AccelerateLEARNING
THE LEADER in STEM EDUCATION

Independent Skills Practice Books

DIGITAL SAMPLE

Independent Skills Practice Books complement any math curriculum with multi-purpose practice problems perfect for homework, centers, review, and extra practice. Our team hopes this sample provides valuable insight into the content and format of these resources.

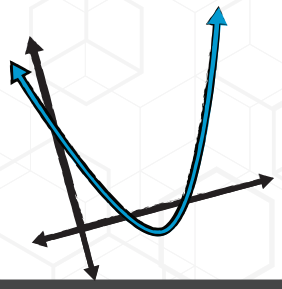
About Accelerate Learning

Accelerate Learning is dedicated to transforming the STEM landscape. Through innovative solutions, we empower educators and engage learners to maximize growth and achievement. We want teachers AND students to have the tools they need to engage in STEM in a more meaningful way.

Name: _____ Date: _____

SKILL E

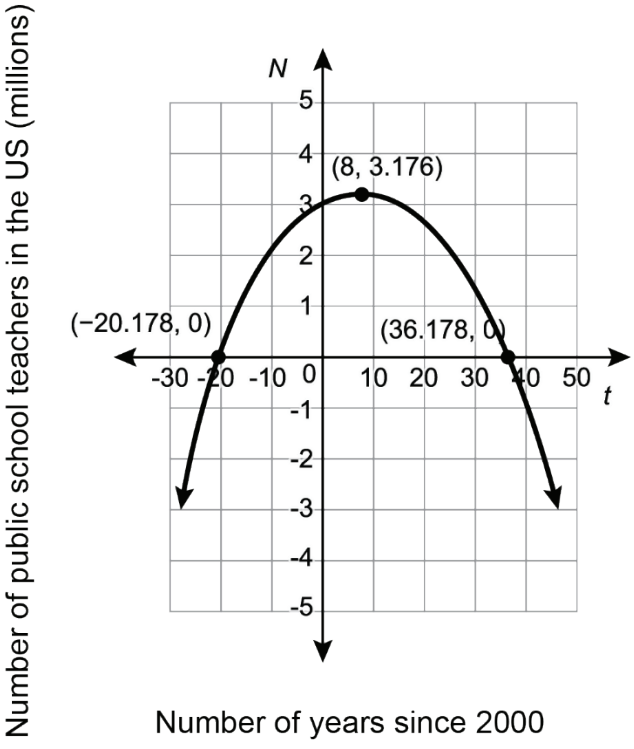
I can interpret key features of quadratic relationships in a real-world context.



Guided Practice

Use the guiding tips to solve the problem. Scan the QR code to watch a video tutorial.

1 The National Center for Education Statistics (NCES) keeps track of the number of public school teachers in the US. Using data from the years 2000–2013, the number of teachers in the US can be modeled by the function $N(t) = -0.004t^2 + 0.064t + 2.92$, where N is the number of public school teachers in millions, and t is the number of years since 2000. The graph of the function is shown.



a. Interpret the vertex of $N(t)$ in context.

b. Find the y-intercept, and interpret it in context.

c. Explain which x-intercept(s), if any, make sense in context.

Guiding Tips

Use these if you need help.

- The vertex is the maximum or minimum of a quadratic function.
- The *y*-intercept is the *y* value when *x* = 0. In this example, this is the value of *N* when *t* = 0, or *N* (0).
- The *x*-intercepts are the *x* values where the function is equal to 0. In this example, these are values of *t* where *N* (*t*) = 0.

Video Tutorial

A video about how to solve.

I can interpret key features of quadratic relationships in a real-world context.

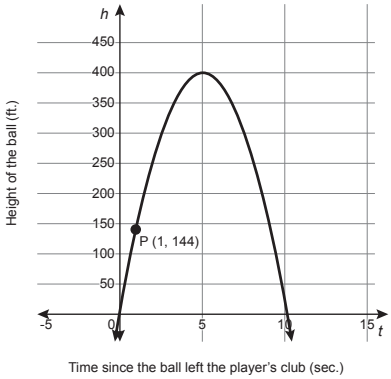
Independent Practice

Solve the following questions using the skills from problem 1.

2 Bella recorded the altitude of the sun between sunrise and sunset on an October day in Sacramento, California. The altitude of the sun is represented by the angle the sun makes with the horizon. She found the altitude could be modeled by the quadratic function $A(t) = -1.6(t - 8)(t - 18)$, where A is the angle the sun makes with the horizon, in degrees, and t is the time, in hours, after midnight.

Find and interpret the x-intercepts in context.

3 The path of a golf ball hit from a player's club can be modeled by a quadratic function, $h(t) = -16t^2 + 160t$, where h represents the height of the ball in feet (ft.) and t represents the time since the ball left the player's club in seconds (sec.). The graph of the function is shown with the coordinates of point P labeled.



