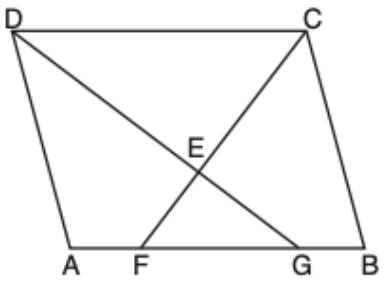
R.5 Quadrilaterals

1. The coordinates of the vertices of parallelogram $CDEH$ are $C(-5, 5)$, $D(2, 5)$, $E(-1, -1)$, and $H(-8, -1)$. What are the coordinates of P, the point of intersection of diagonals $\overline{CE}$ and $\overline{DH}$?

2. Angle measures situation

   In the diagram below of parallelogram $ABCD$, $\overline{AFGB}$, $\overline{CF}$ bisects $\angle DCB$, $\overline{DG}$ bisects $\angle ADC$, and $\overline{CF}$ and $\overline{DG}$ intersect at E.



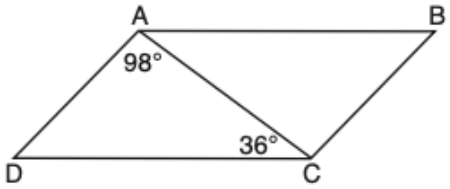
   If $m\angle B = 75°$, then the measure of $\angle EFA$ is

   (1) 142.5° (3) 52.5°

   (2) 127.5° (4) 37.5°

3. Parallelogram properties

   In parallelogram $ABCD$ shown below, $m\angle DAC = 98°$ and $m\angle ACD = 36°$.



   What is the measure of angle B? Explain why.

4. Parallelogram properties

In quadrilateral $QRST$, diagonals $\overline{QS}$ and $\overline{RT}$ intersect at M. Which statement would always prove quadrilateral $QRST$ is a parallelogram?

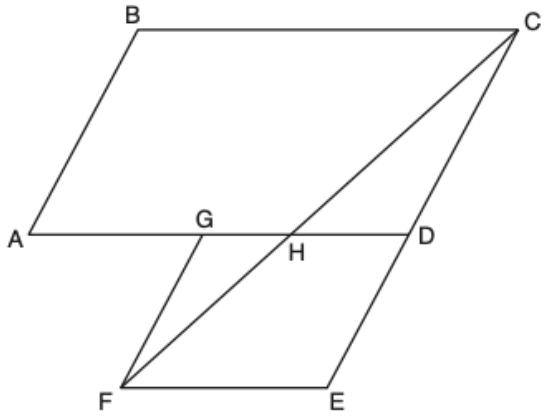
(1) $\angle TQR$ and $\angle QRS$ are supplementary.
(2) $\overline{QM} \cong \overline{SM}$ and $\overline{QT} \cong \overline{RS}$
(3) $\overline{QR} \cong \overline{TS}$ and $\overline{QT} \cong \overline{RS}$
(4) $\overline{QR} \cong \overline{TS}$ and $\overline{QT} \parallel \overline{RS}$

5. Quadrilateral $MATH$ has both pairs of opposite sides congruent and parallel. Which statement about quadrilateral $MATH$ is always true?

(a) $\overline{MT} \cong \overline{AH}$
(b) $\overline{MT} \perp \overline{AH}$
(c) $\angle MHT \cong \angle ATH$
(d) $\angle MAT \cong \angle MHT$

6. Parallelogram angle situation

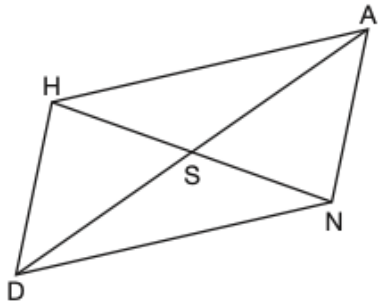
Parallelogram $ABCD$ is adjacent to rhombus $DEFG$, as shown below, and $\overline{FC}$ intersects $\overline{AGD}$ at H.



If $m\angle B = 118°$ and $m\angle AHC = 138°$, determine and state $m\angle GFH$.

7. Parallelogram properties

Parallelogram $HAND$ is drawn below with diagonals $\overline{HN}$ and $\overline{AD}$ intersecting at S.



Which statement is always true?

(1) $HN = \frac{1}{2}AD$

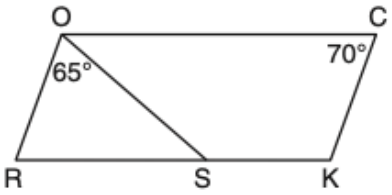
(2) $AS = \frac{1}{2}AD$

(3) $\angle AHS \cong \angle ANS$

(4) $\angle HDS \cong \angle NDS$

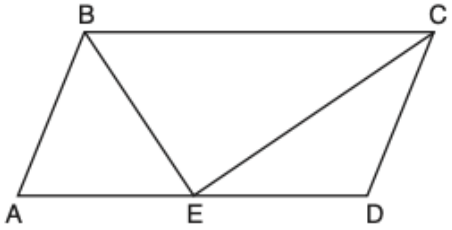
8. Parallelogram angle situation

In the diagram below of parallelogram $ROCK$, $m\angle C$ is $70°$ and $m\angle ROS$ is $65°$.



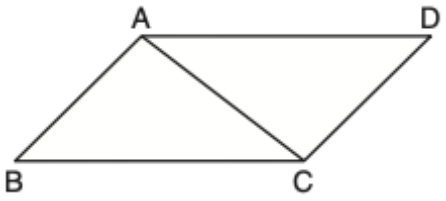
What is $m\angle KSO$?

9. In parallelogram $ABCD$ shown below, the bisectors of $\angle ABC$ and $\angle DCB$ meet at E, a point on $\overline{AD}$.



If the $m\angle A = 68°$, determine and state the $m\angle BEC$.

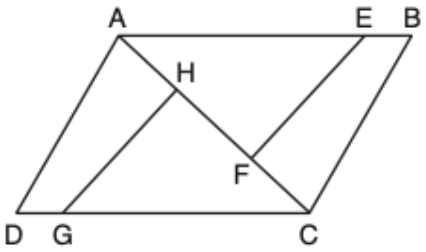
10. Given: Parallelogram $ABCD$ with diagonal $\overline{AC}$ drawn



Prove $\triangle ABC \cong \triangle CDA$

11. Parallelogram angle proof

In the diagram of quadrilateral $ABCD$ with diagonal $\overline{AC}$ shown below, segments GH and EF are drawn, $\overline{AE} \cong \overline{CG}$, $\overline{BE} \cong \overline{DG}$, $\overline{AH} \cong \overline{CF}$, and $\overline{AD} \cong \overline{CB}$.



Prove: $\overline{EF} \cong \overline{GH}$