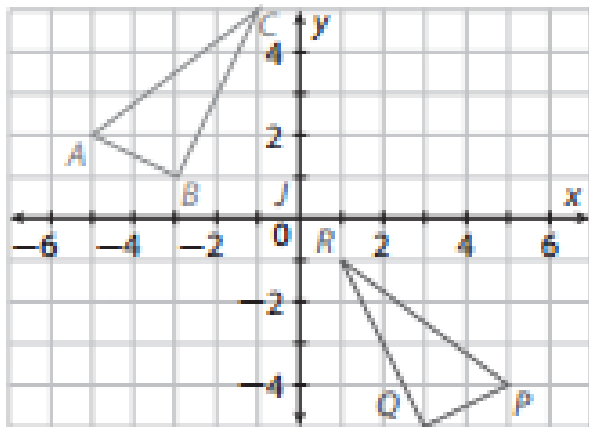


Check Homework

5. Map $\triangle ABC$ to $\triangle PQR$.

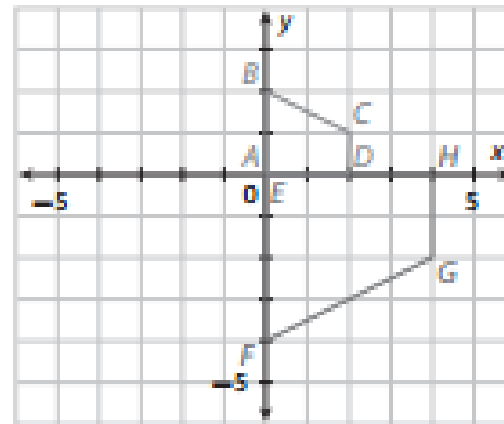


You can map $\triangle ABC$ to $\triangle PQR$ by a reflection followed by a translation.

Reflection: $(x, y) \rightarrow (-x, y)$

Translation: $(x, y) \rightarrow (x, y-6)$

6. Map $ABCD$ to $EFGH$.

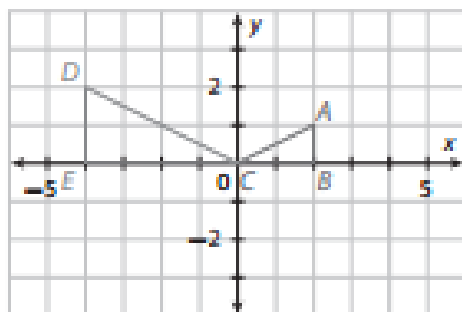


You can map $ABCD$ to $EFGH$ by a reflection followed by a dilation.

Reflection: $(x, y) \rightarrow (x, -y)$

Dilation: $(x, y) \rightarrow (2x, 2y)$

7. Map $\triangle CED$ to $\triangle CBA$.

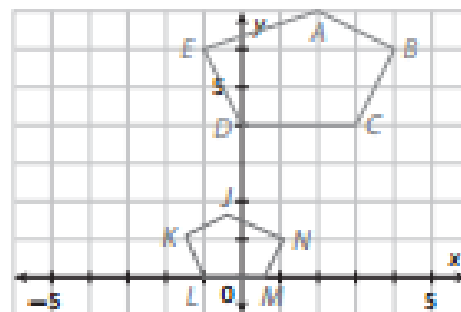


You can map $\triangle CED$ to $\triangle CBA$ by a reflection followed by a dilation.

