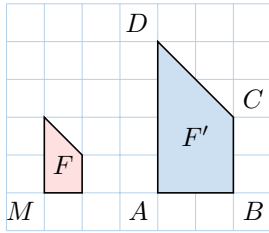


SIMILARITY

A WHAT IS A SIMILARITY?

A.1 FINDING ELEMENTS

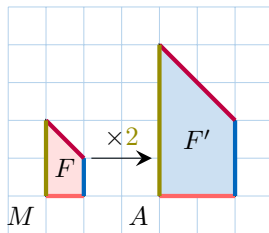
MCQ 1: The figure F' is an enlargement of the figure F .



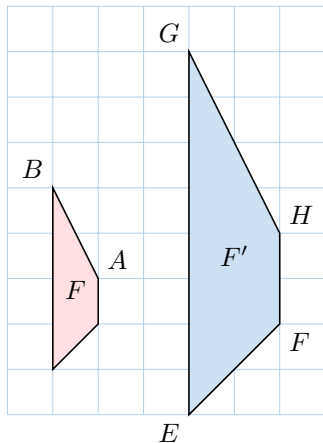
Find the vertex that is the image of vertex M .

- ☒ A
- ☐ B
- ☐ C
- ☐ D

Answer:



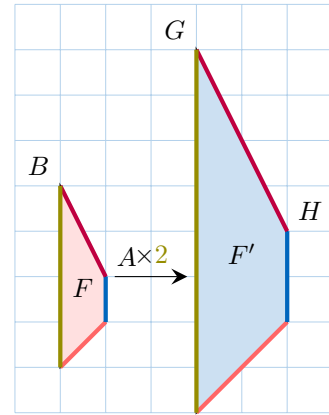
MCQ 2: The figure F' is an enlargement of the figure F .



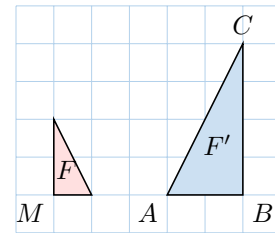
Find the segment that is the image of segment \overline{AB} .

- ☐ \overline{EF}
- ☐ \overline{FG}
- ☒ \overline{GH}
- ☐ \overline{HE}

Answer:



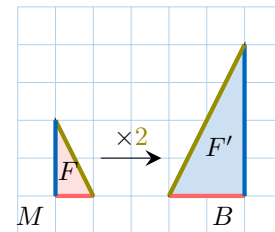
MCQ 3: The figure F' is an enlargement of the figure F .



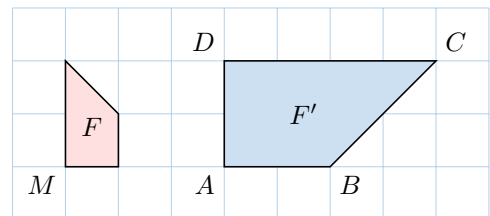
Find the vertex that is the image of vertex M .

- ☐ A
- ☒ B
- ☐ C

Answer:



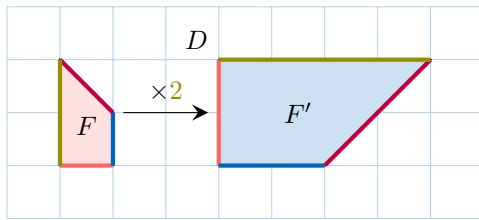
MCQ 4: The figure F' is an enlargement of the figure F .



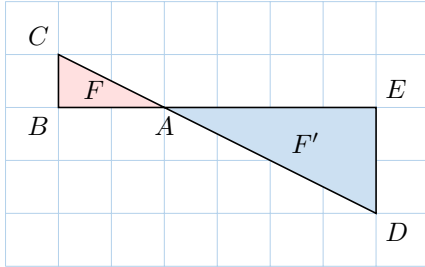
Find the vertex that is the image of vertex M .

- ☐ A
- ☐ B
- ☐ C
- ☒ D

Answer:



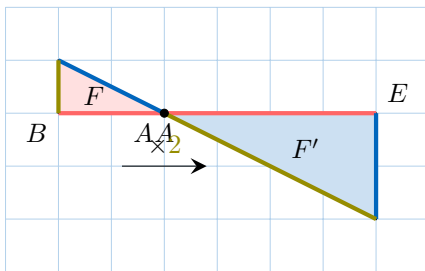
MCQ 5: The figure F' is an enlargement of the figure F .



