$\frac{2}{3} \quad (3)^{-1} \quad \frac{1}{3} \quad \frac{3}{1}$

Warm-Up

$\frac{2}{3} \times \frac{9}{1} = \frac{18}{3} = 18 \div 3 = 6$

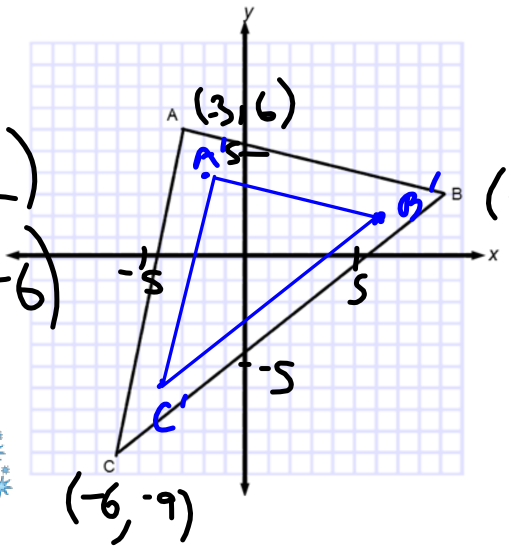
ΔABC is shown on the coordinate plane below. Dilate the figure by a scale factor of $r = \frac{2}{3}$.

a. (1) Identify the coordinates of the dilated $\Delta A'B'C'$, and (2) then draw and label $\Delta A'B'C'$ on the coordinate plane.

$A'\left(\frac{2}{3}(-3), \frac{2}{3}(6)\right) = A'(-2, 4)$

$B'\left(\frac{2}{3}(9), \frac{2}{3}(3)\right) = B'(6, 2)$

$C'\left(\frac{2}{3}(-6), \frac{2}{3}(-9)\right) = C'(-4, -6)$

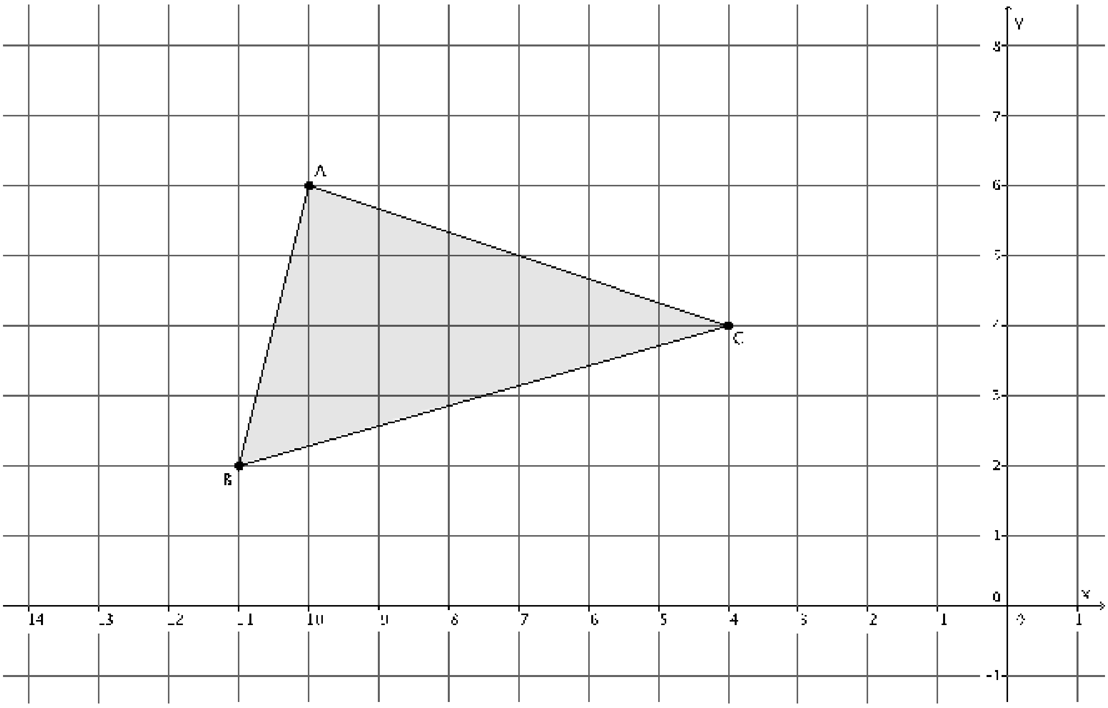


b. What scale factor could be used to dilate $\Delta A'B'C'$ back to it's original image, ΔABC?

