

STEM Accelerated Algebra I Unit 3 Study Guide

1. Understand the main differences between linear and exponential functions [3.1]
2. Be able to model linear functions algebraically, graphically, analytically & verbally [Unit 2 and 3.1]
3. Be able to model exponential functions algebraically, graphically, analytically & verbally [Unit 2 and 3.1]
4. Know that exponential functions' y-values will eventually exceed linear functions' y-values [3.1]
5. Know the transformation rules for exponential functions [3.2]
6. Be able to match algebraic exponential functions with the graph of exponential functions [3.2]
 - ① $f(x) = (a)(r)^x + c \rightarrow$ shift up c units $f(x) + c$
 - ② $f(x) = (a)(r)^x - c \rightarrow$ shift down c units $f(x) - c$
 - ③ $f(x) = (a)(r^{x+c}) \rightarrow$ shift left c units $f(x+c)$
 - ④ $f(x) = (a)(r^{x-c}) \rightarrow$ shift right c units $f(x-c)$
 - ⑤ $f(x) = (a)(r)^x$ if $0 < b < 1 \rightarrow$ reflection across y-axis
 - ⑥ $f(x) = -a(r)^x \rightarrow$ reflection across x-axis
7. Be able to identify the characteristics of graphs such as domain, range, asymptote, y-intercept, x-intercept & end behavior [3.3]
8. Be able to determine the rate of change between two points using the slope formula.

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

9. Be able to compute exponential growth or exponential decay when given a real-world scenario.

$$A = P(1+r)^n$$

A = Total Amt. of Money

P = Principal (deposit)

r = rate (in decimal)

n = number of years

ANNUAL GROWTH

$$f(x) = a(1+r)^n$$

ANNUAL DECAY

$$f(x) = a(1-r)^n$$

10. Be able to evaluate functions when given an algebraic, graphical or analytical function.

TEST FORMAT

90 minute examination

SECTION 1 Multiple-choice questions about 20-25 questions.

55 minutes → 70% of test grade

SECTION 2 Essay Component

35 minutes → 30% of test grade

ESSAY TOPIC: Comparing characteristics of Linear Functions & Exponential Functions.

1st Paragraph - Introduction (3 to 4 sentences)

Answer the following: What is a function? Describe the different representations a function can be. In addition, discuss a way to determine if a representation (graphical) is a function.

Write a thesis statement that will sum up that the essay will be over linear & exponential functions.

2nd Paragraph - Linear Functions (3-4 sentences)

Discuss what linear functions are and what their particular characteristics are. Discuss at least 3 characteristics.

3rd Paragraph - Exponential Functions (3-4 sentences)

Discuss what exponential functions are and what their particular characteristics are. Discuss at least 3 characteristics.

4th Paragraph - Closing Paragraph

Discuss at least 2 similarities between linear & exponential functions. Close the essay by discussing which type of function will eventually have higher y-values.