Find the segment that is the image of segment \overline{AB} .

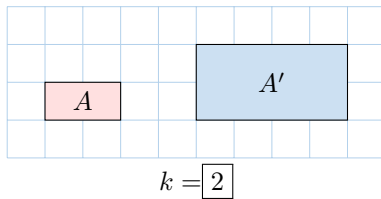
- ☒ \overline{AE}
- ☐ \overline{AD}
- ☐ \overline{DE}

Answer:



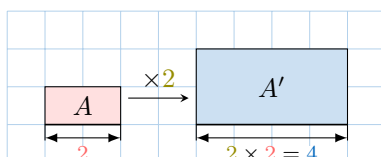
A.2 FINDING THE SCALE FACTOR

Ex 6: Find the scale factor for this enlargement.



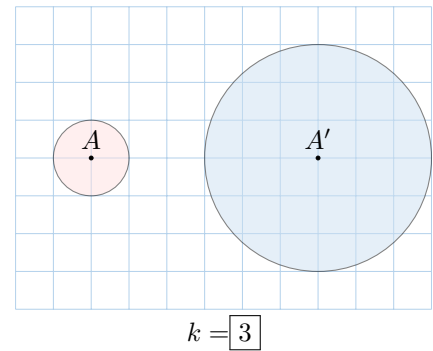
Answer: The scale factor is determined by comparing the side lengths of rectangles A and A' . Rectangle A has a width of 2 units, and A' has a width of 4 units. The ratio is:

$$k = \frac{\text{width of } A'}{\text{width of } A} = \frac{4}{2} = 2$$



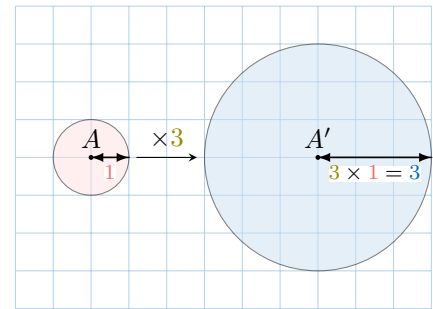
$$k = 2$$

Ex 7: Find the scale factor for this enlargement.



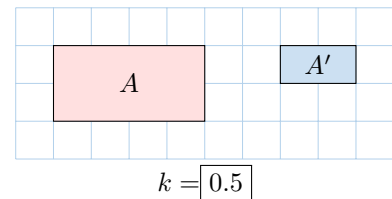
Answer: The scale factor is determined by comparing the radii of circles A and A' . Circle A has a radius of 1 unit, and A' has a radius of 3 units. The ratio is:

$$k = \frac{\text{radius of } A'}{\text{radius of } A} = \frac{3}{1} = 3$$



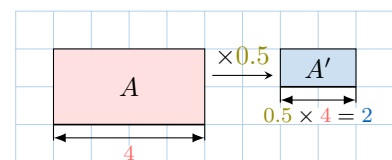
$$k = 3$$

Ex 8: Find the scale factor for this reduction.



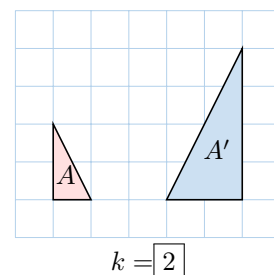
Answer: The scale factor is determined by comparing the side lengths of rectangles A and A' . Rectangle A has a width of 4 units, and A' has a width of 2 units. The ratio is:

$$k = \frac{\text{width of } A'}{\text{width of } A} = \frac{2}{4} = 0.5$$



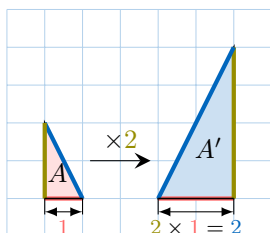
$$k = 0.5$$

Ex 9: Find the scale factor for this enlargement.



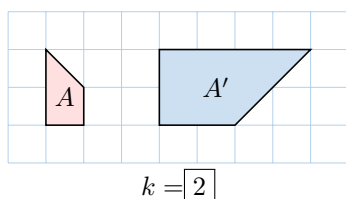
Answer: The scale factor is determined by comparing the side lengths of triangles A and A' . The base of triangle A (from $(1, 1)$ to $(2, 1)$) is 1 unit, and the base of A' (from $(4, 1)$ to $(6, 1)$) is 2 units. The ratio is:

$$k = \frac{\text{base of } A'}{\text{base of } A} = \frac{2}{1} = 2$$



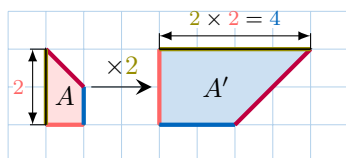
$$k = 2$$

Ex 10: Find the scale factor for this enlargement.