$(\quad) \boxed{\frac{2}{3} \cdot \frac{3}{2}} =$

$\frac{6}{6} = 1$

1. Triangle ABC is shown on the coordinate plane below. The triangle is dilated from the origin by scale factor $r = 4$. Identify the coordinates of the dilated triangle $A'B'C'$.



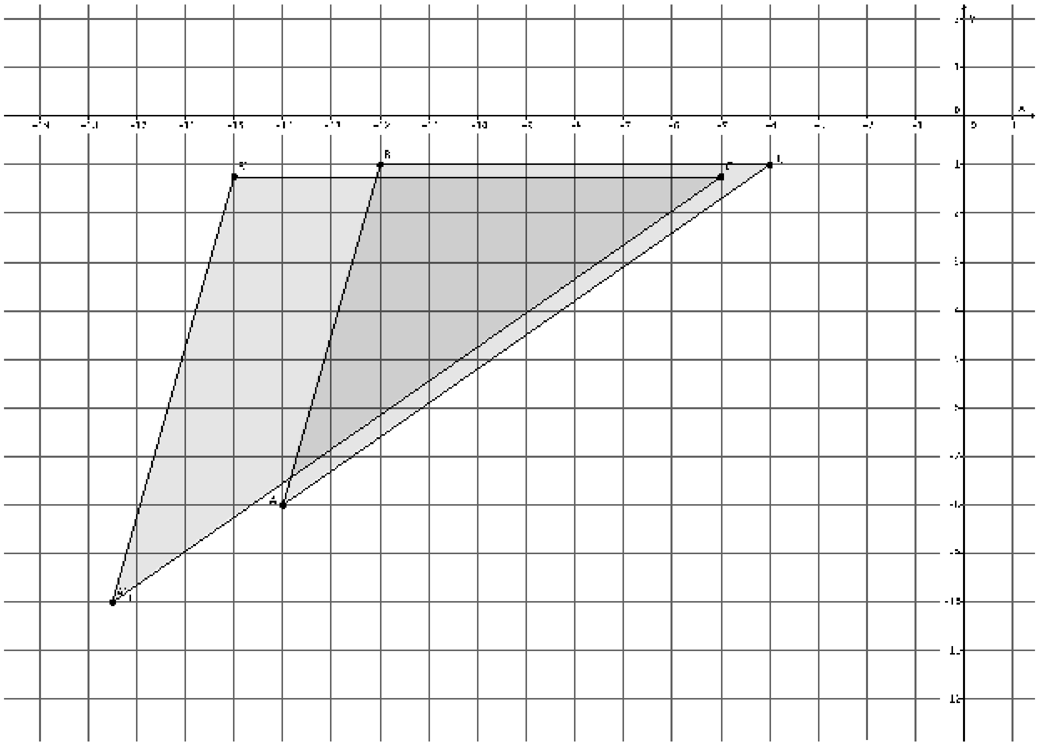
Point $A = (-10, 6)$, *so* $A' = (4 \times (-10), 4 \times 6) = (-40, 24)$.

Point $B = (-11, 2)$, *so* $B' = (4 \times (-11), 4 \times 2) = (-44, 8)$.

Point $C = (-4, 4)$, *so* $C' = (4 \times (-4), 4 \times 4) = (-16, 16)$.

The coordinates of the vertices of triangle $A'B'C'$ *are* $(-40, 24)$, $(-44, 8)$, *and* $(-16, 16)$, *respectively.*

2. Triangle ABC is shown on the coordinate plane below. The triangle is dilated from the origin by scale factor $r = \frac{5}{4}$. Identify the coordinates of the dilated triangle $A'B'C'$.



-17.5

Point $A = (-14, -8)$, *so* $A' = \left(\frac{5}{4} \times (-14), \frac{5}{4} \times (-8)\right) = \left(-\frac{35}{2}, -10\right)$.

Point $B = (-12, -1)$, *so* $B' = \left(\frac{5}{4} \times (-12), \frac{5}{4} \times (-1)\right) = \left(-15, -\frac{5}{4}\right)$. -1.25

Point $C = (-4, -1)$, *so* $C' = \left(\frac{5}{4} \times (-4), \frac{5}{4} \times (-1)\right) = \left(-5, -\frac{5}{4}\right)$. -1.25

3. The triangle ABC has coordinates $A = (6, 1)$, $B = (12, 4)$, and $C = (-6, 2)$. The triangle is dilated from the origin by a scale factor $r = \frac{1}{2}$. Identify the coordinates of the dilated triangle $A'B'C'$.

