

Algebra II

Building, Interpreting and Solving Functions

Students will be required to

- ✚ use mathematical properties to reveal key features of polynomial, exponential, rational, trigonometric, and logarithmic functions.
- ✚ sketch graphs of polynomial, exponential, rational, trigonometric, and logarithmic functions.
- ✚ identify characteristics of the relationship between two quantities in a graph.
- ✚ apply the Remainder Theorem.
- ✚ identify how changing parameters of functions impacts key features of the graph.
- ✚ compare rate of change associated with different intervals.
- ✚ calculate and interpret average rate of change of polynomial, exponential, logarithmic, or trigonometric functions (presented symbolically or in a table) over a specified interval.
- ✚ estimate rates of change from a graph.
- ✚ build functions that model mathematical and contextual situations including those requiring multiple trigonometric functions, sequences, and combinations.
- ✚ use models to solve interpret and generalize about problems.
- ✚ given functions in different forms write multiple equivalent versions of the functions and identifies key features.
- ✚ graph polynomial, exponential, trigonometric, and logarithmic functions showing key features.
- ✚ determine how the changes in a function impact their other representations.

Performance Level Descriptors Covered

- ✚ Interpreting Functions: A-APR.2, A-REI.11, F-IF.4
- ✚ Rate of Change: F-IF.6, F-IF.7
- ✚ Building Functions: A.SSE.4, F-BF.1b, F-BF.2
- ✚ Interpreting Functions: F-IF.7c, F-IF.7e, F-IF.8b, F-IF.9

Name _____

A-APR.2

1. The function $g(x)$ is defined as follows:

- when $g(x)$ is divided by $(x + 4)$ the remainder is 12
- when $g(x)$ is divided by $(x - 1)$ the remainder is -11
- when $g(x)$ is divided by $(x + 2)$ the remainder is 7.

Which of the following are true? Select **all** that apply.

A. $g(2) = 7$

B. $g(1) = -11$

C. $g(-4) = 12$

D. $g(7) = 2$

E. $g(12) = -4$

F-IF.6

2. What is the average rate of change of the function, $h(x) = 0.75(6)^x$ over the interval $[-1, 2]$? Write your answer in the box.

Average rate of change:

F-BF.2

3. Write an equation for the n^{th} term of the arithmetic sequence shown below.

6, 13, 20, 27. . .



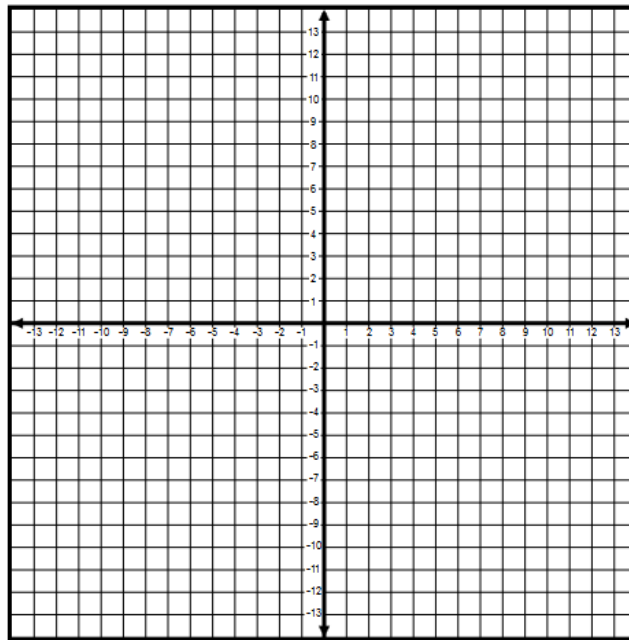
- ▶ Math symbols
- ▶ Relations
- ▶ Geometry
- ▶ Groups
- ▶ Trigonometry
- ▶ Statistics
- ▶ Greek

A-REI.11

4. Graph the system of equations. Then approximate the solution.

$$\begin{cases} y = 3(0.5)^x \\ y = 0.5x + 3 \end{cases}$$

- Linear
- Absolute Value
- Quadratic
- Exponential
- Logarithmic
- Sin/Cos
- Tan/Cotan