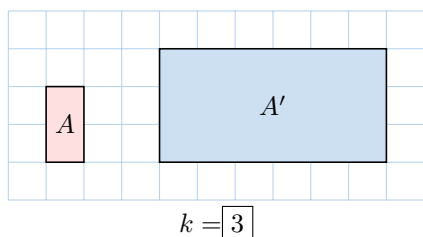
Answer: The scale factor is determined by comparing the side lengths of quadrilaterals A and A' . The side from $(1, 1)$ to $(1, 3)$ in A is 2 units, and the corresponding side from $(4, 3)$ to $(8, 3)$ in A' is 4 units. The ratio is:

$$k = \frac{\text{length in } A'}{\text{length in } A} = \frac{4}{2} = 2$$



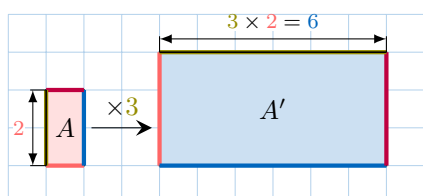
$$k = 2$$

Ex 11: Find the scale factor for this enlargement.



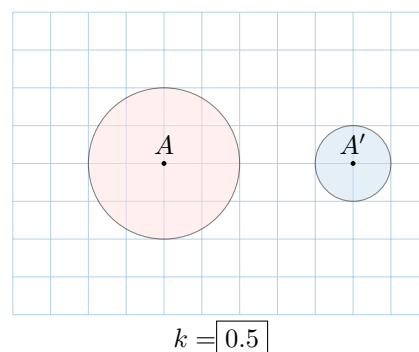
Answer: The scale factor is determined by comparing the side lengths of quadrilaterals A and A' . The side from $(1, 1)$ to $(1, 3)$ in A is 2 units, and the corresponding side from $(4, 4)$ to $(10, 4)$ in A' is 6 units. The ratio is:

$$k = \frac{\text{length in } A'}{\text{length in } A} = \frac{6}{2} = 3$$



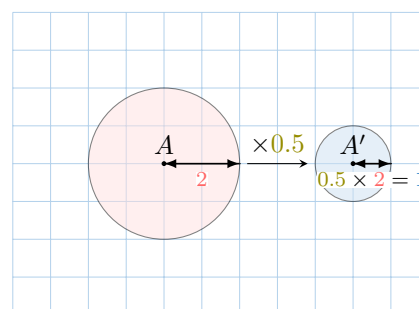
$$k = 3$$

Ex 12: Find the scale factor for this reduction.



Answer: The scale factor is determined by comparing the radii of circles A and A' . Circle A has a radius of 2 units, and A' has a radius of 1 unit. The ratio is:


$$k = \frac{\text{radius of } A'}{\text{radius of } A} = \frac{1}{2} = 0.5$$

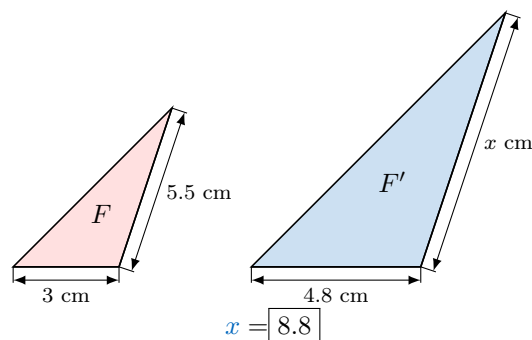


$$k = 0.5$$

B SIMILAR FIGURES


B.1 FINDING UNKNOWN LENGTH

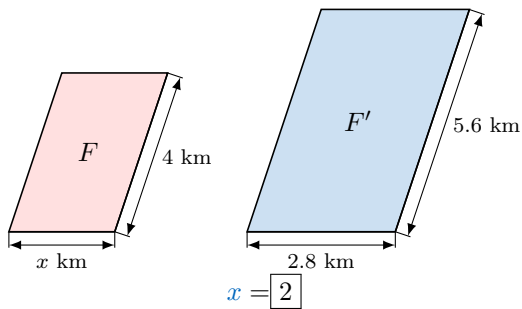
Ex 13:  The figures F and F' are similar. Find x .



