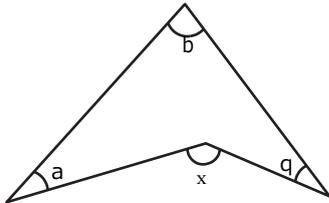


# Geometría

## PROPIEDADES ADICIONALES DE TRIANGULOS

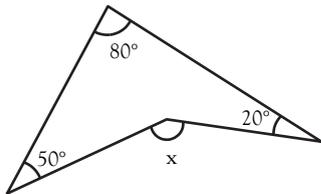
### 1) PROPIEDAD DEL BÚMERAN



$$x = a + b + q$$

*Ejemplo:*

Calcula x.



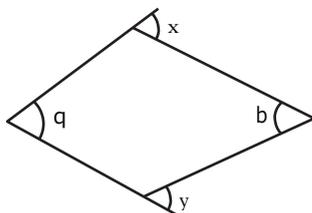
**Resolución:**

Aplicando la prop. del búmeran

$$x = 50^\circ + 80^\circ + 20^\circ$$

$$x = 150^\circ$$

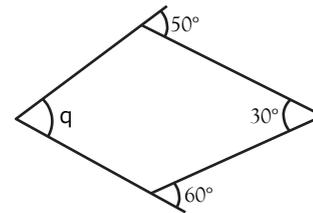
### 2) PROPIEDAD DEL PESCAO



$$q + b = x + y$$

*Ejemplo:*

Calcula la medida de q.



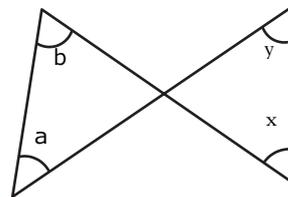
**Resolución:**

Por la propiedad del pescado:

$$q + 30^\circ = 50^\circ + 60^\circ$$

$$q = 80^\circ$$

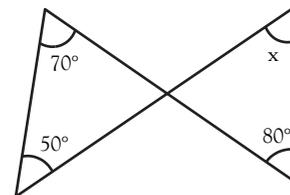
### 3) PROPIEDAD DE LA MARIPOSA



$$a + b = x + y$$

*Ejemplo:*

Calcula x.



**Resolución:**

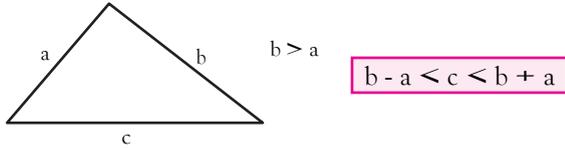
Por la prop. de la mariposa:

$$50^\circ + 70^\circ = x + 80^\circ$$

$$x = 40^\circ$$

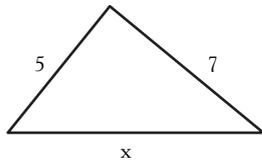
#### 4) PROPIEDAD DE LA EXISTENCIA DE UN TRIÁNGULO

Para que un triángulo exista se debe cumplir la siguiente desigualdad.



#### Ejemplo:

¿Qué valores enteros puede tomar x para que el triángulo exista?



#### Resolución:

Aplicando la desigualdad

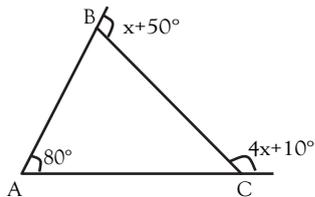
$$7 - 5 < x < 7 + 5 \Rightarrow 2 < x < 12$$

Luego, x puede tomar los valores enteros:

$$x = \{3, 4, 5, 6, 7, 8, 9, 10, 11\}$$

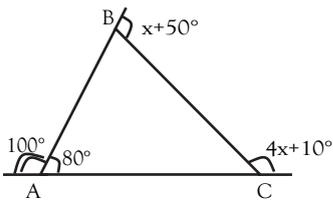
### Ejercicios Resueltos

1) En la figura, calcula x.



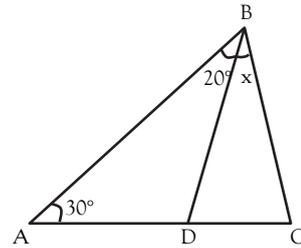
#### Resolución:

Notemos que nos dan dos ángulos externos, busquemos entonces el tercero en "A". El suplemento de  $80^\circ$  es  $100^\circ$ .



Por: suma de  $\angle$  externos =  $360^\circ$   
 $100^\circ + (x + 50^\circ) + (4x + 10^\circ) = 360^\circ$   
 $5x + 160^\circ = 360^\circ \rightarrow 5x = 200^\circ \rightarrow x = 40^\circ$

2) En la figura se pide el valor de x. si  $DB=BC$ .