Solution = $\left(\boxed{}, \boxed{} \right)$

F-BF.1b

5. The functions $k(x) = 3x^2 + 2$ and $w(x) = 0.5x + 1$. Rewrite the function

$$h(x) = \frac{2k(3x) + w(x)}{k(x)}$$

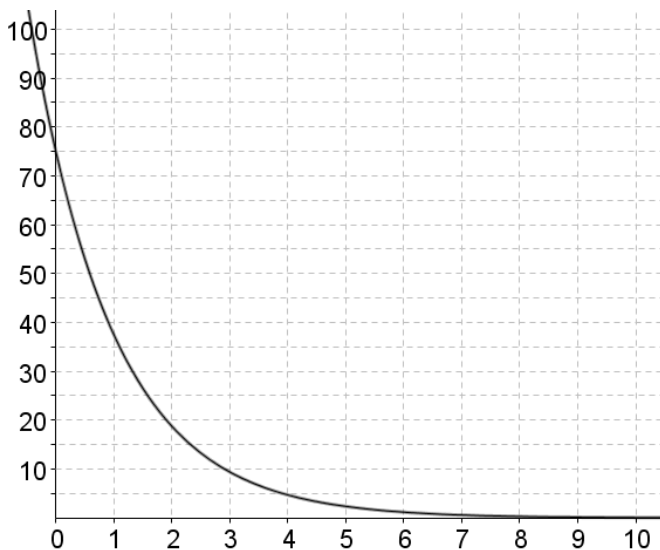


$h(x) = \square$

- ▶ Math symbols
- ▶ Relations
- ▶ Geometry
- ▶ Groups
- ▶ Trigonometry
- ▶ Statistics
- ▶ Greek

F-IF.4

6. A soccer tournament starts with 78 teams. During each round, half of the teams are eliminated. The graph below shows the number of teams remaining y after x rounds of play.



Suppose the number of teams was increased to 100 before any play begins. Which describes how the graph of the function changes? Chose the correct answer.

- A. The x -intercept will change to 100.
- B. The y -intercept will change to 100.
- C. The graph will change to an increasing function.
- D. The graph will change to a decreasing function.

A-SSE.4

7. Marc is driving a post into the ground for a mailbox. The distance the post moves in to the ground based upon the number of swings is shown in the table below.

Swing	1	2	3	4
Distance into ground (in.)	6	3.6	2.16	1.296

After 6 strokes, how far did Marc drive the post into the ground? Write your answer in the box.

inches

F-IF.7c

8. What are the zeros of the $t(x)$?

$$t(x) = x^3 + 3x^2 - 4x - 12$$

Enter your answers in the space provided. You may not need to use all answer boxes.



$x =$
 $x =$
 $x =$
 $x =$

- ▶ Math symbols
- ▶ Relations
- ▶ Geometry
- ▶ Groups
- ▶ Trigonometry
- ▶ Statistics
- ▶ Greek

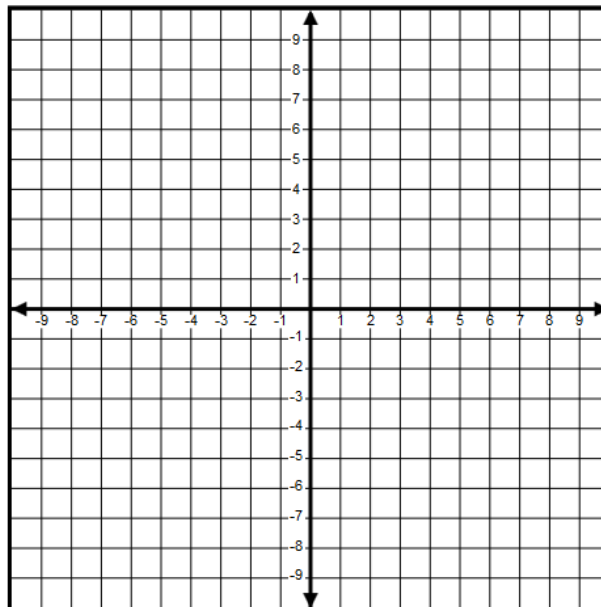
F-IF.7e

9. Using your knowledge of period, amplitude, and points on the midline, graph the function

$$f(x) = \cos \frac{\pi}{2} x + 1$$

First, select the Sin/Cos button. Then, drag the two points to graph the function. One point is on the midline and the other point is on either the minimum or maximum within the same period of the function.

