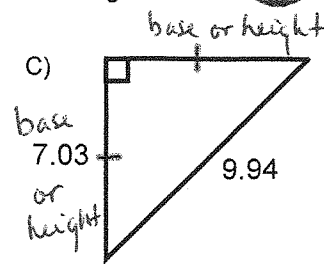
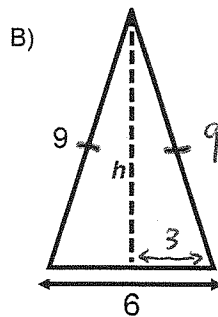
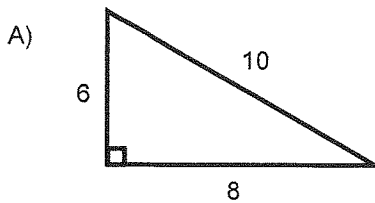


Solutions

Activity

Complete the summary table (further along in package) for each of the triangles shown. Calculations, where necessary, can be completed in the space below the triangles.



Calculations

A) $P = 24$ units

$$A = \frac{6 \times 8}{2}$$

$$= 24 \text{ units}^2$$

B) $P = 24$ units

$$A = \frac{6 \times h}{2}; h = \sqrt{9^2 - 3^2}$$

$$= \frac{6 \times 8.5}{2} = \sqrt{81 - 9}$$

$$= \sqrt{72}$$

$$= 25.5 \text{ units}^2 \approx 8.5$$

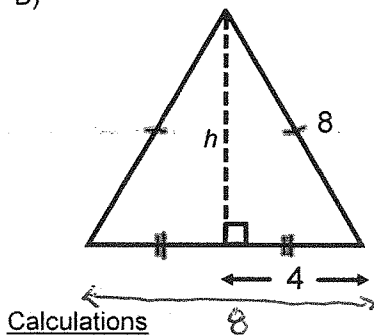
C) $P = 24$ units

$$A = 7.03^2$$

$$= 49.4 \text{ units}^2$$

Part b), h

D)



D) $P = 24$ units

$$A = \frac{b \times h}{2}$$

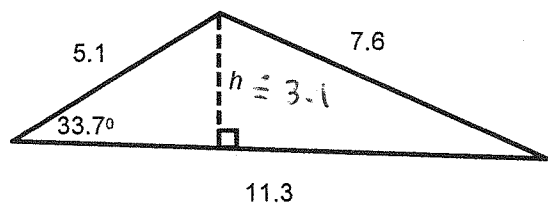
$$= \frac{8 \times h}{2}; h = \sqrt{8^2 - 4^2}$$

$$= \frac{8 \times 6.9}{2} = \sqrt{64 - 16}$$

$$= 27.6 \text{ units}^2 = \sqrt{48}$$

$$= 6.9$$

E)



E) $P = 24$ units

$$\sin 33.7^\circ = \frac{h}{5.1}$$

$$h = 5.1 \sin 37^\circ$$

$$\approx 3.1$$

$$A = \frac{11.3 \times 3.1}{2}$$

$$= 17.5 \text{ units}^2$$



Pull

Pull

Solutions

Summary Table

Triangle	Perimeter (units)	Area (units ²)
A) Right	24 units	24 units ²
B) Isosceles	24 "	25.5 units ²
C) Right Isosceles	24 "	49.4 "
D) Equilateral	24 "	27.6 "
E) Scalene	24 "	17.5 "



Observations

Based on the data you've collected in the table, what conclusion can you draw from this investigation? Write your answer in the space below.

For a fixed perimeter, a right isosceles triangle has maximum area.

Key Ideas

Consider the right isosceles triangle below, right.

- i) Use the Pythagorean Theorem to determine an expression for the length of the hypotenuse.

Let $x = \text{hyp}$.

$$x^2 = a^2 + a^2 \rightarrow x^2 = 2a^2 \rightarrow x = \sqrt{2a^2} \rightarrow x = \sqrt{2}\sqrt{a^2}$$

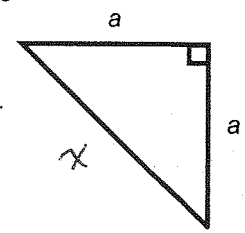
$$x = \sqrt{2}a$$

$$x \approx 1.412a$$

- ii) Write an expression that would represent the perimeter, P , of all right isosceles triangles.

$$P = a + a + \sqrt{2}a \rightarrow P = 2a + \sqrt{2}a$$

- iii) Write an expression that would represent the area, A , of all right isosceles triangles.



ii) $P \approx 2a + 1.412a \rightarrow P \approx 3.412a$

iii) $A = \frac{b \times h}{2} \rightarrow A = \frac{a \cdot a}{2} \rightarrow A = \frac{a^2}{2}$