KEY

LESSON 6.1

Challenge Practice

For use with pages 356–363

Solve the proportion.

1. $\dfrac{3}{a+5} = \dfrac{2a+8}{8}$ $\boxed{-8, -1}$

2. $\dfrac{w-3}{10} = \dfrac{2w}{6w+4}$ $\boxed{-\frac{1}{3}, 6}$

3. $\dfrac{3k+5}{k+3} = \dfrac{15}{9-k}$ $\boxed{\frac{7}{3}, 0}$

4. $\dfrac{n+7}{2n+1} = \dfrac{18n}{11n-2}$ $\boxed{\frac{7}{25}, 2}$

Find the values of *x* and *y*.

5. $\dfrac{3}{x} = \dfrac{9}{2x+5} = \dfrac{6y}{20}$ $\boxed{x=5 \quad y=2}$

6. $\dfrac{y-2}{3} = \dfrac{1-5x}{y-4} = \dfrac{24}{y-1}$ $\boxed{y=10,-7}$ $\boxed{x=-3, -\frac{32}{5}}$

7. $\dfrac{y-1}{x+1} = \dfrac{3x}{2} = \dfrac{5x+1}{4x}$ $\boxed{x=\frac{1}{3}, \frac{1}{2}}$ $\boxed{y=\frac{5}{3}, \frac{17}{8}}$

8. The ratio of the measures of three sides of a triangle is 4 : 5 : 8. The perimeter of the triangle is 85 centimeters. What is the measure of the shortest side of the triangle? $\boxed{20\text{ cm}}$

9. The area of an isosceles triangle is 36 square inches. The ratio of the length of the triangle's base to its height is 2 : 1. What is the perimeter of the triangle? $\boxed{12+12\sqrt{2}\text{ cm}}$

10. Points *X* and *Y* lie on $\overline{WZ}$ and $\dfrac{WX}{XZ} = \dfrac{2}{5}$, $\dfrac{WY}{YZ} = \dfrac{7}{8}$, and $XZ = 37.5$ centimeters. Find *WY*. $\boxed{24.5\text{ cm}}$

11. Use the given information to prove the statement.

GIVEN: $\dfrac{a}{b} = \dfrac{c}{d} = \dfrac{e}{f}$

PROVE: $\dfrac{a+c+e}{b+d+f} = \dfrac{a}{b}$

$\frac{a}{b} = \frac{c}{d} \rightarrow ad = bc$

$\frac{a}{b} = \frac{e}{f} \rightarrow af = be$

$ab = ab$ Reflexive

$ab + ad + af = ba + bc + be$

$a(b+d+f) = b(a+c+e)$

$\frac{a}{b}(b+d+f) = a+c+e$

$\frac{a}{b} = \dfrac{a+c+e}{b+d+f}$

12. You want to enlarge a photograph to make a poster. The poster will have the same length-to-width ratio as the photograph. The photograph is 7 inches by 5 inches. You want the poster to have an area that is at least 250% larger than the area of the photograph.

   a. Find the minimum dimensions of the poster. Round dimensions to the nearest tenth of an inch. $\boxed{7.9\text{ in} \times 11.1\text{ in}}$

   b. What percent of the length of the photograph is the length of the poster? $\boxed{\approx 158\%}$

   c. Is your answer in part (b) the same as the percent change in area? *Explain* why or why not. No. The percent change in area accounts for the percent change in the length and the width so it is larger.

Challenge Practice

1. $a = 14, b = 15$ **2.** $a = -\frac{10}{3}, 4; b = -6, 5$

3. $a = 9, b = 36$

4. No; *Sample answer:* Let $a = 4, b = 5, c = 8,$ and $d = 10$. Then it is true that $\frac{4}{5} = \frac{8}{10}$.

$$\frac{4 \times 5}{5} = \frac{8 \times 10}{10}$$

$$\frac{20}{5} \stackrel{?}{=} \frac{80}{10}$$

$$4 \neq 8$$

So, the property does not hold.

5. Area $\triangle AFE = \frac{1}{2}(AF)(AE)$,

Area $\triangle BEC = \frac{1}{2}(BE)(BC)$,

Area $\triangle DFC = \frac{1}{2}(DF)(DC)$.

Also, $BC = AD = AF + FD$ and $DC = AB = AE + BE$.

So, Area $\triangle AFE = \frac{1}{2}(AF)(AE)$,

Area $\triangle BEC = \frac{1}{2}(BE)(AF + FD)$,

Area $\triangle DFC = \frac{1}{2}(FD)(AE + BF)$.