Interpret point P in context.

4 After a car is purchased, its value tends to depreciate over the years. However, the value of classic cars will often increase after many years if they are kept in good condition. The value of a certain classic car sold in 1950, adjusted for inflation, can be modeled by a quadratic function, $V(t) = 0.25t^2 - 7.5t + 67.9$, where V is the car's value in today's dollars in thousands of dollars and t is the number of years since 1950.

Find and interpret the y-intercept in context.

5 The math club at a high school wants to sell T-shirts to raise money for a competition. They discover that their weekly profit depends on the selling price of the T-shirts. The profit can be modeled by the function $P(x) = -5(x - 5)(x - 19)$, where P represents the club's weekly profit in dollars and x represents the sale price of the T-shirts in dollars.

Find and interpret the x-intercepts of the function in context.

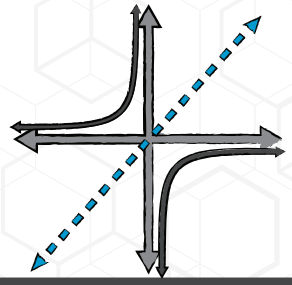
6 Silas is building a fence that will surround a grazing enclosure for his horse. He has 600 ft. of fencing and wants his horse to have as much room as possible. The function $A(x) = -(x - 150)^2 + 22{,}500$ models the situation where A represents the area in square feet (sq. ft.) of the enclosure and x represents the length in ft. of the fence.

Find and interpret the vertex in context.

Name: _____ Date: _____

SKILL A

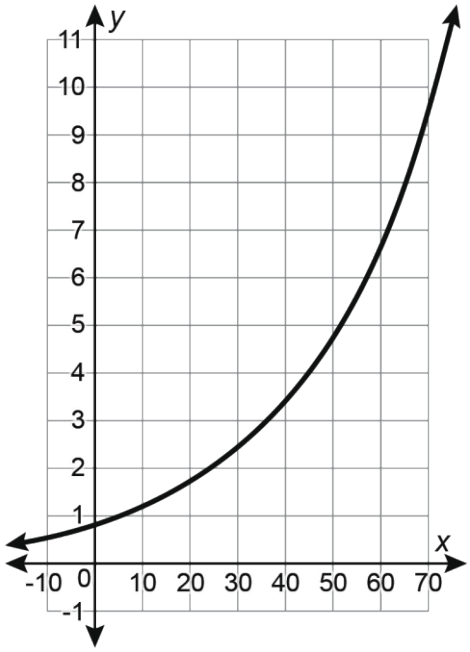
I can interpret key features of an exponential function that models a real-world context.



Guided Practice

Use the guiding tips to solve the problem. Scan the QR code to watch a video tutorial.

1 The annual average US ticket price at a movie theater has been steadily increasing since 1948, when the record of movie ticket prices first began. The ticket prices x years after 1948 are shown on the coordinate plane. The average cost of movie tickets in the US, y, can be modeled by the function $y = 0.855(1.035)^x$, where x is the number of years since 1948.



Complete the table to identify and interpret the key features of the model in context.

Key Feature		Interpretation
Domain		
Range		
y-intercept		

Guiding Tips

Use these if you need help.

- In a real-world context, it is important to verify which values of the domain and range make sense and limit the key features as needed.
- The y-intercept of an exponential function is often the initial value or measurement in the model.

Video Tutorial

A video about how to solve.

I can interpret key features of an exponential function that models a real-world context.

Independent Practice

Solve the following questions using the skills from problem 1.

Use the following information to answers questions 2 and 3.

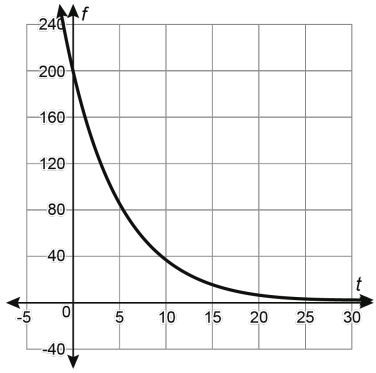
At the end of 2022, the population in Ahmed's town was approximately $35{,}240$ people. Using available data, he noted that the population of his town has grown at a constant rate of 3.1% per year since then. Ahmed created a model, $p(x) = 35{,}240e^{1.031x}$, that can be used to predict the population of his town x years after 2022.

2. Identify and interpret the range of Ahmed's model in this context.

3. Identify and interpret the domain of Ahmed's model in this context.

Use the following information to answer questions 4–6.

