

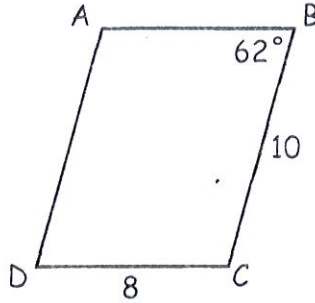
For each parallelogram below, find the values of the missing sides or angles.

1) $AB = \underline{8}$

$AD = \underline{10}$

$m\angle A = \underline{118^\circ}$

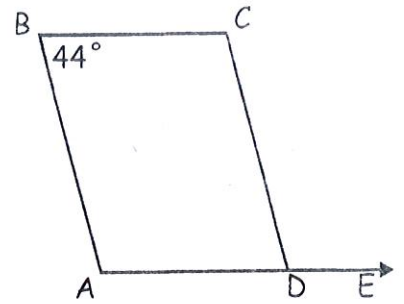
$m\angle D = \underline{62^\circ}$



2) $m\angle A = \underline{136^\circ}$

$m\angle BCD = \underline{136^\circ}$

$m\angle CDE = \underline{136^\circ}$



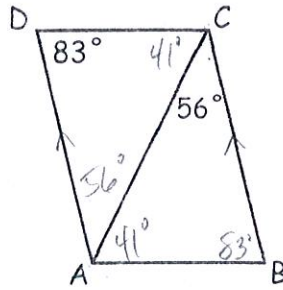
3) $m\angle DCA = \underline{41^\circ}$

$m\angle CAD = \underline{56^\circ}$

$m\angle CBA = \underline{83^\circ}$

$180 - 83 = 97$

$97 - 56 = 41$

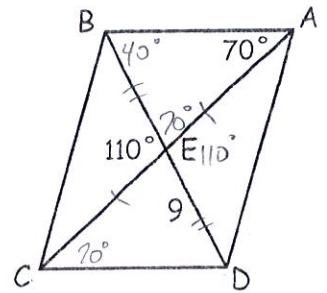


4) $m\angle ECD = \underline{70^\circ}$

$m\angle AED = \underline{110^\circ}$

$m\angle ABD = \underline{40^\circ}$

$BD = \underline{18}$



For problems 5 - 10, $ABCD$ is a parallelogram. Find each unknown measure. Treat each problem independently. (More pics below to use for your diagrams!)

5) If $m\angle DAB = 80^\circ$, then $m\angle ABC = \underline{100^\circ}$

6) If $m\angle ADC = 127^\circ$, then $m\angle CBA = \underline{127^\circ}$

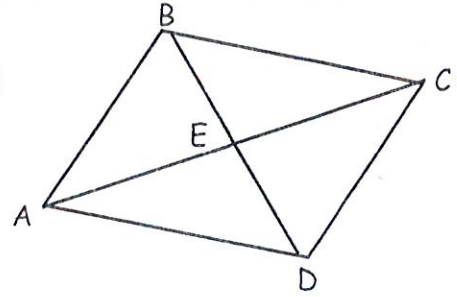
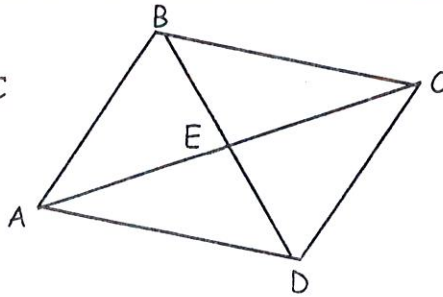
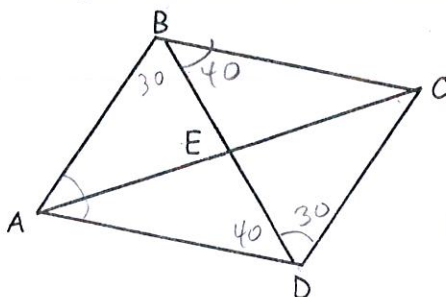
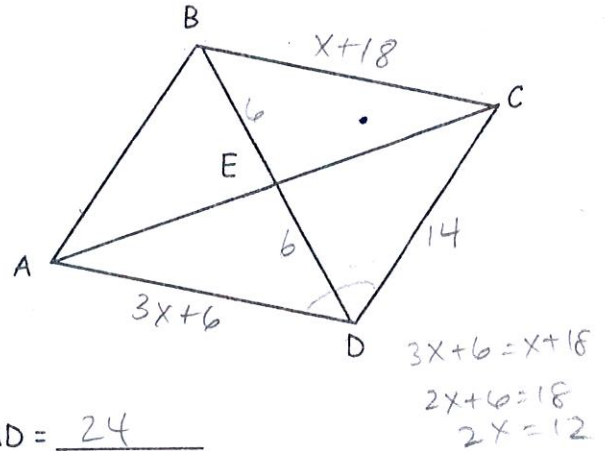
7) If $DE = 6$, then $EB = \underline{6}$ & $DB = \underline{12}$

8) If $DC = 14$, then $AB = \underline{14}$

9) If $AD = 3x + 6$ and $BC = x + 18$, then $x = \underline{6}$ & $AD = \underline{24}$

$3(6) + 6$

10) If $m\angle CDB = 30^\circ$ and $m\angle DBC = 40^\circ$, then $m\angle DBA = \underline{30^\circ}$ and $m\angle DAB = \underline{110^\circ}$.



