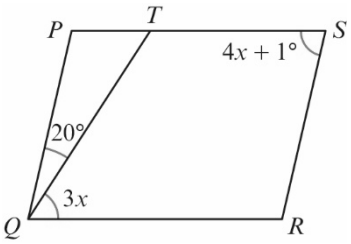
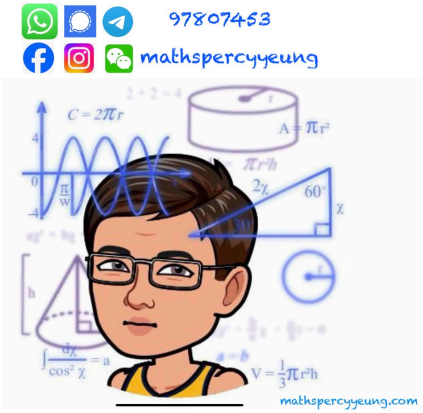
Ch 5 Quadrilaterals

(from Quick Practice 5.1)

In the figure, $PQRS$ is a parallelogram. T is a point on PS such that $\angle PQT = 20°$.





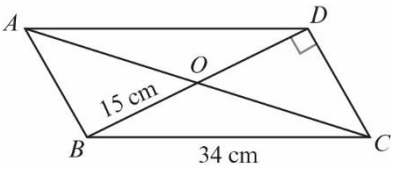
Find

(a) x,

(b) $\angle STQ$.

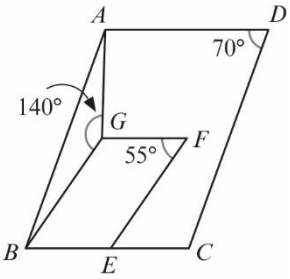
(from Quick Practice 5.2)

In the figure, $ABCD$ is a parallelogram. The diagonals AC and BD intersect at O. If $OB = 15$ cm, $BC = 34$ cm and $\angle BDC = 90°$, find the length of AB.



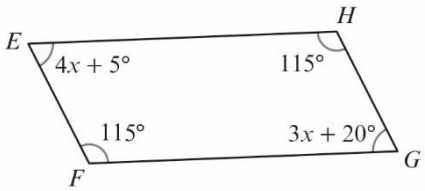
(from Quick Practice 5.3)

In the figure, $ABCD$ and $BEFG$ are parallelograms. If $\angle ADC = 70°$, $\angle AGB = 140°$ and $\angle EFG = 55°$, find $\angle BAG$.



(from Quick Practice 5.4)

In the figure, $EFGH$ is a quadrilateral.

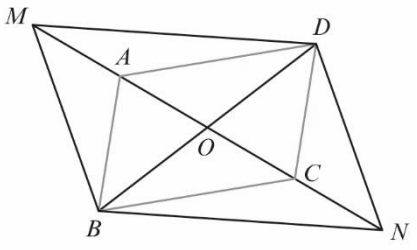


(a) Find x.

(b) Prove that $EFGH$ is a parallelogram.

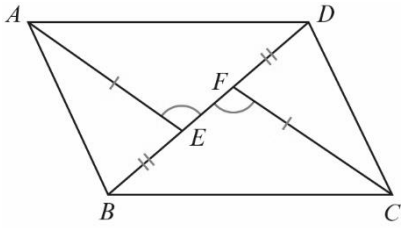
(from Quick Practice 5.5)

In the figure, $ABCD$ is a parallelogram and its diagonals intersect at O. $MAOCN$ is a straight line, where $OM = 2OA$ and $ON = 2OC$. Prove tha $BNDM$ is a parallelogram.



(from Quick Practice 5.6)

In the figure, $ABCD$ is a quadrilateral. $BEFD$ is a straight line. $AE = CF$, $BE = DF$ and $\angle AED = \angle CFB$.

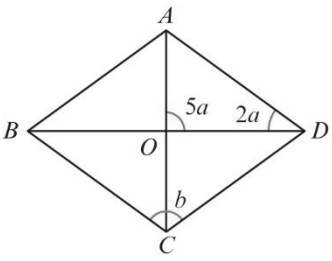


(a) Prove that $\triangle AED \cong \triangle CFB$.