Answer: The ratios of the corresponding sides are equal:


$$\begin{aligned} \frac{x}{5.5} &= \frac{4.8}{3} \\ x \times 3 &= 5.5 \times 4.8 \quad (\text{cross multiplication}) \\ x &= \frac{5.5 \times 4.8}{3} \\ x &= \frac{26.4}{3} \\ x &= 8.8 \end{aligned}$$

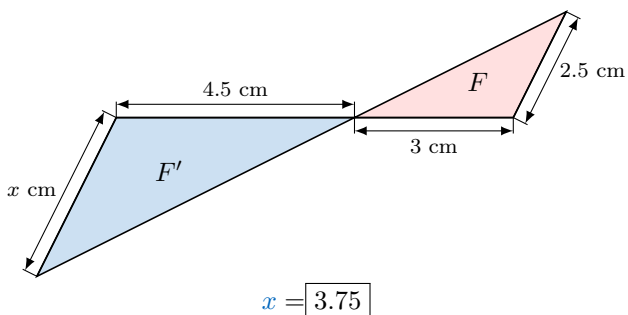
Ex 14:  The figures F and F' are similar. Find x .



Answer: The ratios of the corresponding sides are equal:


$$\begin{aligned}\frac{2.8}{x} &= \frac{5.6}{4} \\ x \times 5.6 &= 2.8 \times 4 \quad (\text{cross multiplication}) \\ x &= \frac{2.8 \times 4}{5.6} \quad (\text{dividing by } 5.6) \\ x &= \frac{11.2}{5.6} \\ x &= 2\end{aligned}$$

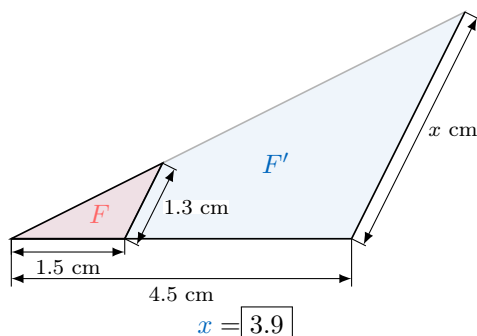
Ex 15:  The figures F and F' are similar. Find x .



Answer: The ratios of the corresponding sides are equal:

$$\begin{aligned}\frac{x}{2.5} &= \frac{4.5}{3} \\ x \times 3 &= 2.5 \times 4.5 \quad (\text{cross multiplication}) \\ x &= \frac{2.5 \times 4.5}{3} \\ x &= \frac{11.25}{3} \\ x &= 3.75\end{aligned}$$

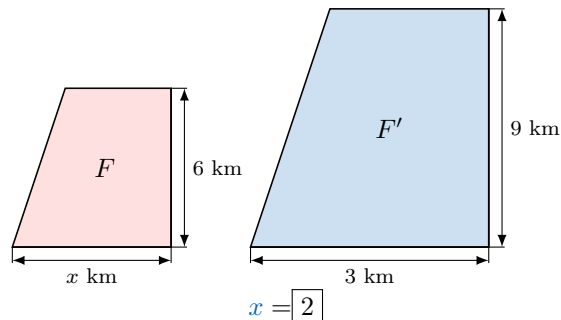
Ex 16:  The figures F and F' are similar. Find x .



Answer: The ratios of the corresponding sides are equal:

$$\begin{aligned}\frac{x}{1.3} &= \frac{4.5}{1.5} \\ x \times 1.5 &= 1.3 \times 4.5 \quad (\text{cross multiplication}) \\ x &= \frac{1.3 \times 4.5}{1.5} \\ x &= \frac{5.85}{1.5} \\ x &= 3.9\end{aligned}$$

Ex 17: The figures F and F' are similar. Find x .