Sin/Cos



F-IF.8b

10. The function $b(h) = (1.07)^h$ represents the number of bacteria on an object after h hours or d days. Which equations are equivalent to $b(h)$? Select **all** that apply.

A. $m(d) = (12.07)^{12d}$

B. $f(d) = \frac{1.07^d}{24}$

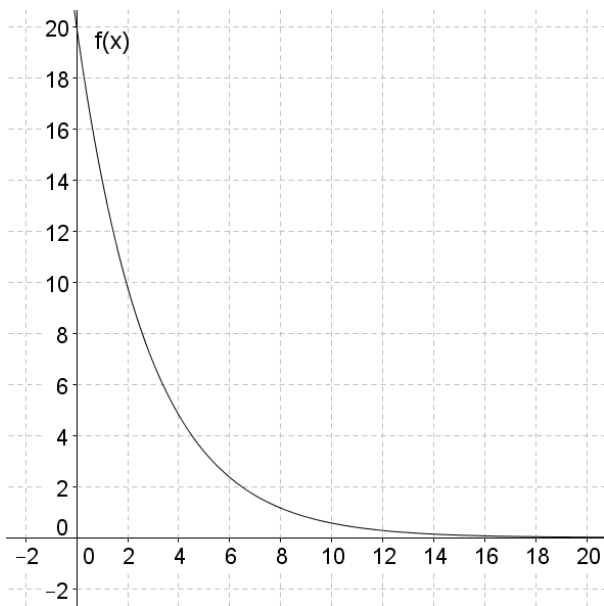
C. $g(d) = 24(1.07)^d$

D. $k(d) = (1.07)^{24d}$

E. $e(d) = (5.07)^d$

F-IF.9

11. Select from the dropdown menu to create a true inequality to compare the two functions.



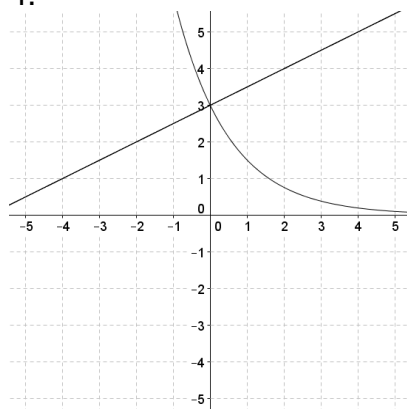
$g(x)$	
x	y
1	9
2	16
3	23
4	30
5	37
6	44

$f(5)$

Choose	<input type="button" value="v"/>
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 $g(5)$

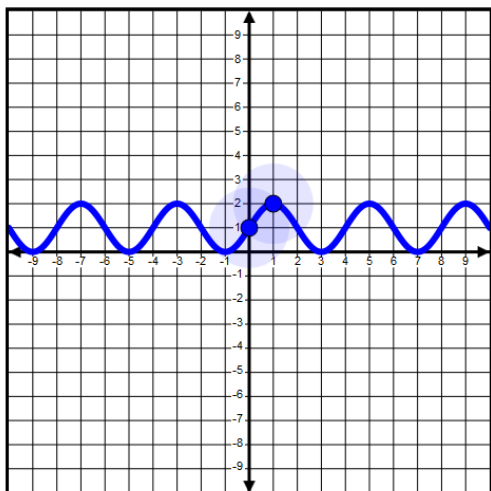
1. B, C
2. 26.875
3. $a_n = 7n - 1$
- 4.



Solution = (0,3)

5. $h(x) = \frac{54x^2 + 0.5x + 5}{3x^2 + 2}$

6. B
- A-SSE.4
7. 14.30016 inches
8. 2, -2, -3
- 9.



10. D, E

11. <