Reflection: $(x, y) \rightarrow (-x, y)$

Dilation: $(x, y) \rightarrow \left(\frac{1}{2}x, \frac{1}{2}y\right)$

8. Map $ABCDE$ to $JKLMN$.



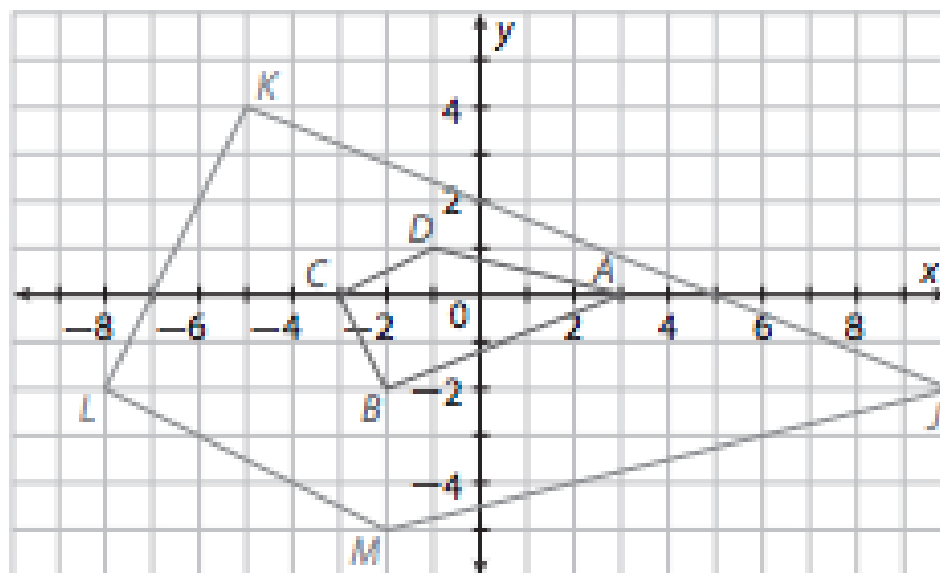
You can map $ABCDE$ to $JKLMN$ by a reflection followed by a dilation centered at the origin followed by a translation.

Reflection: $(x, y) \rightarrow (-x, y)$

Dilation: $(x, y) \rightarrow \left(\frac{1}{2}x, \frac{1}{2}y\right)$

Translation: $(x, y) \rightarrow \left(x + \frac{1}{2}, y - 2\right)$

9. Map $ABCD$ to $JKLM$.



You can map $ABCD$ to $JKLM$ by a reflection followed by a dilation centered at the origin followed by a translation.

