median to \overline{BD} ; O is the midpoint of \overline{AC} ; $\overline{AC} \perp \overline{BD}$ | 1. Given |
| 2. $\overline{BO} \cong \overline{OD}$ | 2. A median creates 2 \cong seg. |
| 3. $\overline{AO} \cong \overline{OC}$ | 3. A midpoint creates 2 \cong seg. |
| 4. Quadrilateral $ABCD$ is a parallelogram | 4. Diagonals bisect each other |
| 5. Quadrilateral $ABCD$ is a rhombus | 5. A rhombus is a \square with \perp diagonals |

25. Given: Parallelogram $ANDR$; $\overline{ER} \cong \overline{NW}$
 Prove: $\triangle ANW \cong \triangle DRE$

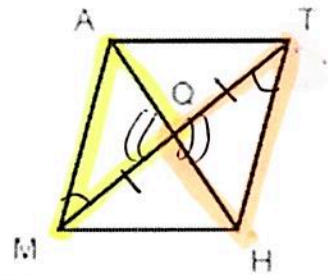
Plan: SAS!



| STATEMENT | REASON |
|--|---|
| ① \square $ANDR$, $\overline{ER} \cong \overline{NW}$ | ① Given |
| ② $\overline{AR} \cong \overline{DN}$ | ② opp. sides of a \square are \cong |
| ③ $\overline{AD} \cong \overline{AD}$ | ③ opp. sides of a \square are \cong |
| ④ $\triangle ANW \cong \triangle DRE$ | ④ SAS \cong SAS |

26. Given: AH bisects MT at Q and $\angle TMA \cong \angle MTH$
 Prove: MATH is a parallelogram

- Plan: ① $\triangle AMQ \cong \triangle HTQ$ by ASA
 ② $\overline{AQ} \cong \overline{QH}$ by CPCTC
 ③ \square b/c diagonals bisect



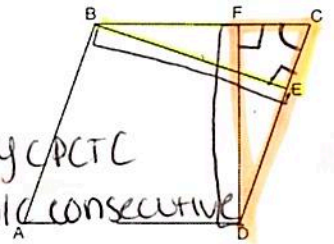
STATEMENT

REASON

- | STATEMENT | REASON |
|--|---|
| ① AH bisects MT, $\angle TMA \cong \angle MTH$ | ① Given |
| ② $\overline{MQ} \cong \overline{QT}$ | ② A bisector creates 2 \cong segments |
| ③ $\angle AQM \cong \angle HQT$ | ③ Vertical \angle 's are \cong |
| ④ $\triangle AMQ \cong \triangle HTQ$ | ④ ASA \cong ASA |
| ⑤ $\overline{AQ} \cong \overline{QH}$ | ⑤ CPCTC |
| ⑥ MATH is a \square | ⑥ Diagonals bisect each other |

27. Given: Parallelogram ABCD, $\overline{BE} \perp \overline{CD}$, $\overline{DF} \perp \overline{BC}$, $\overline{BE} \cong \overline{FD}$.
 Prove ABCD is a rhombus.
 **HINT: Prove that $\triangle BCE \cong \triangle DCF$ first in order to get consecutive sides congruent.
 Look for a reflexive angle!**

- Plan: ① AAS
 ② $BC \cong CD$ by CPCTC
 ③ A rhombus b/c consecutive sides \cong



STATEMENT

REASON

- | STATEMENT | REASON |
|---|---|
| ① \square ABCD, $\overline{BE} \perp \overline{CD}$, $\overline{DF} \perp \overline{BC}$, $\overline{BE} \cong \overline{FD}$ | ① Given |
| ② $\angle C \cong \angle C$ | ② Reflexive property |
| ③ $\angle CFD \cong \angle CEB$ | ③ \perp lines create \cong right \angle 's |
| ④ $\triangle BCE \cong \triangle DCF$ | ④ AAS \cong AAS |
| ⑤ $\overline{BC} \cong \overline{CD}$ | ⑤ CPCTC |
| ⑥ ABCD is a rhombus | ⑥ A \square with consecutive sides \cong is a rhombus |