#### Resolución:

\*  $\triangle ABD$ ; por  $\angle$  exterior:

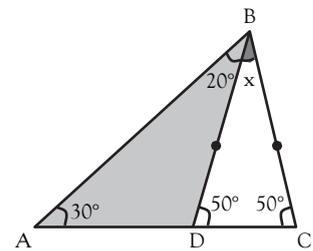
$$m\angle BDC = 30^\circ + 20^\circ = 50^\circ$$

\* Como  $DB=BC$

$\triangle DBC$ : Isósceles

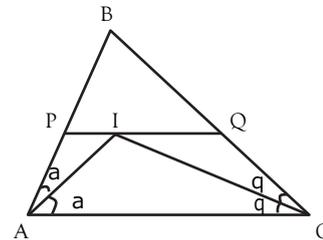
$$50^\circ + 50^\circ + x = 180^\circ$$

$$x = 80^\circ$$



3) En la figura:  $\overline{PQ} \parallel \overline{AC}$ ;  $AP=5$  y  $QC=7$ .

Calcula el valor de PQ.

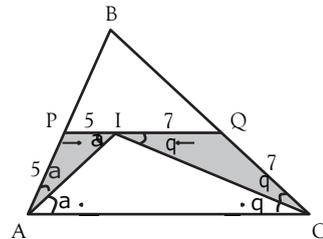


#### Resolución:

Por alternos internos:

$$m\angle PIA = a$$

$$m\angle QIC = q$$



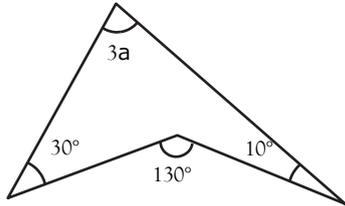
$\triangle API$ : Isósceles ( $AP=PI=5$ )

$\triangle IQC$ : Isósceles ( $IQ=QC=7$ )

$$\therefore PQ = 5 + 7 = 12$$

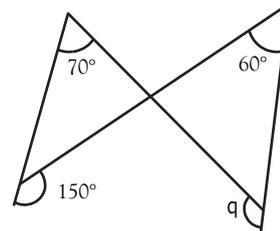
## Resolviendo en clase

1 Calcula  $a$ .



Resolución:

3 Calcula  $q$ .

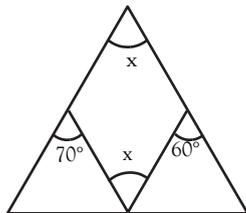


Resolución:

*Rpta:*

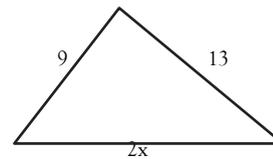
*Rpta:*

2 Calcula  $x$ .



Resolución:

4 Calcula el máximo valor entero que puede tomar  $x$ .

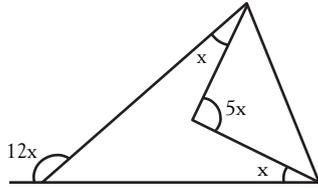


Resolución:

*Rpta:*

*Rpta:*

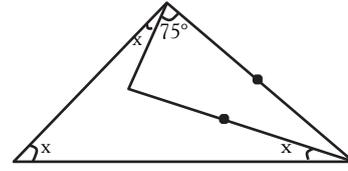
5 Calcula  $x$ .



Resolución:

*Rpta:*

6 Halla  $x$ .

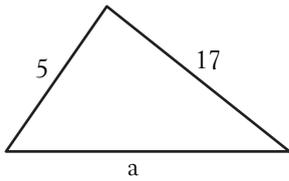


Resolución:

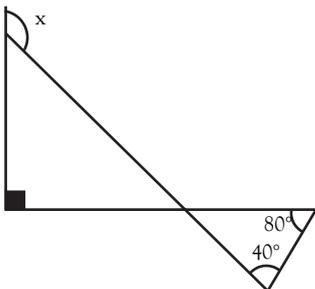
*Rpta:*

## Ahora en tu cuaderno

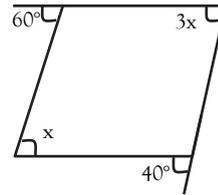
7. Halla el máximo valor entero que puede tomar "a".



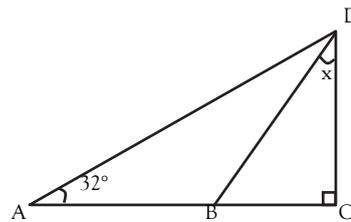
8. Calcula  $x$ .



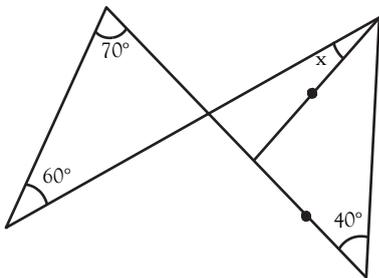
9. Calcula  $x$ .



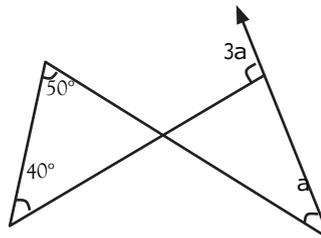
10. Halla  $x$  si  $AB = BD$ .



