Unit 6 Review **Name:** _____

I. Applications of Quadratics (DESMOS). Round to the nearest hundredth when necessary.

1. A rock is thrown from the top of a tall building. The height, in feet, between the rock and the ground t seconds after it is thrown is given by $h(t) = -16t^2 + 40t + 382$.

a. How long after the rock is thrown is it 370 feet from the ground?

b. How long will it take for the rock to reach its maximum height?

c. What is the maximum height of the rock?

d. When will the rock hit the ground?

e. Julie is in the building and is looking straight out the window. Julie is 60 feet above the ground. How long after the rock is thrown will Julie see the rock pass by?

2. A concert venue needs to model their profit based on ticket prices. The revenue for the business is modeled by $R(x) = 2500 - 5x^2$ and the operating cost is modeled by $C(x) = 1500 - 200x$, where x is the ticket price. $P(x) = R(x) - C(x)$.

a. Write a function to model the profit, $P(x)$, for the business.

b. Determine the maximum profit.

c. What ticket price will produce the maximum profit?

d. The manager insists on charging \$30 per ticket. How much less profit will the venue make charging \$30 per ticket than if they charged the amount to maximize the profit?

3. A farmer wants to put a fence around a vegetable garden. Only three sides must be fenced, since a rock wall will form the fourth side. If he uses 40 m of fencing what is the maximum area possible?

4. A farmer needs to enclose a rectangular area into 5 equal pens for his animals. He has 480 m of fencing to do this, and plans the arrangement shown. What is the largest area that can be enclosed?

5. The golden arches on the McDonald's logo are created by two identical parabolas. The equation $h(w) = -3.2(w - 2.5)^2 + 20$ models the parabola on the left, where w represents the width in feet and $h(w)$represents the height in feet.

a. How wide is the M?

b. How tall is the M?

II. Dilations & Properties of Dilations

6. After a dilation of ΔRED, $\overline{RE}$ is parallel to $\overline{R'E'}$, $\overline{ED}$ is collinear with $\overline{E'D'}$, and , $\overline{RD}$ is collinear with $\overline{R'D'}$.

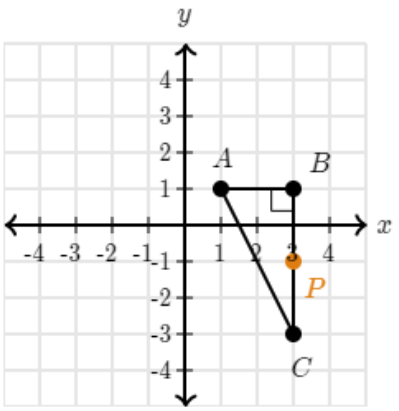
a. Determine the center of dilation.

b. If $ED = 4\ cm$, $RD = 6\ cm$, and $E'D' = 3\ cm$, determine $R'D'$.

c. If $m\angle R = 65°$, $m\angle E = 35°$, determine $m\angle D'$.

d. If the function rule for the dilation is $f(x, y) = (\frac{5}{4}x, \frac{5}{4}y)$, is the dilation an enlargement or reduction?

7. $\Delta A'B'C'$ is the result of dilating ΔABC about the origin by a scale factor of $\frac{1}{2}$. Select ALL correct statements about the related properties of ΔABC and $\Delta A'B'C'$.



A. Points A and A' have the same coordinates.

B. ΔABC and $\Delta A'B'C'$ have the same perimeters.

C. $\overline{BC}$ and $\overline{B'C'}$ are both parallel to the y-axis.

D. The distance from the origin to point C' is the half of the distance from the origin to point C.

E. The $m\angle B = 90°$ and $m\angle B' = 45°$.

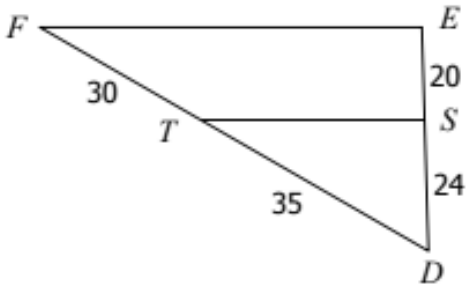
F. $m\angle C = m\angle C'$

8. The function rule $f(x, y) = (\frac{1}{2}x, \frac{1}{2}y)$ was used to dilate $\overline{ML}$ to create $\overline{M'L'}$. If the range of is $\{M'(-18, 2), L'(0, \frac{1}{2})$, determine the domain.

III. Triangle Similarity

Determine if the triangles are similar. If they are similar, write a similarity statement. Show all work to justify your conclusion.

9.



