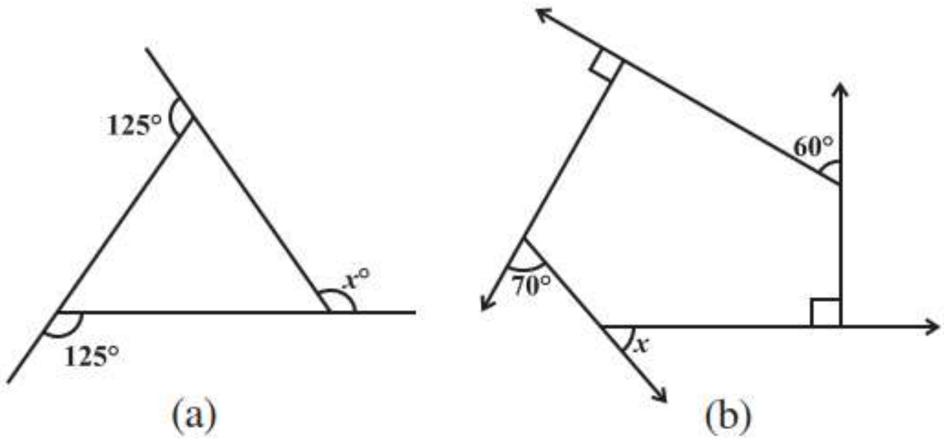
Understanding Quadrilaterals: Exercise 3.2

Q.1 Find *x* in the following figures.



Sol. (a) Since, sum of all exterior angles of any polygon = 360°

So, $125° + 125° + x = 360°$

$250° + x = 360°$

$x = 360° - 250° = 110°$

(b) Since, sum of all exterior angles of any polygon = 360°

So, $60° + 90° + 70° + x + 90° = 360°$

$310° + x = 360°$

$x = 360° - 310° = 50°$

Q.2 Find the measure of each exterior angle of a regular polygon of
(i) 9 sides (ii) 15 sides

Sol. (i) Since, sum of all exterior angles of any polygon = 360°

And for any regular polygon, the measure of each exterior angle will be same.

So, measure of each exterior angle for a regular polygon with 9 sides = $\frac{360^0}{9}$ = 40°

(ii) Since, sum of all exterior angles of any polygon = 360°

And for any regular polygon, the measure of each exterior angle will be same.

So, measure of each exterior angle of a regular polygon with 15 sides = $\frac{360^0}{15}$ = 24°

Q.3 How many sides does a regular polygon have if the measure of an exterior angle is 24°?

Sol. Since, as we now that sum of all exterior angles of any polygon = 360°

and measure of an exterior angle = 24°

So, number of sides of the regular polygon will be = $\frac{360^0}{24^0}$ = 15

Q.4 How many sides does a regular polygon have if each of its interior angles is 165°?

Sol. **Given:** Each of interior angles of polynomial = 165°

So, the exterior angle = (180° -165°) = 15°
Since, sum of all exterior angles of any polygon = 360^o

So, number of sides of the regular polygon = $\frac{360^0}{15^0}$ = 24

Q.5 (a) Is it possible to have a regular polygon with measure of each exterior angle as 22°?
(b) Can it be an interior angle of a regular polygon? Why?
Sol. (a) It is not possible to have a regular polygon with measure of each exterior angle as 22°. Because sum of all exterior angles of any polygon is 360^o. So, each exterior angle has to be multiple of 360^o. Given exterior angle as 22° which is not the multiple of 360^o.
Thus such polygon is not possible.

(b) It is not possible to have a regular polygon with measure of interior angle as 22°. As we know that sum of all exterior angles of any polygon is 360^o.
Since, interior angle = 22°
So, exterior angle will be = 180° - 22° = 158°
Since, 158° is not the multiple of 360^o.
Thus, such polygon is not possible.

Q.6 (a) What is the minimum interior angle possible for a regular polygon? Why?
(b) What is the maximum exterior angle possible for a regular polygon?
Sol. (a) Since, a regular polygon with lowest number of equal sides = 3 (equilateral triangle).
And each angle of equilateral triangle = 60^o
As we know we that sum of all the angles of a triangle = 180^o
So, $x + x + x = 180^o$
$3x = 180^o$
$x = 60^o$
Thus, minimum interior angle possible for a regular polygon = 60^o.

(b) Since, a regular polygon with lowest possible number of sides = 3.
And sum of all exterior angles of any polygon = 360^o

Therefore, exterior angle of triangle will be = $\frac{360^0}{3^0}$ = 120°

Thus, maximum exterior angle possible for a regular polygon = 120^o