Because all the areas are equal,

$\frac{1}{2}(AF)(AE) = \frac{1}{2}(BE)(AF + FD) = \frac{1}{2}(FD)(AE + BE)$.

$$(BE)(AF + FD) = (FD)(AE + BE)$$

$$(BE)(AF) + (BE)(FD) = (FD)(AE) + (FD)(BE)$$

$$\frac{(BE)(AF) + (BE)(FD)}{(BE)(FD)} = \frac{(FD)(AE) + (FD)(BE)}{(FD)(BE)}$$

$$\frac{(BE)(AF)}{(BE)(FD)} + \frac{(BE)(FD)}{(BE)(FD)} = \frac{(FD)(AE)}{(FD)(BE)} + \frac{(FD)(BE)}{(FD)(BE)}$$

$$\frac{(BE)(AF)}{(BE)(FD)} = \frac{(FD)(AE)}{(FD)(BE)}$$

$$\frac{AF}{FD} = \frac{AE}{BE}$$

$$\frac{AE}{EB} = \frac{AF}{FD}$$

6. width $= 32.25$ yd, length $= 43$ yd

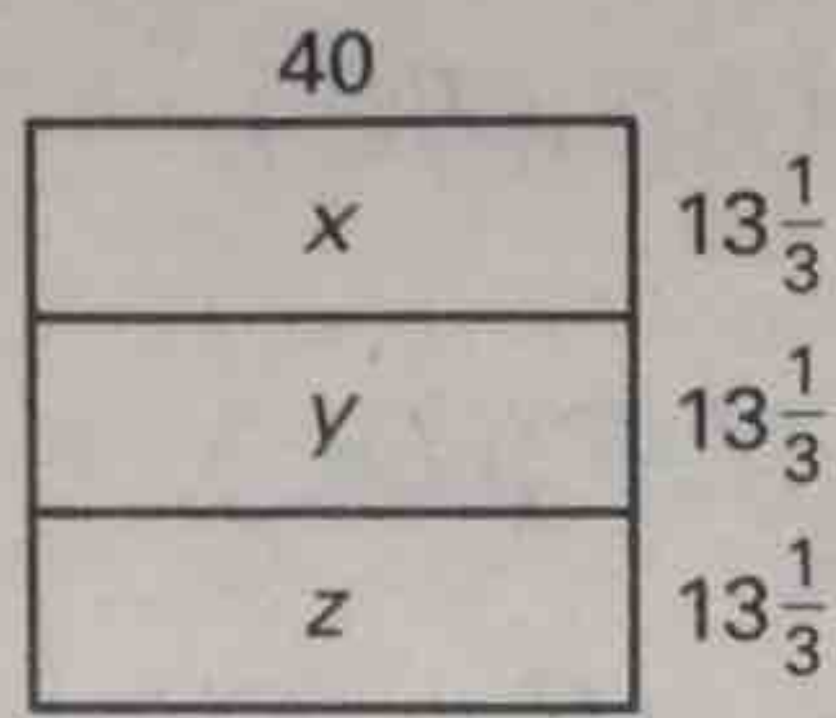
7. 1.5 in.

Challenge Practice

1. $\frac{7}{4}$ **2.** 21 cm **3.** $JK = 35$ cm, $JL = 36.75$ cm, $RS = 20$ cm, $ST = 13$ cm, $RT = 21$ cm

4. Area of $\triangle JKL = 385.875 \text{ cm}^2$; Area of $\triangle RST = 126 \text{ cm}^2$; 3.0625; The scale factor of the areas is the square of the scale factor of the perimeters.

5. *Sample answer:*



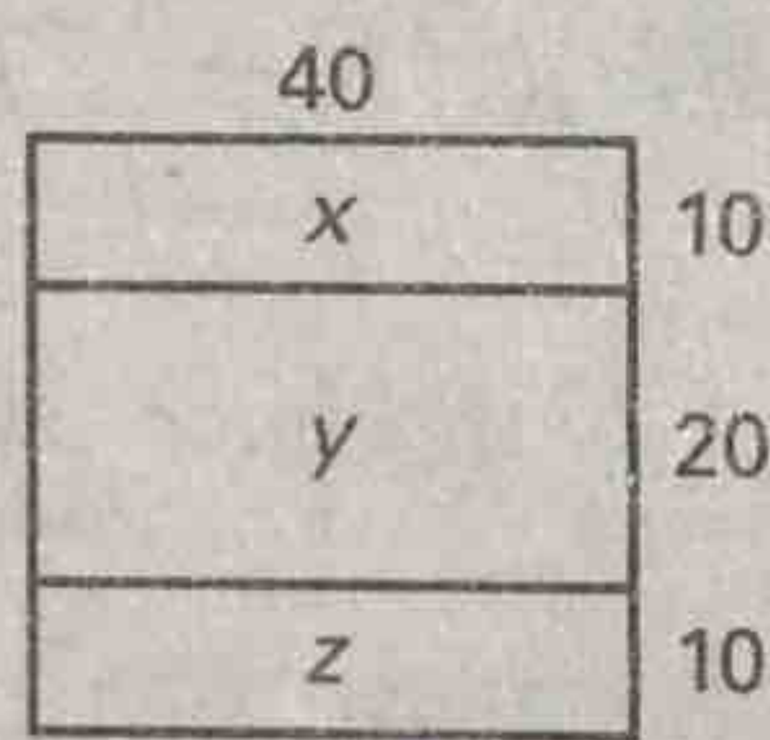
$\square x \cong \square y \cong \square z$