11. Calcula  $x$ .

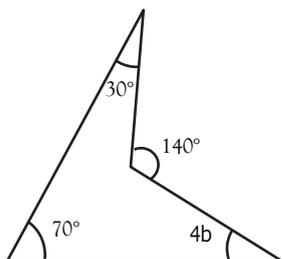


12. Halla  $a$ .



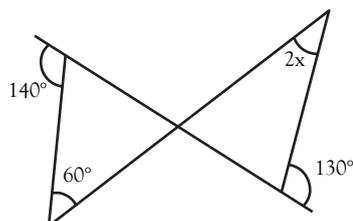
## Para reforzar

1. Calcula  $b$ .



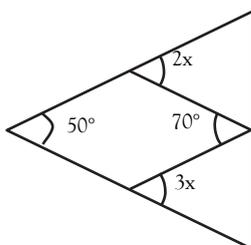
- a)  $5^\circ$
- b)  $10^\circ$
- c)  $15^\circ$
- d)  $20^\circ$
- e)  $40^\circ$

3. Calcula  $x$ .



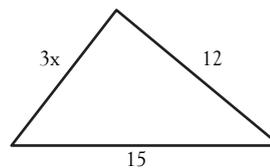
- a)  $25^\circ$
- b)  $50^\circ$
- c)  $48^\circ$
- d)  $52^\circ$
- e)  $100^\circ$

2. Calcula  $x$ .



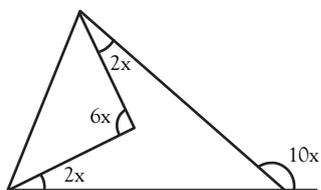
- a)  $24^\circ$
- b)  $20^\circ$
- c)  $30^\circ$
- d)  $12^\circ$
- e)  $18^\circ$

4. Calcula el mínimo valor entero que puede tomar  $x$ .



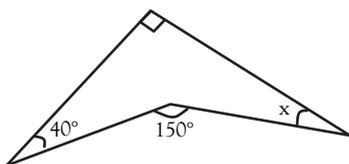
- a) 1
- b) 2
- c) 3
- d) 4
- e) 5

5. Calcula  $x$ .



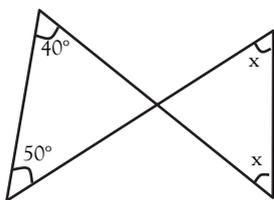
- a)  $12^\circ$       b)  $15^\circ$       c)  $9^\circ$   
 d)  $18^\circ$       e)  $20^\circ$

6. Calcula  $x$ .



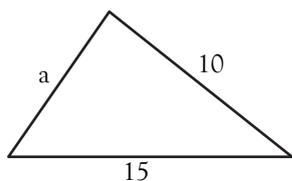
- a)  $10^\circ$       b)  $20^\circ$       c)  $15^\circ$   
 d)  $30^\circ$       e)  $25^\circ$

7. Halla  $x$ .



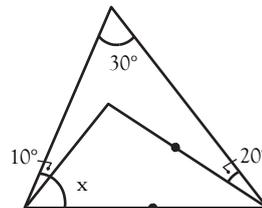
- a)  $40^\circ$       b)  $50^\circ$       c)  $55^\circ$   
 d)  $60^\circ$       e)  $45^\circ$

8. Halla el máximo valor entero que puede tomar "a".



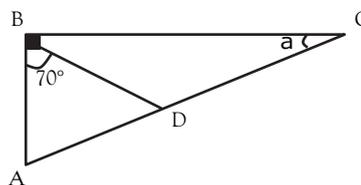
- a) 24      b) 23      c) 22  
 d) 25      e) 12

9. Calcula  $x$ .



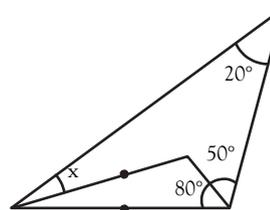
- a)  $60^\circ$       b)  $50^\circ$       c)  $70^\circ$   
 d)  $80^\circ$       e)  $40^\circ$

10. Calcula  $a$  si  $AD=DC=BD$ .



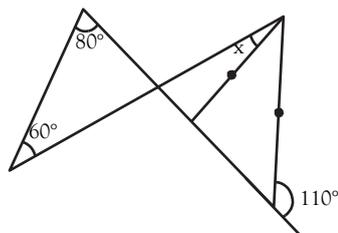
- a)  $10^\circ$       b)  $30^\circ$       c)  $35^\circ$   
 d)  $20^\circ$       e)  $25^\circ$

11. Calcula  $x$ .



- a)  $10^\circ$       b)  $15^\circ$       c)  $20^\circ$   
 d)  $5^\circ$       e)  $25^\circ$

12. Calcula  $x$ .



- a)  $150^\circ$       b)  $30^\circ$       c)  $40^\circ$   
 d)  $160^\circ$       e)  $35^\circ$