

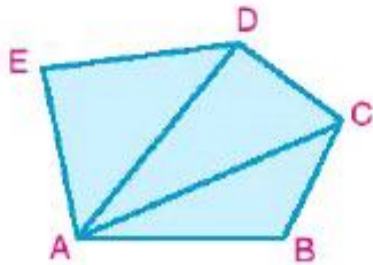
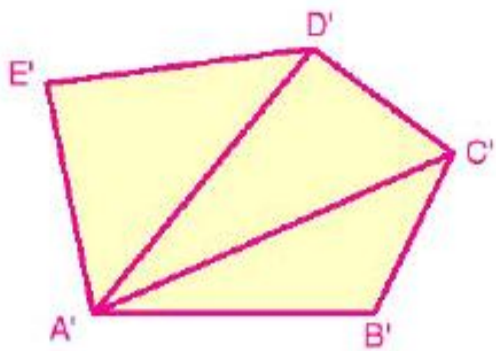
Relation between the areas of two similar polygons_3

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theorem 4

Ratio of the areas of the surfaces of two similar polygons equals the square of the ratio of the lengths of any two corresponding sides of the polygons

(Proof is not required)



4 sides
3 sides

4 ABCD and XYZL are two similar polygons and : $m(\angle A) = 40^\circ$ $XY = \frac{3}{4} AB$, $CD = 16$ cm.

Calculate: **first:** $m(\angle X)$

Second: length of \overline{ZL}

third: $\frac{A(\text{polygon ABCD})}{A(\text{polygon XYZL})}$

\therefore Polygon ABCD \sim polygon XYZL

$\therefore m(\angle A) = m(\angle X) = 40^\circ$

$\therefore m(\angle X) = 40^\circ \neq 1$

$\therefore XY = \frac{3}{4} AB \Rightarrow$

$\frac{XY}{AB} = \frac{3}{4}$

$\therefore \frac{AB}{XY} = \frac{BC}{YZ} = \frac{CD}{ZL} = \frac{AD}{LX} = \frac{4}{3}$

$\frac{16}{ZL} = \frac{4}{3}$

$ZL = \frac{3 \times 16}{4}$

$\frac{A(\text{poly. ABCD})}{A(\text{poly. XYZL})} = \frac{4^2}{3^2} = \frac{16}{9}$

Relation between the areas of two similar polygons_4

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5 The ratio of the perimeters of two similar polygons equals 3 : 4, if the sum of their areas equals 225cm², then find the area of each of them.

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ratio

$$\frac{A_1}{A_2} = \frac{9x}{16x}$$

$$A_1 + A_2 = 225 \text{ cm}^2$$

$$A_1 : A_2 : P$$

$$A_2 = \frac{16 \times 225}{25}$$

$$9 : 16 : 25$$

$$A_1 : A_2 : 225$$

$$A_1 = \frac{9 \times 225}{25}$$

$$\begin{aligned} \rightarrow A_1 &= 9x = 81 \\ \rightarrow A_2 &= 16x = 144 \end{aligned}$$

$$\frac{A_1}{A_2} = \frac{18}{32} = \frac{9}{16}$$

$$\frac{A_1}{A_2} = \frac{27}{48} = \frac{9}{16}$$

$$\begin{aligned} 9x + 16x &= 225 \\ 25x &= 225 \\ x &= \frac{225}{25} = 9 \end{aligned}$$

Exercise_1

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ABCD is a parallelogram, AE, EB = 4:3

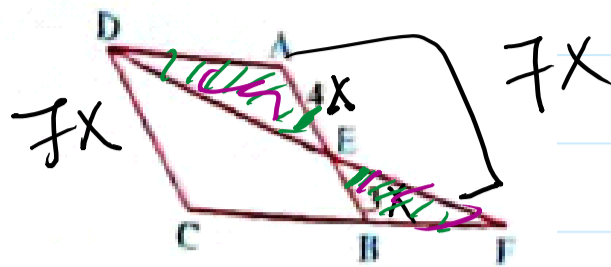
If $(\Delta ADE) = 32 \text{ cm}^2$, then $(\Delta DFC) = \dots \text{ cm}^2$

(a) 18

(c) 24

(b) 98

(d) 42



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$$\therefore m(\angle AED) = m(\angle BEF) \longrightarrow \textcircled{1} \quad \text{V.O.A}$$

$$\therefore ABCD \text{ is } \square \quad \therefore \overline{DA} \parallel \overline{CB}$$

$$\therefore m(\angle DAB) = m(\angle ABF) \longrightarrow \textcircled{2} \quad \text{Alt. angle}$$

$$\therefore \Delta AED \sim \Delta BEF \quad \text{AA}$$

$$\frac{AE}{BE} = \frac{ED}{EF} = \frac{AD}{BF} = \frac{4}{3}$$

$$\frac{4^2}{3^2} = \frac{A. \Delta ADE}{A. \Delta BEF} \implies \frac{16}{9} = \frac{32}{A}$$

$$A = \frac{32 \times 9}{16} = \checkmark$$