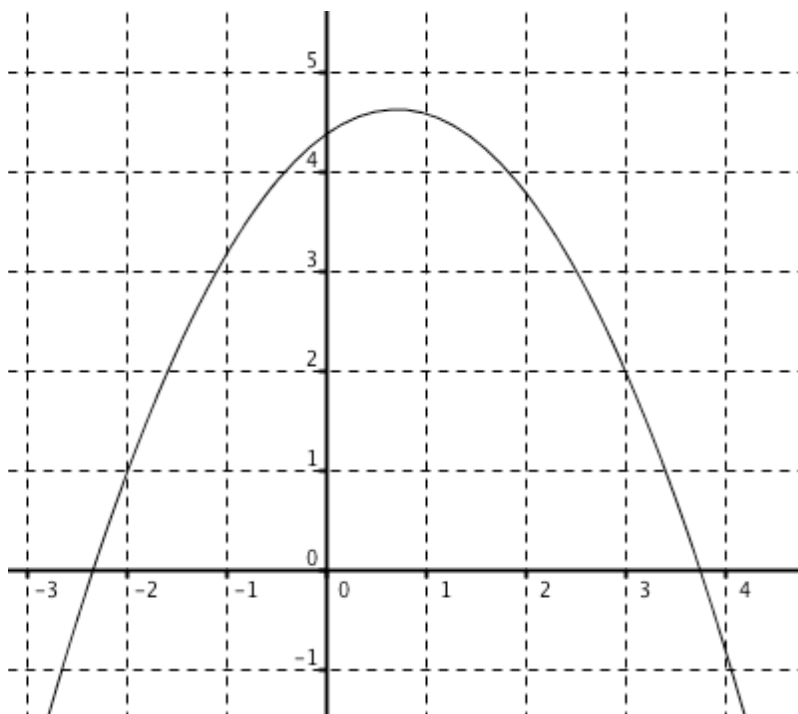


Instructions:

- May 31 – Jun 8: Complete and review the six questions included in this package as preparation for the culminating activity test. Your work at this stage will not be graded.
- Thursday, June 9: Your test will include three of these questions. The numbers will be different, the questions may be shortened, but they will otherwise be the same as they are here.

1. Simplify the rational expression $\frac{8x - 40}{x^2 - 11x + 30} \div \frac{2x - 6}{x^2 - 36} - \frac{5}{x - 1}$. State all restrictions.

