

A SAMPLE OF WHAT YOUR CHILD WILL BE DOING TO PREPARE FOR COLLEGE AND CAREER

- Working with rational and irrational numbers, including working with rational exponents
- Solving real-world and mathematical problems by writing and solving nonlinear equations, such as quadratic equations
- Interpreting algebraic expressions and transforming them purposefully to solve problems (e.g., in solving a problem about a loan with interest rate r and principal P , seeing the expression $P(1+r)^n$ as a product of P with a factor not depending on P)
- Analyzing functions algebraically and graphically, and working with functions presented in different forms (e.g., given a graph of one quadratic function and an algebraic expression for another, say which has the larger maximum)
- Working with function families and understanding their behavior (such as linear, quadratic, and exponential functions)
- Analyzing real-world situations using mathematics to understand the situation better and optimize, troubleshoot, or make an informed decision (e.g., estimating water and food needs in a disaster area)
- Working with probability and using ideas from probability in everyday situations

MATHEMATICAL PRACTICES

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

TALK TO YOUR CHILD'S TEACHER

Don't be afraid to reach out to your child's teacher—you are still an important part of your child's education. Ask to see samples of your child's work and discuss his or her progress with the teacher using questions like:

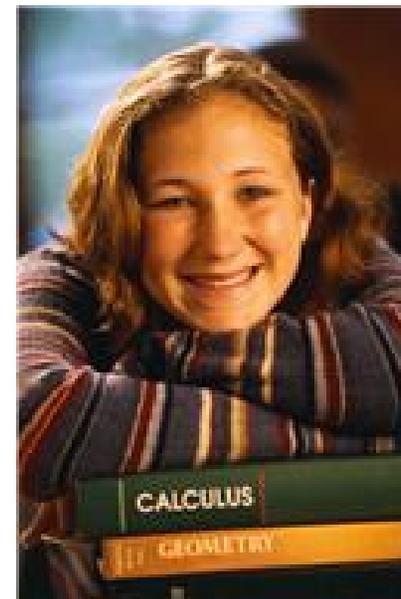
- Where is my child excelling? How can I support this success?
- What do you think is giving my child the most trouble? How can I help my child improve in this area?
- Are there options provided by the school for enrichment experiences or for students having difficulty in mathematics?
- Is there a resource outside of class for students to ask questions about their homework or what they are learning?

HELPING YOUR CHILD LEARN OUTSIDE OF SCHOOL

- Show your enthusiasm for your child's study of mathematics.
- Encourage your child to be persistent; make sure that he or she knows that mathematics requires patience, practice, and time to think and reflect.
- Urge your child to ask the teacher questions either during or after class.
- Encourage your child to review class notes every night. If there is something he or she doesn't understand, tell your child to look at the answers and work backwards to determine how the solution was found.

High School

Parent Resource Mathematics



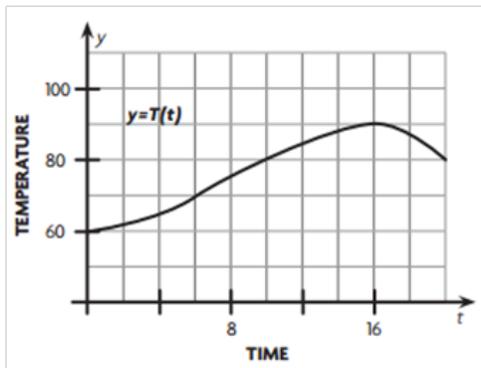
COMMON CORE STATE STANDARDS



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EXAMPLES OF CONNECTING FUNCTIONS, ALGEBRA, AND MODELING

The figure shows the graph of T , the temperature (in degrees Fahrenheit) over one particular 20-hour period as a function of time t .



- Estimate $T(14)$.
- If $t=0$ corresponds to midnight, interpret what we mean by $t(14)$ in words.
- From the graph, estimate the highest temperature during this 20-hour period.
- If Anya wants to go for a two-hour hike and return before the temperature is over 80 degrees, when should she leave?

Solution:

In this task, $T(14)$ means that 14 hours after midnight, the temperature is a little less than 90 degrees Fahrenheit; $T(14)$ is 2:00 p.m. The highest temperature on the graph is about 90 degrees. The temperature was decreasing between 4:00 p.m. and 8:00 p.m. It might have continued to decrease after that, but there is no information about the temperature after 8:00 p.m. If Anya wants to go for a two-hour hike and return before the temperature is over 80 degrees, then she should start her hike before 8:00 a.m.

Note: This is a straight-forward assessment task of reading and interpreting graphs. It requires an understanding of function notation and reinforces the idea that when a variable represents time, $t=0$ is chosen as an arbitrary point in time and positive times are interpreted as times that happen after that point.

Algebraic Expressions

8th Grade Mathematics

- Know and apply the properties of integer exponents (positive numbers, negative numbers, or 0) to write equivalent expressions (such as $4^2 \cdot 4^3 = 4^5$, where " \cdot " means to multiply).
- Graph proportional relationships, identifying the unit rate as the slope (how steep or how flat a line is).
- Solve linear equations (equations that make a straight line when they are graphed, such as $y=2x+1$).

High School Mathematics

- Interpret the structure of an expression.
- Use the structure of an expression to identify ways to rewrite it. for example, $x^4 - y^4 = (x^2)^2 - (y^2)^2$.
- Interpret one or more parts of an expression individually. for example, interpret $6+(x-2)^2$ as the sum of a constant and the square of $x-2$.
- Solve quadratic equations (equations that include the square of a variable, such as $5x^2 - 3x + 3 = 0$).
- Factor a quadratic expression to reveal the zeros of the function it defines.

High School Mathematics

- Write expressions in equivalent forms to solve problems.
- Use the properties of exponents to transform and evaluate expressions. For example, interpret $(8^{2/3})^2 = (8^{1/3})^4 = 2^4 = 16$.
- Derive the formula for the sum of a finite geometric series, and use the formula to solve problems. For example, 3, 12, 48, 192 is a finite series where the ratio between each term is 4; $12/3=48/12=192/48=4$.
- Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines.

Relationships Between Quantities

8th Grade Mathematics

- Understand that a function is a rule that assigns to each input exactly one output, and the graph of a function is a set of ordered pairs consisting of an input and a corresponding output.
- Compare the properties of two functions each represented in a different way (for example, in a table, graph, equation, or description).
- Determine the rate of change and initial value of a function based on a description of a proportional relationship or of at least two given (x,y) values.

High School Mathematics

- Understand and use function notation (for example, $f(x)$ denotes the output of f corresponding to the input of x).
- Interpret functions in terms of the context.
- Calculate and interpret the average rate of change of a function presented in a graph or table over a given interval.
- Graph functions symbolically and show key features of the graph, by hand or using technology (such as graphing calculators and computer programs) for more complicated cases.

High School Mathematics

- Write a function defined by an expression in different but equivalent forms.
- For a function that models a relationship between two quantities, interpret key features of graphs and tables, including intercepts, intervals where the function is increasing or decreasing, relative maximums and minimums, etc.
- Construct, compare, and apply linear, quadratic, and exponential models to solve problems.