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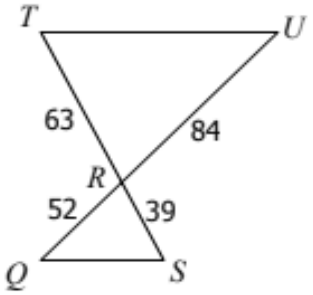

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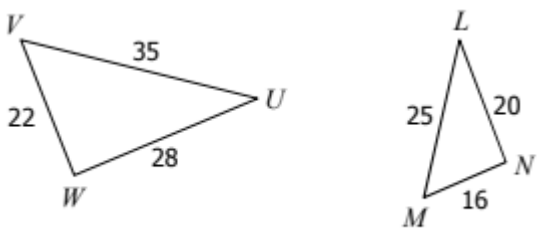

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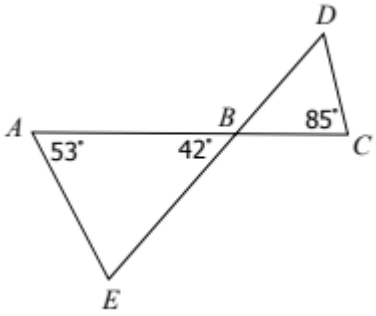

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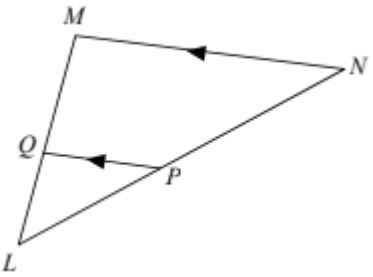

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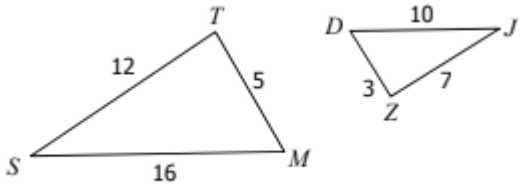
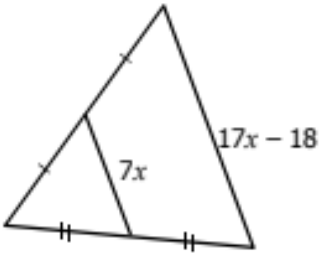
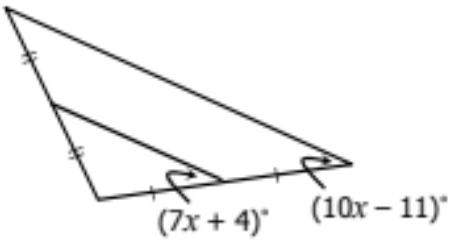


IV. Triangle Midsegment & Proportionality Theorem, Solving Similar Triangles

15. Solve for x.

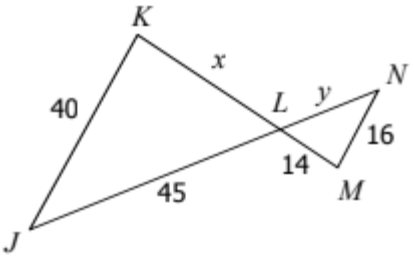


16. Solve for x.



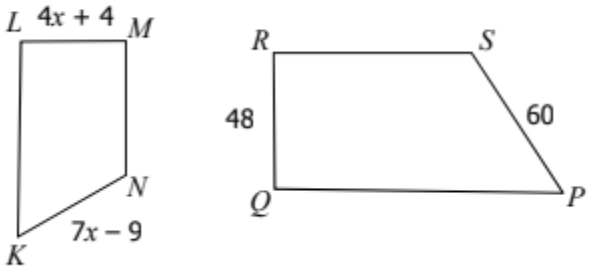
17. Solve for x and y.

$\Delta JKL \sim \Delta NML$



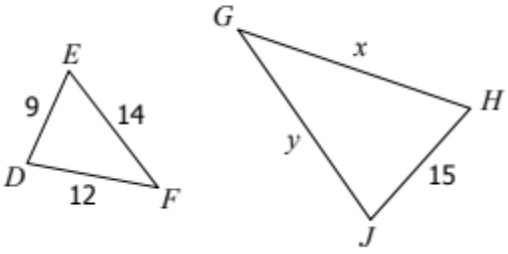
18. Solve for x.

$KLMN \sim PQRS$



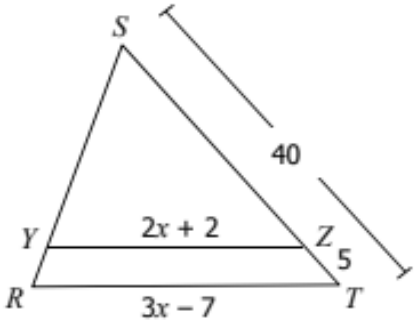
19. Solve for x and y.

$\Delta DEF \sim \Delta HJG$



20. Solve for x.

$\Delta RST \sim \Delta YSZ$



21. 17th, 18th, 19th, and 20th Street are parallel. Solve for x and y. Round to the nearest tenth.