

MINISTRY OF EDUCATION
BADAA AL MUTAWA SCHOOL
 MATHEMATICS • M3L1 – Dilations

Student Name:	
Grade:	
Date:	

Subject: Mathematics | Subject Teacher: Abdulkader Amro

Instructions: Choose the one correct answer for each question. For graphing items, select the coordinate set that should be plotted for the image.

SECTION A • APPLY DILATIONS *Items 6–9*

1. A triangle has vertices $J(-8, 0)$, $K(-4, 4)$, and $L(-2, 0)$. After a dilation centered at the origin with scale factor $k = 0.5$, which coordinates are the image vertices J' , K' , and L' ?

Original item 6

- A. $J'(-16, 0)$, $K'(-8, 8)$, $L'(-4, 0)$ B. $J'(-4, 0)$, $K'(2, 2)$, $L'(1, 0)$
 C. $J'(-4, 0)$, $K'(-2, 2)$, $L'(-1, 0)$ D. $J'(-4, 0)$, $K'(-2, 4)$, $L'(-1, 0)$

2. A triangle has vertices $S(0, 0)$, $T(-4, 0)$, and $V(-8, -8)$. After a dilation centered at the origin with scale factor $k = 1.25$, which coordinates are the image vertices S' , T' , and V' ?

Original item 7

- A. $S'(0, 0)$, $T'(-5, 0)$, $V'(-10, -10)$ B. $S'(0, 0)$, $T'(5, 0)$, $V'(10, 10)$
 C. $S'(0, 0)$, $T'(-5, 0)$, $V'(-8, -10)$ D. $S'(0, 0)$, $T'(-4, 0)$, $V'(-10, -10)$

3. A triangle has vertices $A(9, 9)$, $B(3, 3)$, and $C(6, 0)$. After a dilation centered at the origin with scale factor $k = \frac{1}{3}$, which coordinates are the image vertices A' , B' , and C' ?

Original item 8

- A. $A'(6, 6)$, $B'(2, 2)$, $C'(3, 0)$ B. $A'(27, 27)$, $B'(9, 9)$, $C'(18, 0)$
 C. $A'(3, 3)$, $B'(1, 1)$, $C'(2, 0)$ D. $A'(3, 3)$, $B'(1, 1)$, $C'(2, 0)$

4. A triangle has vertices $D(4, 4)$, $F(0, 0)$, and $G(8, 0)$. After a dilation centered at the origin with scale factor $k = 0.75$, which coordinates are the image vertices D' , F' , and G' ?

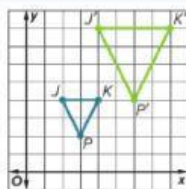
Original item 9

- A. $D'(4, 3)$, $F'(0, 0)$, $G'(6, 0)$ B. $D'(3, 3)$, $F'(0, 0)$, $G'(6, 0)$
 C. $D'(3, 3)$, $F'(0, 0)$, $G'(8, 0)$ D. $D'(6, 6)$, $F'(0, 0)$, $G'(12, 0)$

SECTION B • SCALE FACTORS FROM GRAPHS *Items 10–12*

5. $\triangle J'K'P'$ is the image of $\triangle JKP$. From the coordinate graph, what is the scale factor of the dilation?

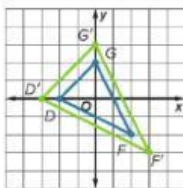
Original item 10



- A. $k = 4$ B. $k = 3$
 C. $k = 2$ D. $k = \frac{1}{2}$

6. $\triangle D'F'G'$ is the image of $\triangle DFG$. From the coordinate graph, what is the scale factor of the dilation?

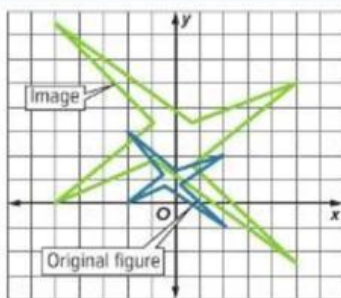
Original item 11



- A. $k = 1.5$ B. $k = 2$
C. $k = 1.25$ D. $k = 0.75$

7. Tyrone drew a logo and a dilation of the same logo on the coordinate plane. What is the scale factor of the dilation shown?

Original item 12



- A. $k = 0.5$ B. $k = 3$
C. $k = 1.5$ D. $k = 2$

SECTION C • MIXED DILATION EXERCISES Items 13–16

8. $F(-10, 4)$, $G(-4, 4)$, $H(-4, -8)$, $k = 0.25$. Which coordinates should be plotted for the image after the dilation centered at the origin?

Original item 13

- A. $F'(-2, 1)$, $G'(-1, 1)$, $H'(-1, -2)$ B. $F'(-2.5, 1)$, $G'(-1, 4)$, $H'(-1, -2)$
C. $F'(-40, 16)$, $G'(-16, 16)$, $H'(-16, -32)$ D. $F'(-2.5, 1)$, $G'(-1, 1)$, $H'(-1, -2)$

9. $X(2, -1)$, $Y(-6, 4)$, $Z(-2, -5)$, $k = 5/4$. Which coordinates should be plotted for the image after the dilation centered at the origin?