Reflection: $(x, y) \rightarrow (x, -y)$

Dilation: $(x, y) \rightarrow (3x, 3y)$

Translation: $(x, y) \rightarrow (x + 1, y - 2)$

18. Which of the following is a dilation?

A. $(x, y) \rightarrow (x, 3y)$

B. $(x, y) \rightarrow (3x, -y)$

C. $(x, y) \rightarrow (3x, 3y)$

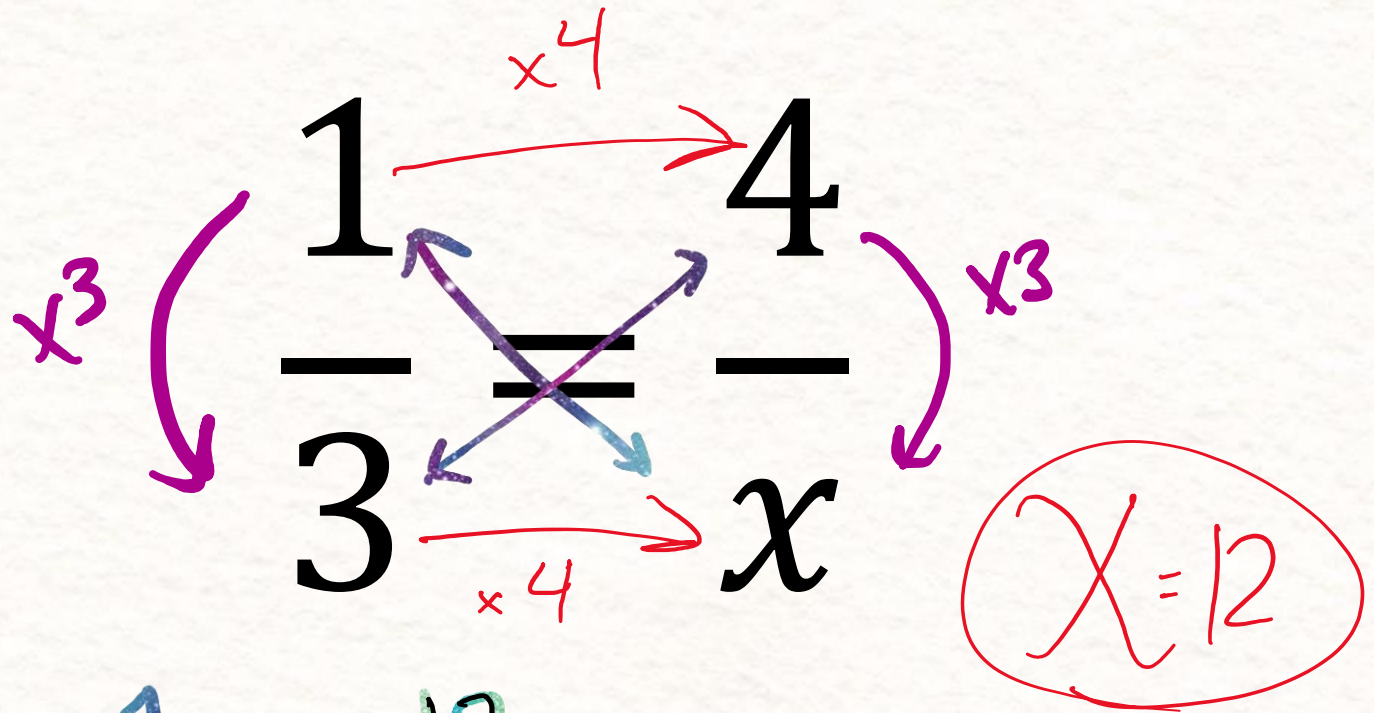
D. $(x, y) \rightarrow (x, y - 3)$

E. $(x, y) \rightarrow (x - 3, y - 3)$

Hand Back Quizzes

Quiz Tuesday

- Dilations 16.1
- Sequence of Transformations 16.2
- Proportions (7th grade)
- Parts of Similar Figures 16.3
- Similarity Shortcuts 16.4



$$1x = 12$$

$$x = 12$$

$$\frac{2}{x} = \frac{8}{20}$$

Handwritten annotations: A red arrow points from 8 to 2 with the number 4 above it. A red arrow points from 20 to x with the number 4 below it. Two blue arrows cross each other, connecting 2 to 20 and x to 8.

$$40 = 8x$$

$$5 = x$$

$$\frac{35}{-40} = \frac{7}{x}$$

Handwritten red annotations: $\div 5$ above the arrow from 35 to 7, and $\div 5$ above the arrow from -40 to x .

$$x = -8$$

$$\frac{x}{11} = \frac{100}{20}$$

The image shows a handwritten equation $\frac{x}{11} = \frac{100}{20}$. The variable x is circled. The number 100 is circled. The number 11 is underlined with two lines. The number 20 is underlined with two lines. A curved arrow on the left points from the underlined 11 to the circled x , with the label $x \cdot 5$ next to it. A curved arrow on the right points from the underlined 20 to the circled 100, with the label $x \cdot 5$ next to it.

$$x = 55$$

The result $x = 55$ is circled.

$$\frac{4}{10} \neq \frac{x \cdot 10}{25}$$

$$100 = 10x$$

$10 = x$

$$\frac{x}{12} = \frac{15}{20}$$

$$\frac{30}{45} = \frac{22}{x}$$

12

$$x+1=12$$

$$x=11$$

$$\frac{3}{4} \times \frac{6}{8} = \frac{x+1}{16}$$

Diagram illustrating the simplification of the fraction $\frac{3}{4} \times \frac{6}{8}$ to $\frac{x+1}{16}$. The number 3 is written in blue to the left of the fraction. The number 4 is written in blue below the fraction. The number 6 is written in black above the fraction. The number 8 is written in black below the fraction. The number 12 is written in red above the fraction. The number 16 is written in black below the fraction. The number $x+1$ is written in black above the fraction. The number 16 is written in black below the fraction. Red arrows labeled $\times 2$ indicate the simplification of the fraction $\frac{6}{8}$ to $\frac{3}{4}$. Purple arrows indicate the simplification of the fraction $\frac{3}{4} \times \frac{6}{8}$ to $\frac{x+1}{16}$.