For problems 1-9, use rectangle QUAD. Treat each problem independently.

1) If $DP = 4x + 1$ and $PA = x + 13$, then $DP = \underline{17}$

$$\begin{aligned} 4x + 1 &= x + 13 \\ 3x + 1 &= 13 \\ 3x &= 12 \quad x = 4 \\ DP &= 4(4) + 1 \end{aligned}$$

2) If $DU = 5x - 4$ and $QP = 2x + 7$, then $DU = \underline{86}$

$$\begin{aligned} DU &= 2(QP) \\ 2(2x + 7) &= 5x - 4 \\ 4x + 14 &= 5x - 4 \\ 14 &= x - 4 \quad x = 18 \end{aligned}$$

3) If $m\angle 2 = 12x + 4$ and $m\angle 3 = 16x - 12$, then $m\angle 3 = \underline{52^\circ}$

$$\begin{aligned} 12x + 4 &= 16x - 12 \\ 4 &= 4x - 12 \\ 16 &= 4x \quad x = 4 \end{aligned}$$

4) If $m\angle 5 = 12x - 3$ and $m\angle 6 = 10x + 9$, then $m\angle 4 = \underline{42^\circ}$

$$\begin{aligned} 12x - 3 &= 10x + 9 \\ 2x - 3 &= 9 \\ 2x &= 12 \quad x = 6 \\ m\angle 5 &= 12(6) - 3 = 69 \\ m\angle 6 &= 10(6) + 9 = 69 \\ 180 - 2(69) &= 42^\circ \end{aligned}$$

5) If $m\angle 4 = 6x - 16$ and $m\angle 8 = 2x + 4$, then $m\angle 4 = \underline{56^\circ}$

→ exterior angle

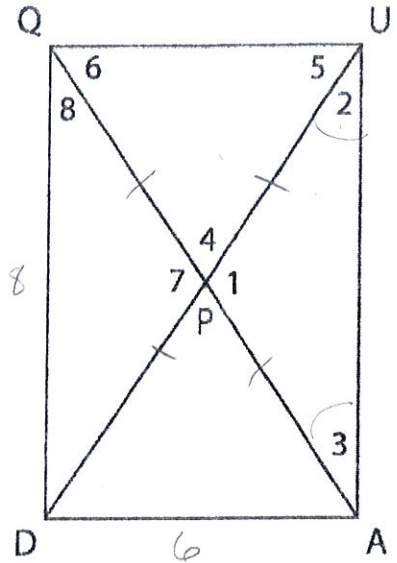
$$\begin{aligned} 6x - 16 &= 2(2x + 4) \\ 6x - 16 &= 4x + 8 \\ 2x - 16 &= 8 \\ 2x &= 24 \\ x &= 12 \\ 6(12) - 16 &= 56^\circ \end{aligned}$$

6) If $m\angle 3 = 18x - 8$ and $m\angle 6 = 70 - 4x$, then $m\angle 6 = \underline{62^\circ}$

$$\begin{aligned} m\angle 3 &= m\angle 2 \\ m\angle 6 &= m\angle 5 \\ \text{So } m\angle 5 + m\angle 2 &= 90 \\ 18x - 8 + 70 - 4x &= 90 \\ 14x + 62 &= 90 \\ 14x &= 28 \\ x &= 2 \\ 70 - 4(2) &= 70 - 8 = 62 \end{aligned}$$

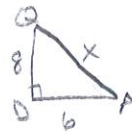
~~7) If $m\angle 2 = 32$ and $DU = 12$, then $DA = \underline{\hspace{2cm}}$, $AU = \underline{\hspace{2cm}}$ and perimeter of QUAD = $\underline{\hspace{2cm}}$~~

SKIP



8) If $QD = 8$ and $AD = 6$, then $QA = \underline{10}$

Use Pythagorean Theorem
 $a^2 + b^2 = c^2$



$$\begin{aligned} 8^2 + 6^2 &= x^2 \\ 64 + 36 &= x^2 \\ 100 &= x^2 \quad x = 10 \end{aligned}$$

9) Classify the following triangles by their sides:

a. $\triangle DPA$ is isosceles

b. $\triangle UPQ$ is isosceles

c. $\triangle QPD$ is isosceles

d. $\triangle APU$ is isosceles

e. Explain why these triangles are classified as such.

They all have 2 sides congruent.