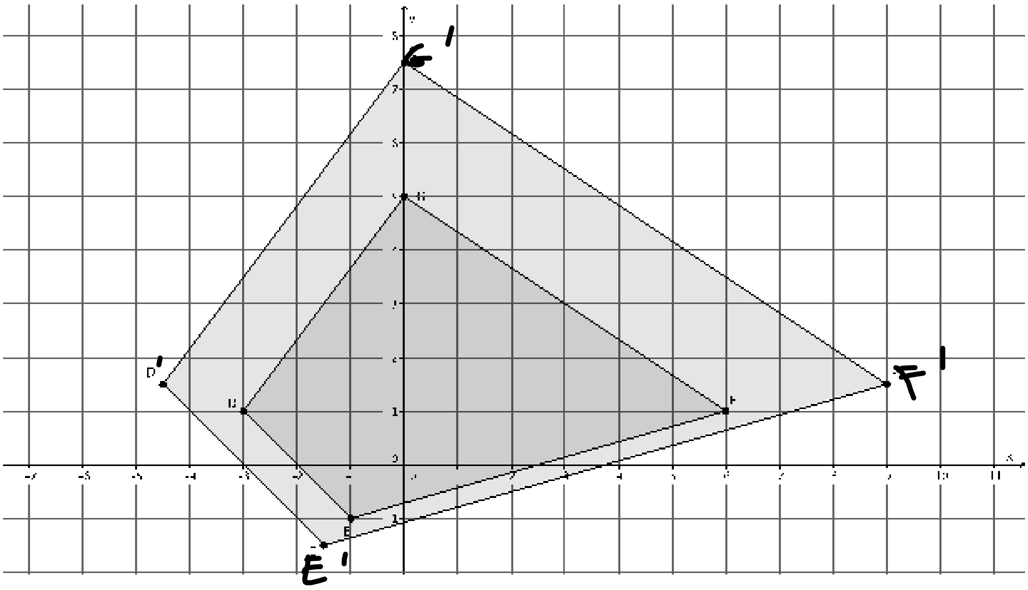
Point $A = (6, 1)$, *so* $A' = \left(\frac{1}{2} \times 6, \frac{1}{2} \times 1\right) = \left(3, \frac{1}{2}\right)$.

Point $B = (12, 4)$, *so* $B' = \left(\frac{1}{2} \times 12, \frac{1}{2} \times 4\right) = (6, 2)$.

Point $C = (-6, 2)$, *so* $C' = \left(\frac{1}{2} \times (-6), \frac{1}{2} \times 2\right) = (-3, 1)$.

The coordinates of the vertices of triangle $A'B'C'$ *are* $\left(3, \frac{1}{2}\right)$, $(6, 2)$, *and* $(-3, 1)$, *respectively.*

4. Figure $DEFG$ is shown on the coordinate plane below. The figure is dilated from the origin by scale factor $r = \frac{3}{2}$. $2\overline{)3}$ $= 1.5$
Identify the coordinates of the dilated figure $D'E'F'G'$, and then draw and label figure $D'E'F'G'$ on the coordinate plane.



Point $D = (-3, 1)$, so $D' = \left(\frac{3}{2} \times (-3), \frac{3}{2} \times 1\right) = \left(-\frac{9}{2}, \frac{3}{2}\right)$. $= (-4.5, 1.5)$

Point $E = (-1, -1)$, so $E' = \left(\frac{3}{2} \times (-1), \frac{3}{2} \times (-1)\right) = \left(-\frac{3}{2}, -\frac{3}{2}\right)$. $= (-1.5, -1.5)$

Point $F = (6, 1)$, so $F' = \left(\frac{3}{2} \times 6, \frac{3}{2} \times 1\right) = \left(9, \frac{3}{2}\right)$. $= (9, 1.5)$

Point $G = (0, 5)$, so $G' = \left(\frac{3}{2} \times 0, \frac{3}{2} \times 5\right) = \left(0, \frac{15}{2}\right)$. $= (0, 7.5)$

The coordinates of the vertices of figure $D'E'F'G'$ are $\left(-\frac{9}{2}, \frac{3}{2}\right)$, $\left(-\frac{3}{2}, -\frac{3}{2}\right)$, $\left(9, \frac{3}{2}\right)$, and $\left(0, \frac{15}{2}\right)$, respectively.