$$4(x+1) = 3(16)$$

$$4x+4 = 48$$

$$4x = 44$$

$$x = 11$$

$$\frac{10}{x-2} = \frac{30}{18}$$

5
3

$$5(x-2) = 30$$
$$5x - 10 = 30$$

$5x = 40$
 $x = 8$

$$\frac{4x}{24} = \frac{5}{15}$$

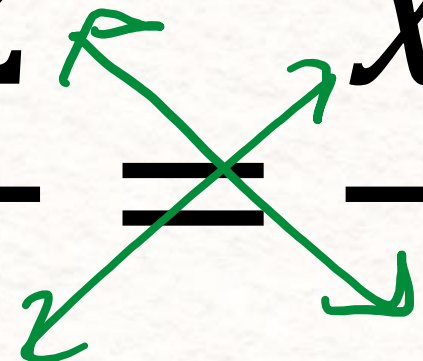
$$\frac{45}{60} = \frac{15}{2x + 4}$$


Handwritten annotations: A purple oval encircles the fraction $\frac{45}{60}$. To its left, the numbers 3 and 4 are written vertically with a horizontal line between them. Green arrows point from the 45 to the 15 and from the 60 to the $2x + 4$.

$$60 = 6x + 12$$
$$48 = 6x$$

Handwritten annotations: A green arrow points from the second equation to a green circle containing the solution $x = 8$.

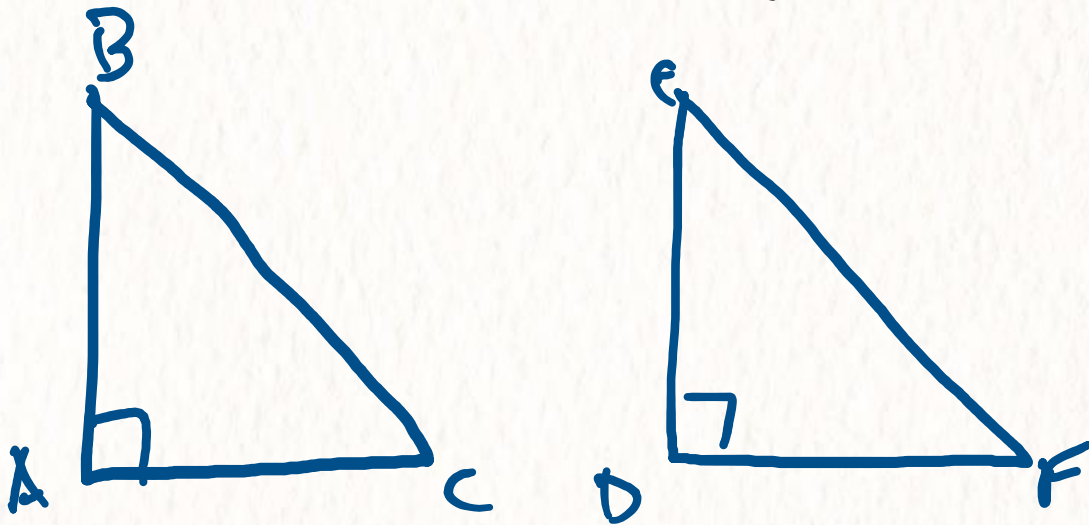
$$\frac{24}{36} = \frac{20 - x}{27}$$

$$\frac{x + 2}{12} = \frac{x - 1}{8}$$


$$8(x+2) = 12(x-1)$$
$$8x + 16 = 12x - 12$$
$$28 = 4x$$


$x = 7$

Congruent Figures



~~$\triangle ABC \cong \triangle FED$~~

$\underline{\triangle ABC} \cong \underline{\triangle DEF}$

Congruence statement

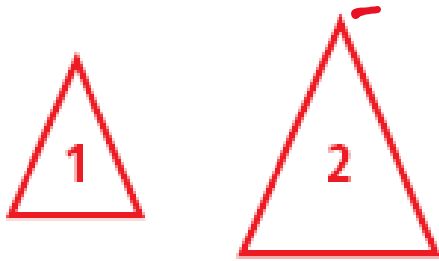
- Objective:
- Explore and understand similar polygons

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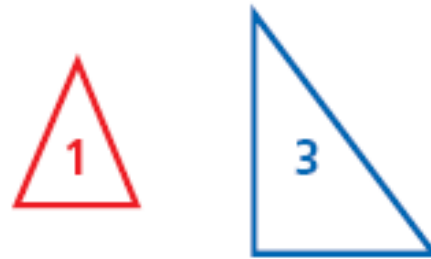
\cong
Congruent

\sim
Similar

Figures that are similar (\sim) have the same shape but not necessarily the same size.



$\triangle 1$ is similar to $\triangle 2$ ($\triangle 1 \sim \triangle 2$).



$\triangle 1$ is not similar to $\triangle 3$ ($\triangle 1 \not\sim \triangle 3$).