(b) Prove that $ABCD$ is a parallelogram.

(from Quick Practice 5.7)

In the figure, $ABCD$ is a rhombus. The diagonals AC and BD intersect at O. $\angle ADO = 2a$, $\angle AOD = 5a$ and $\angle BCD = b$.

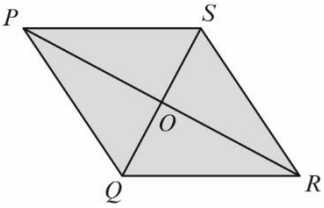


(a) Find a.

(b) Hence, find b.

(from Quick Practice 5.8)

In the figure, $PQRS$ is a rhombus and its diagonals intersect at O.



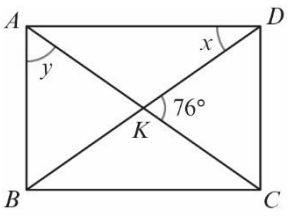
If the perimeter of $PQRS$ is 68 cm and $PR = 30$ cm, find

(a) the length of OS,

(b) the area of $PQRS$.

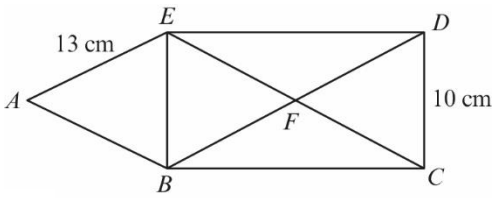
(from Quick Practice 5.9)

In the figure, $ABCD$ is a rectangle. The diagonals AC and BD intersect at K and $\angle CKD = 76°$. Find x and y.



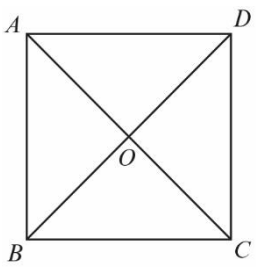
(from Quick Practice 5.10)

In the figure, *ABFE* is a rhombus and *BCDE* is a rectangle. The diagonals *BD* and *CE* intersect at *F*. If *AE* = 13 cm and *CD* = 10 cm, find the perimeter of rectangle *BCDE*.



(from Quick Practice 5.11)

In the figure, *ABCD* is a square. The diagonals *AC* and *BD* intersect at *O*.



If $BD = 14$ cm, find

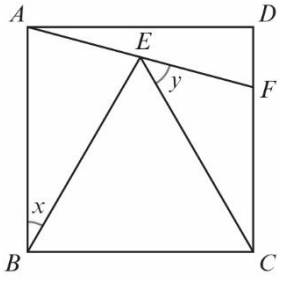
(a) the length of OA,

(b) the perimeter of square $ABCD$.

(Give your answers correct to 3 significant figures if necessary.)

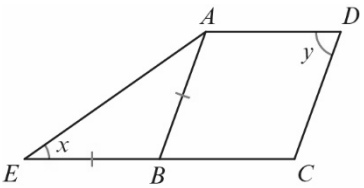
(from Quick Practice 5.12)

In the figure, $ABCD$ is a square and $\triangle BCE$ is an equilateral triangle. AEF and CFD are straight lines. Find x and y.



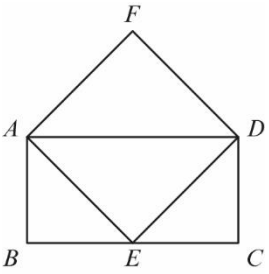
(from Quick Practice 5.13)

In the figure, $ABCD$ is a parallelogram. CB is produced to a point E such that $BA = BE$. Prove that $y = 2x$.



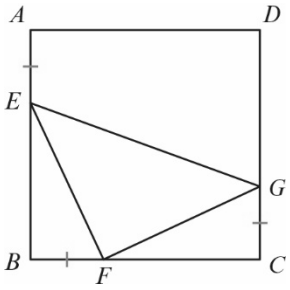
(from Quick Practice 5.14)

In the figure, $ABCD$ is a rectangle and $AEDF$ is a parallelogram. E is the mid-point of BC. Prove that $AF = AE$.



(from Quick Practice 5.15)

In the figure, $ABCD$ is a square. E, F and G are points on AB, BC and CD respectively such that $AE = BF = CG$.

