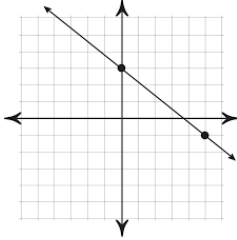


2.1 Linear & Quadratic Functions and Modeling

Review Target: Graph and Solve Quadratic Functions

*Review of Prior Concepts***Find the slope of the line:**

a)

b) that contains the points $(2, -3)$ and $(5, 1)$ **More Practice****Finding Slope of a Line**<http://www.coolmath.com/algebra/08-lines/06-finding-slope-line-given-two-points-01><https://www.khanacademy.org/math/algebra/two-var-linear-equations/slope/v/slope-of-a-line><http://www.mathwarehouse.com/algebra/linear-equation/slope-of-a-line.php>https://www.youtube.com/watch?v=Z31F_75C_VE**SAT Connection****Heart of Algebra**

1. Create, solve, or interpret a linear expression or equation in one variable that represents a context.

Example:

$$h = 3a + 28.6$$

A pediatrician uses the model above to estimate the height h of a boy, in inches, in terms of the boy's age a , in years, between the ages of 2 and 5. Based on the model, what is the estimated increase, in inches, of a boy's height each year?

- A) 3
- B) 5.7
- C) 9.5
- D) 14.3

Solution

Polynomial Functions

A polynomial function of degree n (where n is a nonnegative integer) is written as:

$$f(x) =$$



Example:

Write a sample polynomial:

$$f(x) =$$

Degree:

Leading coefficient:

Name	Form	Degree

Linear Function

$$f(x) =$$

One of the forms below is needed to write a linear function.

Slope-Intercept Form	Point-Slope Form

Example: Write an equation for the linear function, $f(x)$, where $f(1) = 3$ and $f(-2) = 9$.

Quadratic Function

Standard Form	Vertex Form

Find the vertex, find the axis of symmetry, and describe the opening of the function:

Example 1:

$$f(x) = 3(x + 2)^2 - 7$$

Example 2:

$$g(x) = -2x^2 + 7x - 3$$

Example 3:

$$h(x) = 8 + 2x - x^2$$

Example 4:

Write the quadratic equation with the vertex $(2, -7)$ and the point $(4, 5)$.

More Practice

Writing Linear Equations

<http://www.mathsisfun.com/algebra/linear-equations.html>

<http://www.mathplanet.com/education/algebra-1/formulating-linear-equations/writing-linear-equations-using-the-slope-intercept-form>

<https://www.khanacademy.org/math/algebra/two-var-linear-equations/point-slope/v/idea-behind-point-slope-form>

<https://www.youtube.com/watch?v=eHPTyYbNmx4>

Quadratic Functions

<http://mathbitsnotebook.com/Algebra1/Quadratics/QDVertexForm.html>

<http://www.purplemath.com/modules/grphquad2.htm>

<http://jwilson.coe.uga.edu/emt668/emt6680.f99/jones/instructional%20unit/writingquads.html>

<https://www.youtube.com/watch?v=0vSVCN3kJTY>

<https://www.youtube.com/watch?v=Pk-vBgl67JI>

<https://www.youtube.com/watch?v=BYlWhtgUwJI>

Homework Assignment

p.169 #9,13,16,17,21,23, 25,27,35,39

SAT Connection**Solution**

Choice A is correct. In the equation $h = 3a + 28.6$, if a , the age of the boy, increases by 1, then h becomes $h = 3(a + 1) + 28.6 = 3a + 3 + 28.6 = (3a + 28.6) + 3$. Therefore, the model estimates that the boy's height increases by 3 inches each year.

Alternatively: The height, h , is a linear function of the age, a , of the boy. The coefficient 3 can be interpreted as the rate of change of the function; in this case, the rate of change can be described as a change of 3 inches in height for every additional year in age.

Choices B, C, and D are incorrect and are likely to result from common errors in calculating the value of h or in calculating the difference between the values of h for different values of a .