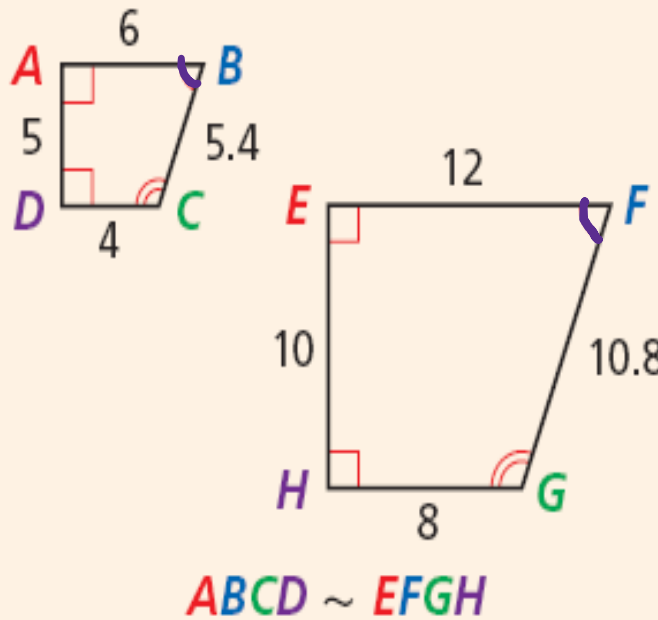
Oh look- a fancy box!

Similar Polygons

DEFINITION

Two polygons are **similar polygons** if and only if their corresponding angles are congruent and their corresponding side lengths are proportional.

DIAGRAM



STATEMENTS

$$\angle A \cong \angle E$$

$$\angle B \cong \angle F$$

$$\angle C \cong \angle G$$

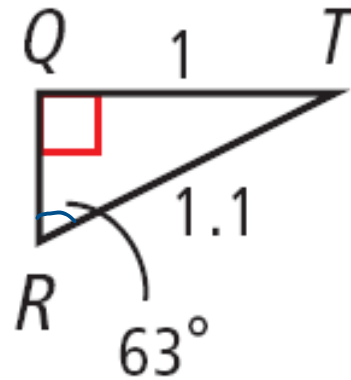
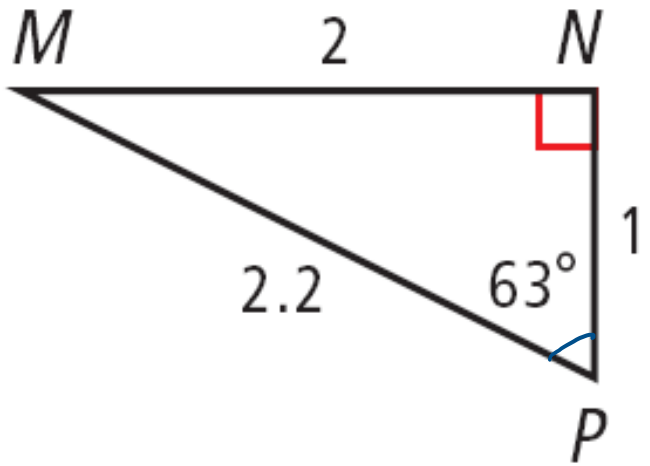
$$\angle D \cong \angle H$$

$$\frac{AB}{EF} = \frac{BC}{FG} = \frac{CD}{GH} = \frac{DA}{HE} = \frac{1}{2}$$

$$\frac{EF}{AB} = \frac{FG}{BC} = \frac{GH}{CD} = \frac{HE}{DA} = \frac{2}{1}$$

Writing Math

Writing a similarity statement is like writing a congruence statement—be sure to list corresponding vertices in the same order.



$$\triangle MNP \sim \triangle TQR$$

$$\frac{MN}{TQ} = \frac{NP}{QR} = \frac{MP}{TR}$$

pg. 853 (A, B)

Example 1 Identify properties of similar figures.