5. Figure $DEFG$ has coordinates $D = (1, 1)$, $E = (7, 3)$, $F = (5, -4)$, and $G = (-1, -4)$. The figure is dilated from the origin by scale factor $r = 7$. Identify the coordinates of the dilated figure $D'E'F'G'$.

Point $D = (1, 1)$, *so* $D' = (7 \times 1, 7 \times 1) = (7, 7)$.

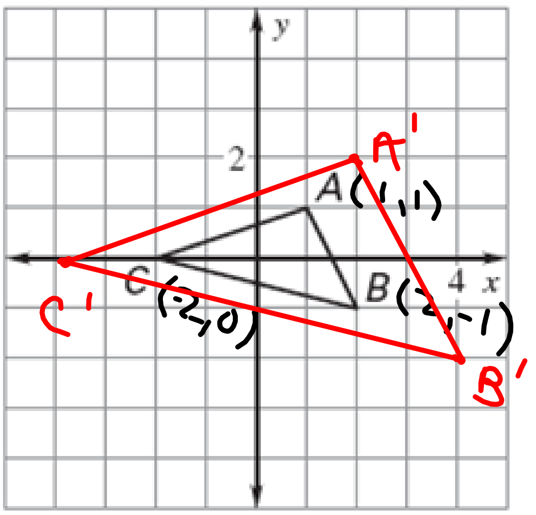
Point $E = (7, 3)$, *so* $E' = (7 \times 7, 7 \times 3) = (49, 21)$.

Point $F = (5, -4)$, *so* $F' = \big(7 \times 5, 7 \times (-4)\big) = (35, -28)$.

Point $G = (-1, -4)$, *so* $G' = \big(7 \times (-1), 7 \times (-4)\big) = (-7, -28)$.

The coordinates of the vertices of figure $D'E'F'G'$ *are* $(7, 7)$, $(49, 21)$, $(35, -28)$, *and* $(-7, -28)$, *respectively.*