The effectiveness of medicine decreases over time. A study on a new headache medication found that the medication is only 85% as effective as it was in the previous hour. Eventually, the patient does not have enough medication in their bloodstream for it to be effective and needs another dose. The amount of medication in milligrams (mg) available in the system after t hours can be modeled by the function $f(t) = 200(0.85)^t$. The graph of $f(t)$ is shown on the coordinate plane.



4. Interpret the domain of $f(t)$ in this context.

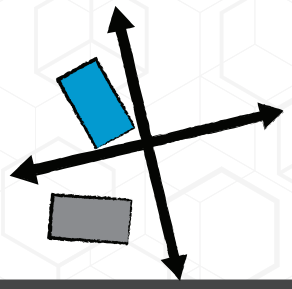
5. Interpret the range of $f(t)$ in this context.

6. Interpret the y-intercept of $f(t)$ in this context.

Name: _____ Date: _____

SKILL A

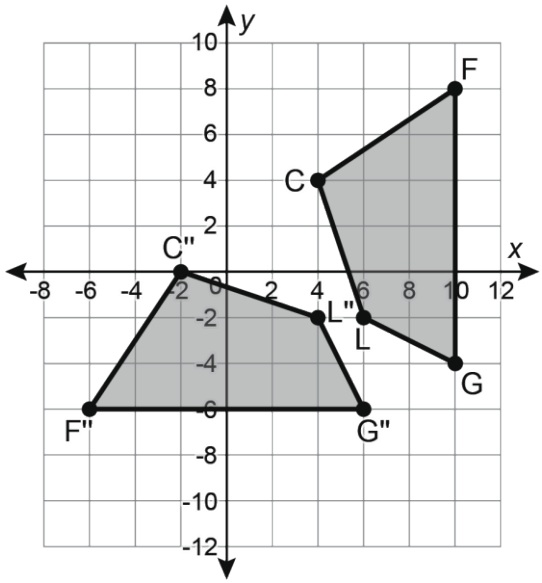
I can specify a sequence of transformations that will map a given figure onto another congruent figure.



Guided Practice

Use the guiding tips to solve the problem. Scan the QR code to watch a video tutorial.

1 Quadrilateral $CFGL$ was transformed to create quadrilateral $C''F''G''L''$, as shown on the coordinate plane.



a. Describe the sequence of two transformations that mapped quadrilateral $CFGL$ onto quadrilateral $C''F''G''L''$.

b. Write the sequence of two transformations using algebraic descriptions.

Guiding Tips

Use these if you need help.

- Use the orientation and position of the image compared to the preimage to help determine whether a rotation, reflection, and/or translation has occurred to map the given figure onto the other congruent figure.
- Identify corresponding sides and points to help determine the individual transformations in the sequence. Verify that the sequence of transformations you identify maps all points of the preimage to the image.
- More than one sequence of transformations can map a given figure onto another congruent figure.

Video Tutorial

A video about how to solve.

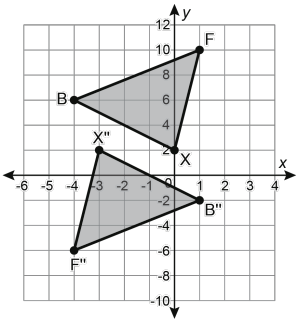
I can specify a sequence of transformations that will map a given figure onto another congruent figure.

Independent Practice

Solve the following questions using the skills from problem 1.

Use the following information to answer questions 2–4.

A sequence of two transformations maps triangle BFX onto triangle $B''F''X''$, as shown on the coordinate plane.



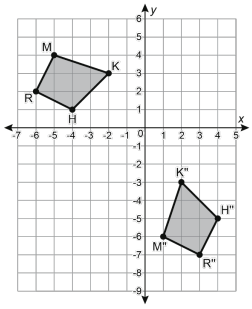
2 Identify the first transformation in the sequence so triangle BFX is oriented the same way as triangle $B''F''X''$.

3 Identify the second transformation in the sequence so the result for triangle BFX from question 2 maps onto triangle $B''F''X''$.

4 Write the sequence of transformations from questions 2 and 3 that maps triangle BFX onto triangle $B''F''X''$ using algebraic descriptions.

Use the following information to answer questions 5 and 6.

Quadrilaterals $HKMR$ and $H''K''M''R''$ are shown on the coordinate plane.



Martin described the transformation that maps quadrilateral $HKMR$ onto $H''K''M''R''$ as a translation 1 unit left and 5 units down followed by a rotation of $90°$ counterclockwise about the origin.

Ahmari described the transformation as a rotation of $270°$ clockwise about the origin followed by a translation right 5 units and down 1 unit.

5 Explain who is correct, if anyone.

6 Write a sequence of transformations that maps quadrilateral $HKMR$ onto $H''K''M''R''$using algebraic descriptions.