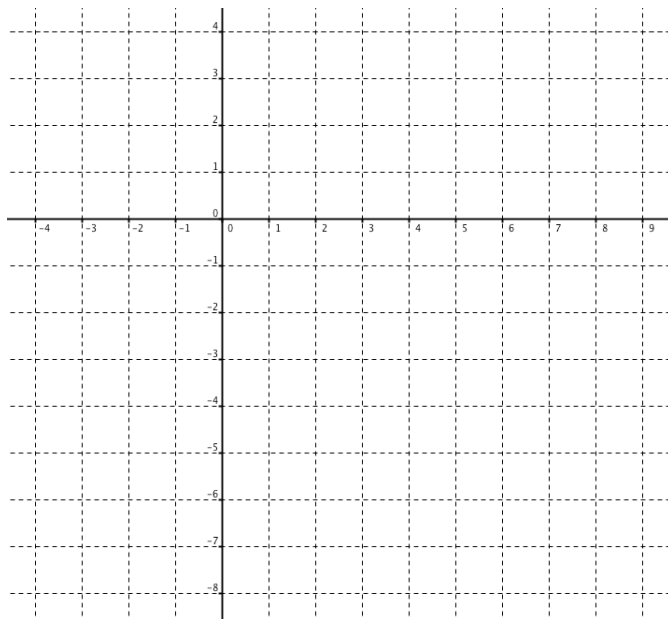
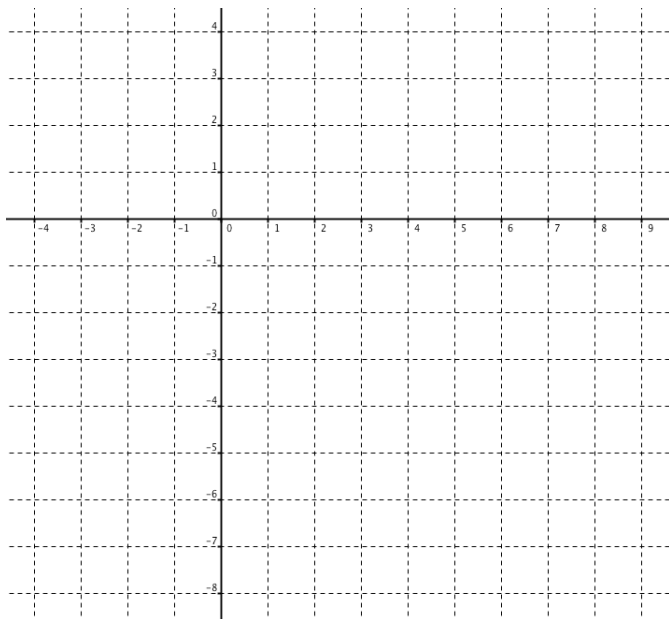
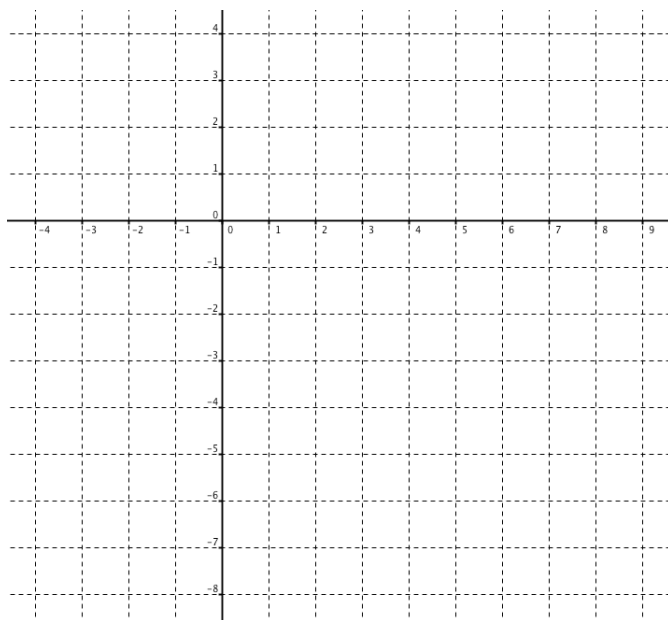
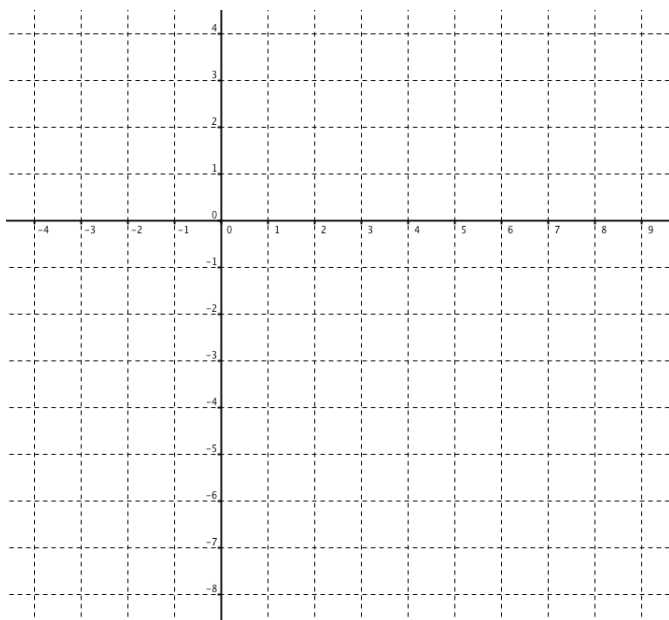
2. Use the approximate values of the x-intercepts of the following parabola (along with one other point) to determine its equation in standard form. Use at least two decimal places for all calculations. Check the accuracy of your equation by comparing its vertex to the vertex shown in the graph.



3. Carefully read the following equations representing different kinds of functions:

$$p(x) = 3^{x-1} - 5 \quad q(x) = 3x^{-1} - 5 \quad r(x) = 3x^{1/2} - 5 \quad s(x) = 3^{1/2x} - 5 \quad t(x) = 3x^2 - 5$$

- Graph these functions on the grids provided.
- Write the equation of the base graph for each of these functions.
- Describe any similarities and differences between the transformations applied to each graph.