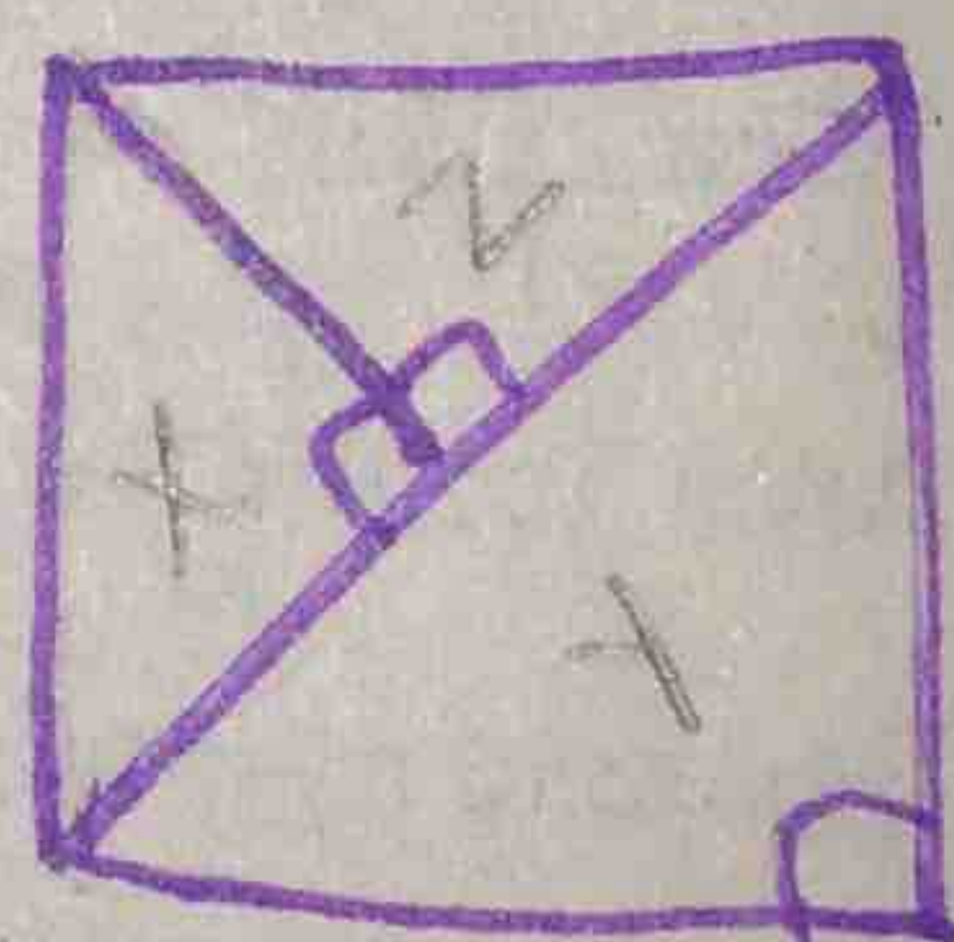
Perimeter x = Perimeter y = Perimeter z

Area x = Area y = Area z

or

6. *Sample answer:*





$\square x \sim \square y$; $\square y \sim \square z$, ($\square x \cong \square z$)

Perimeter of x ~ Perimeter of y, Perimeter of y ~ Perimeter of z (perimeter of x ≅ perimeter of z).

Area of x ~ Area of y; Area of y ~ Area of z, (Area of x ≅ Area of z)

7. Yes; *Sample answer:* The side lengths are given (or can be determined by addition); trapezoid $ABGF$ ~ trapezoid $ACDE$; Scale factor of the side lengths of trapezoid $ABGF$ to trapezoid $ACDE$ is $1:2$.