Original item 14

- A. $X'(2.5, -1.25)$, $Y'(-6, 5)$, $Z'(-2.5, -5)$ B. $X'(1.6, -0.8)$, $Y'(-4.8, 3.2)$, $Z'(-1.6, -4)$
C. $X'(7, -5)$, $Y'(-1, 9)$, $Z'(3, -10)$ D. $X'(2.5, -1.25)$, $Y'(-7.5, 5)$, $Z'(-2.5, -6.25)$

10. $M(4, 6)$, $N(-6, 2)$, $P(0, -8)$, $k = 3/4$. Which coordinates should be plotted for the image after the dilation centered at the origin?

Original item 15

- A. $M'(3, 4.5)$, $N'(-4.5, 1.5)$, $P'(0, -6)$ B. $M'(3, 4.5)$, $N'(-4.5, 2)$, $P'(0, -6)$
C. $M'(5.33, 8)$, $N'(-8, 2.67)$, $P'(0, -10.67)$ D. $M'(1, 4.5)$, $N'(-4.5, 1.5)$, $P'(0, -6)$

11. $R(-2, 6)$, $S(0, -1)$, $T(-5, 3)$, $k = 1.5$. Which coordinates should be plotted for the image after the dilation centered at the origin?

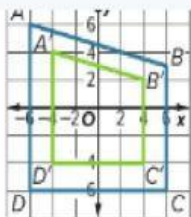
Original item 16

- A. $R'(-3, 6)$, $S'(0, -1)$, $T'(-7.5, 3)$ B. $R'(-2, 9)$, $S'(0, -1.5)$, $T'(-7.5, 4.5)$
C. $R'(-3, 9)$, $S'(0, -1.5)$, $T'(-7.5, 4.5)$ D. $R'(-3, 9)$, $S'(0, -1.5)$, $T'(-5, 4.5)$

SECTION D • DETERMINE THE SCALE FACTOR Items 17–20

12. $A'B'C'D'$ is the image of $ABCD$. From the coordinate graph, what is the scale factor of the dilation?

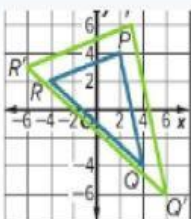
Original item 17



- A. $k = 2$ B. $k = \frac{1}{2}$
C. $k = \frac{2}{3}$ D. $k = \frac{3}{2}$

13. $\triangle P'Q'R'$ is the image of $\triangle PQR$. From the coordinate graph, what is the scale factor of the dilation?

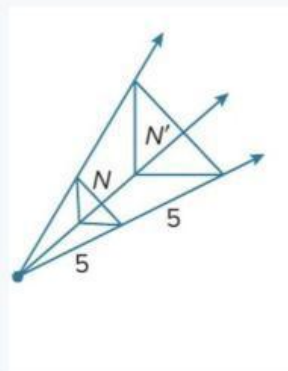
Original item 18



- A. $k = \frac{1}{2}$ B. $k = \frac{3}{2}$
C. $k = \frac{2}{3}$ D. $k = 2$

14. Determine whether the dilation from Figure N to N' is an enlargement or a reduction. Find the scale factor. The diagram shows a distance of 5 from the center to N and another 5 from N to N' along the same ray.

Original item 19



- A. Reduction; $k = 2$ B. Enlargement; $k = \frac{1}{2}$
C. Enlargement; $k = 2$ D. Reduction; $k = \frac{1}{2}$

15. Determine whether the dilation from Figure N to N' is an enlargement or a reduction. Find the scale factor of the dilation.

Original item 20

- A. $C'(7.5, 5)$ B. $C'(10, 4)$
C. $C'(12.5, 5)$ D. $C'(5, 12.5)$

SECTION E • PERIMETER AND DILATION *Item 24*

16. WXYZ has vertices W(6, 2), X(3, 7), Y(-1, 4), and Z(4, -2). Which statement correctly gives the perimeter of WXYZ and the perimeter of its image after a dilation of $\frac{1}{2}$ centered at the origin?

Original item 24

- A. $P = \sqrt{34} + 5 + 4\sqrt{5}$; $P' = \frac{1}{2}(\sqrt{34} + 5 + 4\sqrt{5})$, so the image perimeter is half the original. B. $P = 34 + 5 + 5\sqrt{5}$; $P' = \frac{1}{2}(34 + 5 + 5\sqrt{5})$, so the image perimeter is half the original.
- C. $P = \sqrt{34} + 5 + 5\sqrt{5}$; $P' = \frac{1}{2}(\sqrt{34} + 5 + 5\sqrt{5})$, so the image perimeter is half the original. D. $P = \sqrt{34} + 5 + 5\sqrt{5}$; $P' = 2(\sqrt{34} + 5 + 5\sqrt{5})$, so the image perimeter is double the original.