$\tan \theta = \frac{\sin \theta}{\cos \theta}$	$\sin^2 \theta + \cos^2 \theta = 1$	$\csc \theta = \frac{1}{\sin \theta}$	$\sec \theta = \frac{1}{\cos \theta}$	$\cot \theta = \frac{1}{\tan \theta}$
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4. Use the basic trigonometric identities provided above to prove the following:

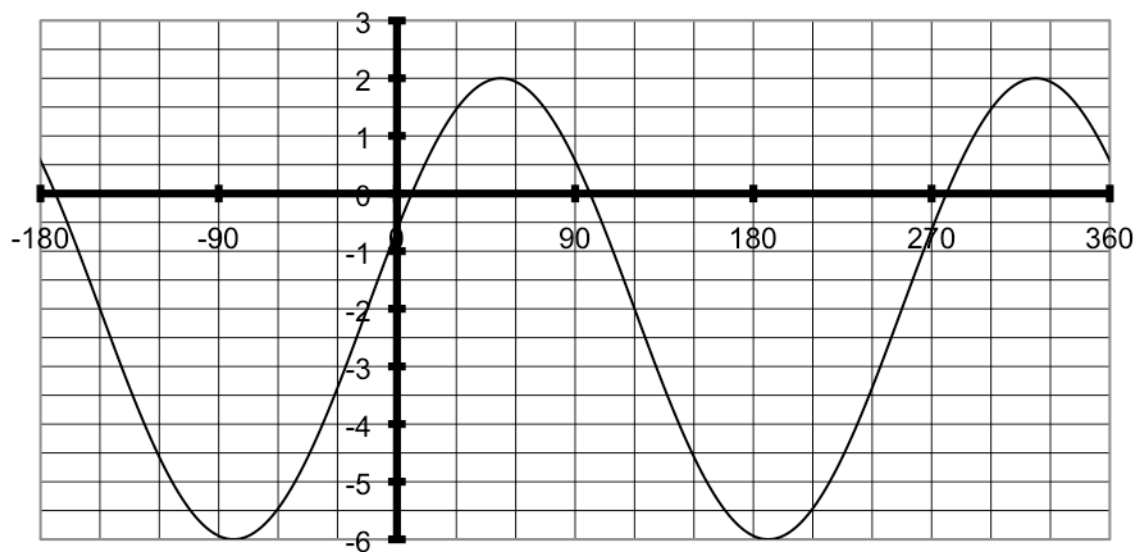
a) $\tan^2 \theta + 1 = \sec^2 \theta$

b) $\tan^2 \theta \csc^2 \theta - 1 = \tan^2 \theta$

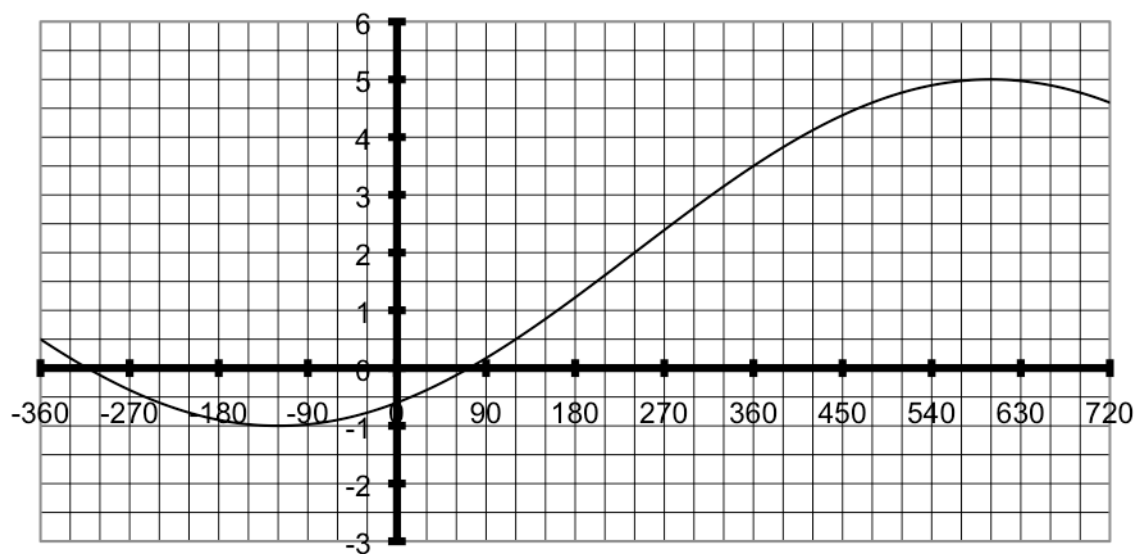
c) $\sec^2 \theta \cot^2 \theta = 1 + \cot^2 \theta$

5. Determine equations to model the sinusoidal functions shown in the graphs below.

a)



b)



6. John inherited \$340,000 at the age of 42. He decided to invest the money as retirement savings, and was able to earn interest at a rate of 4.5% per year, compounded quarterly.
- a) Calculate the value of his retirement savings when he is 55 years old (round to the nearest dollar).
 - b) Calculate the regular monthly payment that John will receive between the ages of 55 and 85 years if he converts his investment to an annuity earning 3.6% interest compounded monthly.