1. $k = 2$



$A'(2\cdot 1, 2\cdot 1) = A'(2,2)$

$B'(2\cdot 2, 2\cdot(-1)) = B'(4,-2)$

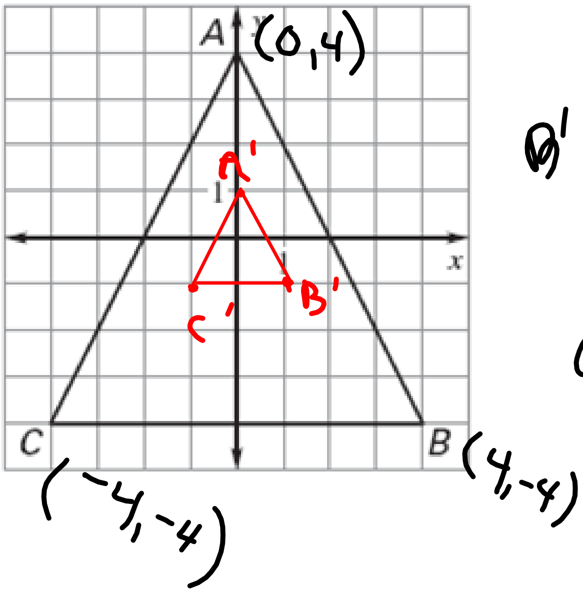
$C'(2\cdot(-2), 2\cdot 0)$

$= C'(-4,0)$

2. $r = \frac{1}{4} = 0.25$

$A'(0 \times 0.25, 4 \times 0.25)$

$A'(0, 1)$



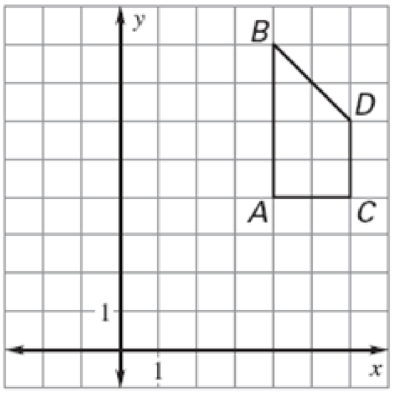
$B'(4 \times 0.25, -4 \times 0.25)$

$B'(1, -1)$

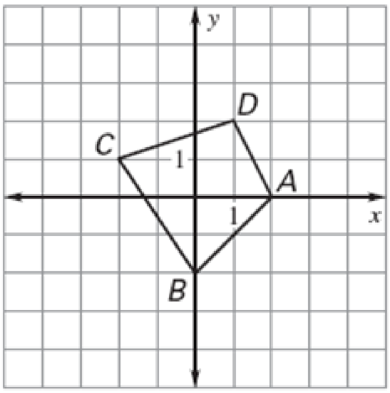
$C'(-4 \times 0.25, -4 \times 0.25)$

$C'(-1, -1)$

3. $k = \frac{1}{2}$



4. $k = 1\frac{1}{2}$



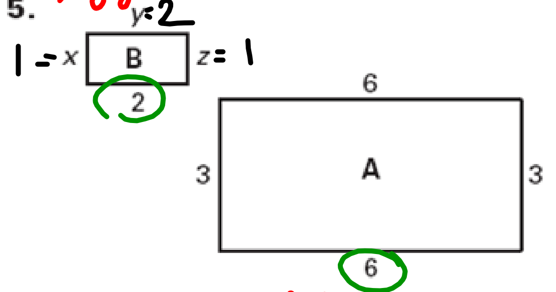
new = r · old

smaller

r < 1

Determine whether the dilation from Figure A to Figure B is a *reduction* or an *enlargement*. Then, find the values of the variables.

5. bigger r r > 1

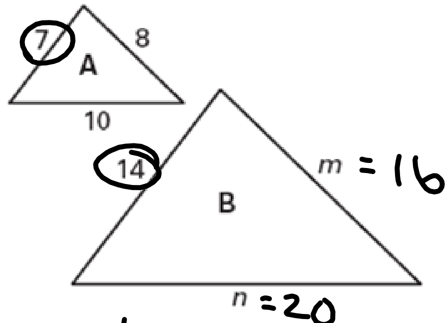


smaller → r < 1

$$\frac{2}{6} = \frac{r \cdot 6}{6}$$

$$r = \frac{1}{3}$$

6.



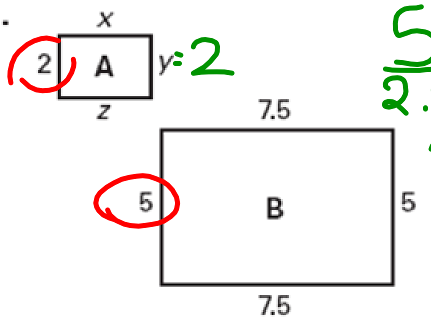
enlarge → r > 1

$$\frac{14}{7} = \frac{r \cdot 7}{7}$$

$$r = 2$$

new = r · old

7.



$$\frac{5}{2.5} = \frac{2.5 \cdot y}{2.5}$$

$$2 = y$$

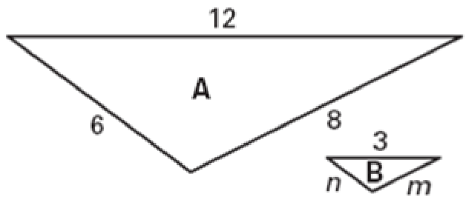
$$\frac{7.5}{2.5} = \frac{2.5 \cdot x}{2.5}$$

$$\boxed{x = 3}$$

$$\frac{5}{2} = \frac{r \cdot 2}{2}$$

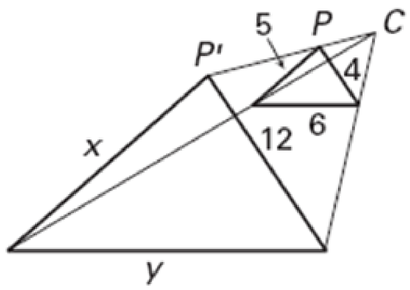
$$r = 5/2 = 2.5$$

8.

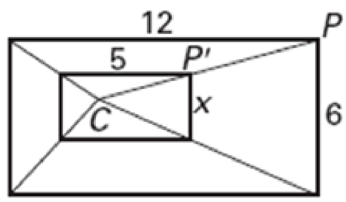


Find the scale factor. Tell whether the dilation is a *reduction* or an *enlargement*. Then find the values of the variables.

9



10



Determine if the following scale factor would create an enlargement, reduction, or isometric figure.

11. 3.5 12. 2/5 13. 0.6 14. 1 15. 4/3 16. 5/8

Given the point and its image, determine the scale factor.

17. A(3,6) A'(4.5, 9)

18. G'(3,6) G(1.5,3)

19. B(2,5) B'(1,2.5)

20. The sides of one right triangle are 6, 8, and 10. The sides of another right triangle are 10, 24, and 26. Determine if the triangles are similar. If so, what is the ratio of corresponding sides?