- (A) Figure $EFGH$ maps to figure $RSTU$ by a similarity transformation. Write a proportion that contains EF and RU . List any angles that must be congruent to $\angle G$ or congruent to $\angle U$.

$$\frac{EF}{RS} = \frac{EH}{RU} \quad \angle T \text{ is congruent to } \angle G, \text{ and } \angle H \text{ is congruent to } \angle U.$$

- (B) Figure $JKLMN$ maps to figure $TUVWX$ by a similarity transformation. Write a proportion that contains TX and LM . List any angles that must be congruent to $\angle V$ or congruent to $\angle K$.

$$\frac{\boxed{JN}}{TX} = \frac{LM}{\boxed{VW}} \quad \angle \underline{L} \text{ is congruent to } \angle V, \text{ and } \angle \underline{U} \text{ is congruent to } \angle K.$$

pg. 854 (5, 6)

Your Turn

5. Triangles $\triangle PQR$ and $\triangle LMN$ are similar. If $QR = 6$ and $MN = 9$, what similarity transformation (in coordinate notation) maps $\triangle PQR$ to $\triangle LMN$?

The ratio $\frac{MN}{QR} = 1.5$, therefore the similarity transformation is $(x, y) \rightarrow (1.5x, 1.5y)$.

6. **Error Analysis** Triangles $\triangle DEF$ and $\triangle UVW$ are similar. $\frac{DE}{UV} = \frac{VW}{EF}$ Is the statement true?

No. The proportion must compare corresponding sides. One possibility is $\frac{DE}{UV} = \frac{EF}{VW}$.

pg. 854 B

B

Find the value of x .

$$m\angle LMN = m\angle XYZ$$

$$\frac{5(x - 5)}{5x - 25} = \frac{4x}{4x}$$

$$\frac{5x - 25}{5x - 25} = \frac{4x}{4x}$$

$$\frac{x}{x} = \frac{25}{25}$$

Find the value of y .

$$\frac{JK}{VW} = \frac{MN}{YZ}$$

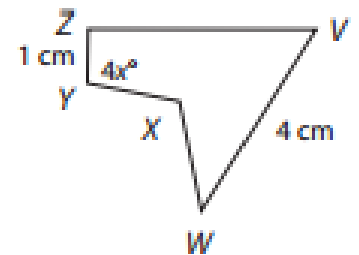
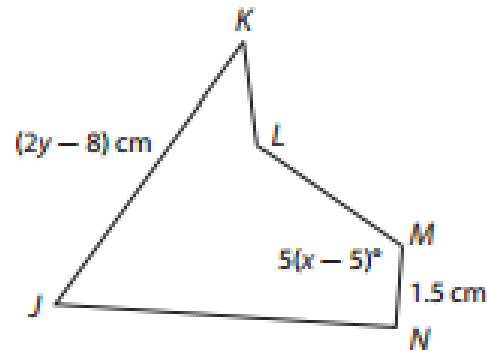
$$\frac{2x - 8}{4} = \frac{1.5}{1}$$

$$\frac{2x - 8}{4} = \frac{1.5(4)}{1}$$

$$\frac{2x - 8}{4} = 6$$

$$\frac{2x - 8}{4} = 6$$

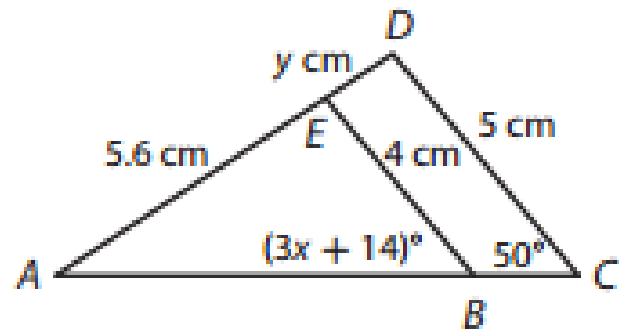
$$\frac{2x - 8}{4} = 6$$



pg. 855 (8, 9)

Your Turn

Use the diagram, in which $\triangle ABE \sim \triangle ACD$.



8. Find the value of x .

$$m\angle C = m\angle ABE$$

$$50 = 3x + 14$$

$$36 = 3x$$

$$12 = x$$

9. Find the value of y .

$$\frac{AD}{AE} = \frac{CD}{BE}$$

$$\frac{5.6 + y}{5.6} = \frac{5}{4}$$

$$5.6 + y = \frac{5}{4} \cdot 5.6$$

$$y = 1.4$$

Homework

- pg. 857 (14-17 write a system, 20, 23, 26)