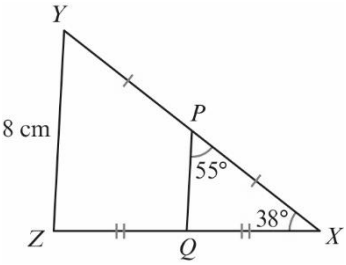


(a) Prove that $\triangle EBF \cong \triangle FCG$.

(b) Is $\triangle EFG$ a right-angled triangle? Explain your answer.

(from Quick Practice 5.16)

The figure shows $\triangle XYZ$. P and Q are the mid-points of XY and XZ respectively. It is given that $YZ = 8$ cm, $\angle YXZ = 38°$ and $\angle XPQ = 55°$.



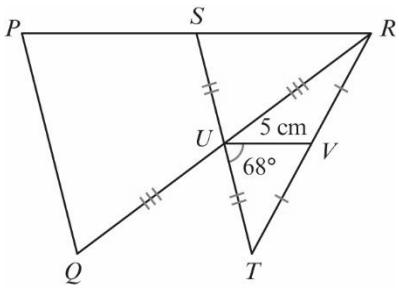
Find

(a) the length of PQ,

(b) $\angle XZY$.

(from Quick Practice 5.17)

In the figure, PSR is a straight line. U is the mid-point of both QR and ST, while V is the mid-point of RT. It is given that $UV = 5$ cm and $\angle TUV = 68°$.

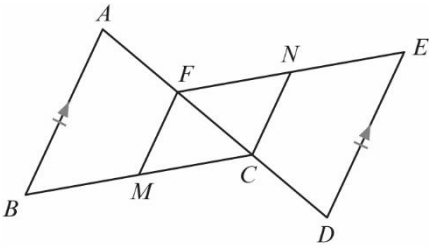


(a) Find the length of SR.

(b) If $PS = 10$ cm and $\angle PRQ = 25°$, find $\angle PQR$.

(from Quick Practice 5.18)

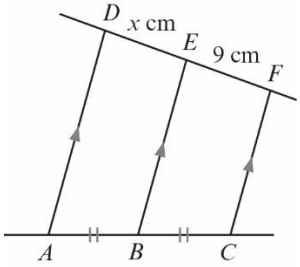
In the figure, M and N are the mid-points of BC and EF respectively. It is given that $AB = DE$ and $BA \parallel DE$. If $AF = FC = CD$ and $AFCD$ is a straight line, prove that $FMCN$ is a parallelogram.



(from Quick Practice 5.19)

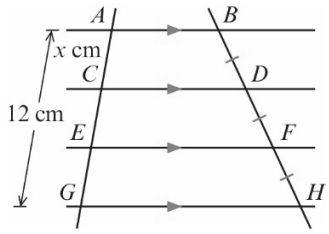
Find the unknown in each of the following figures.

(a)



ABC and DEF are straight lines.

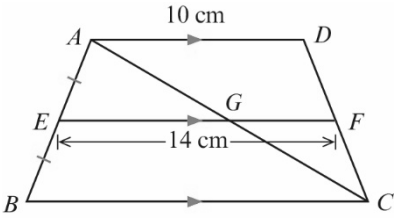
(b)



ACEG and BDFH are straight lines.

(from Quick Practice 5.20)

In the figure, *AEB*, *AGC*, *DFC* and *EGF* are straight lines, *AD* // *EF* // *BC* and *AE* = *EB*.



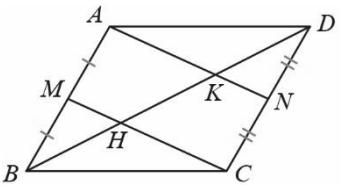
If *AD* = 10 cm and *EF* = 14 cm, find the lengths of

(a) *GF*,

(b) *BC*.

(from Quick Practice 5.21)

In the figure, $ABCD$ is a parallelogram. M and N are points on AB and DC respectively such that $AMCN$ is a parallelogram. BD intersects MC and AN at H and K respectively.



If $AM = MB$ and $DN = NC$, prove that

(a) $BH = HK = KD$,

(b) $AK = 2KN$.