Answer: The ratios of the corresponding sides are equal:

$$\begin{aligned}\frac{3}{x} &= \frac{9}{6} \\ x \times 9 &= 3 \times 6 \quad (\text{cross multiplication}) \\ x &= \frac{3 \times 6}{9} \quad (\text{dividing by } 9) \\ x &= \frac{18}{9} \\ x &= 2\end{aligned}$$

B.2 DETERMINING SHAPE SIMILARITY

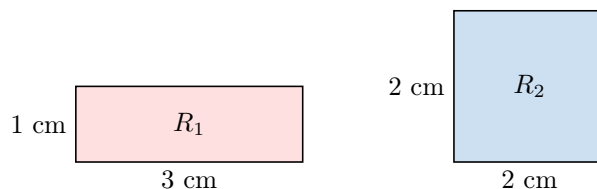
MCQ 18: Are all rectangles similar?

☐ True

☒ False

Answer: Not all rectangles are similar. For rectangles to be similar, the ratios of their corresponding side lengths must be equal. Consider the following rectangles:

- Rectangle R_1 with side lengths 3 cm and 1 cm.
- Rectangle R_2 with side lengths 2 cm and 2 cm.



The ratios of the corresponding sides are not equal:

$$\frac{\text{long side of } R_2}{\text{long side of } R_1} = \frac{2}{3}, \quad \frac{\text{short side of } R_2}{\text{short side of } R_1} = \frac{2}{1}$$

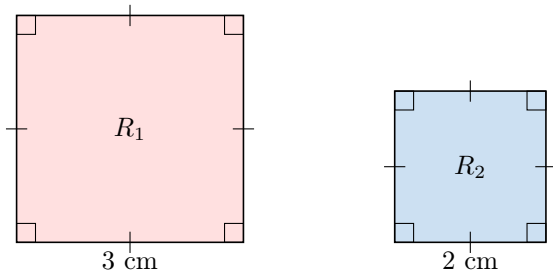
Since $\frac{2}{3} \neq \frac{2}{1}$, the rectangles are not similar. Therefore, the correct answer is False.

MCQ 19: Are all squares similar?

- ☒ True
- ☐ False

Answer: All squares are similar because they have four right angles and four equal sides, with the ratio of corresponding side lengths being constant between any two squares. For example:

- Square R_1 with side length 3 cm.
- Square R_2 with side length 2 cm.



The ratio of the side lengths is:

$$\frac{\text{side of } R_2}{\text{side of } R_1} = \frac{2}{3}$$

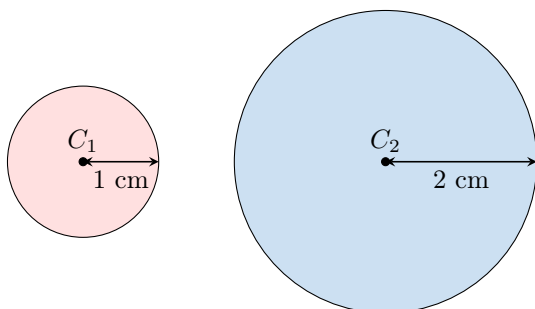
Since all sides of a square are equal, the ratios of corresponding sides are always equal, and the angles are all 90° , making all squares similar. Therefore, the correct answer is True.

MCQ 20: Are all circles similar?

- ☒ True
- ☐ False

Answer: All circles are similar because they have the same shape, defined by a constant radius, and can be scaled by a factor to match any other circle. For example:

- Circle C_1 with radius 1 cm.
- Circle C_2 with radius 2 cm.



The ratio of the radii is:

$$\frac{\text{radius of } C_2}{\text{radius of } C_1} = \frac{2}{1} = 2$$

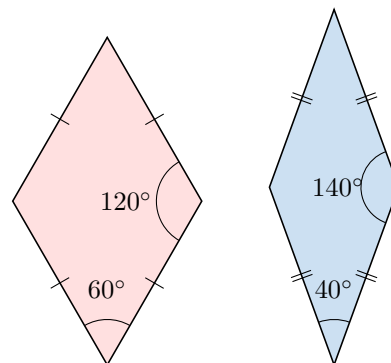
Therefore, the correct answer is True.

MCQ 21: Are all rhombuses similar?

- ☐ True
- ☒ False

Answer: Not all rhombuses are similar. For rhombuses to be similar, their corresponding angles must be equal, in addition to having equal side lengths within each rhombus. Consider the following rhombuses:

- Rhombus R_1 with angles 60° and 120° .
- Rhombus R_2 with angles 40° and 140° .



These rhombuses are not similar because their corresponding angles are not equal ($60^\circ \neq 40^\circ$, $120^\circ \neq 140^\circ$). Therefore, the correct answer is False.