

## Major Learning Targets for This Course

### Rational Exponents and Complex Numbers

Students will extend their knowledge of number systems to include complex numbers and discover how the irrational and complex number systems are related to the integers.

"I can convert between radical form and rational exponents, and I can multiply and divide powers with rational exponents." (E.g.  $\sqrt[3]{8} = 8^{\frac{1}{3}}$ )

"I can add, subtract and multiply polynomials."  
*(Polynomials are numbers represented with many terms, like  $3x^2 + 4x - 1$ .)*

"I can add, subtract, and multiply complex numbers."  
*(Complex numbers are written as  $a + bi$  where  $a$  and  $b$  are real numbers and  $i$  is the imaginary unit)*

#### Example Tasks:

Find some possible expressions in the form of  $(a + bi) + (a + bi)$  and  $(a + bi) - (a + bi)$  that would result in  $3 - 4i$ .

Polynomials	Complex Numbers
$(x - 5)(2x + 1)$	$(-5 + i)(1 + 2i)$
Explain the similarities and differences in the steps for multiplying each expression.	

### Quadratic Functions

Students will learn to graph quadratic functions, use them to model real situations, and solve quadratic equations. (A quadratic function is written as  $f(x) = ax^2 + bx + c$  whose graph is a parabola)

"I can explain the differences among linear, exponential, and quadratic equations."

"I can recognize different forms of quadratic equations and can change between them."

"I can identify key features of a parabola and use this information to model quadratic situations and solve problems."

#### Example Task:

A frog is about to hop from the bank of a creek. The path of the jump can be modeled by the equation  $h(x) = -x^2 + 4x + 1$ , where  $h(x)$  is the frog's height above the water and  $x$  is the number of seconds since the frog jumped. A fly is cruising at a height of 5 feet above the water. Is it possible for the frog to catch the fly, given the equation of the frog's jump?

### Geometry

Students will become experts in similarity, learn to prove geometry statements, and study the geometry of circles.

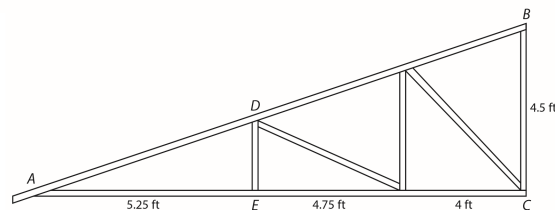
"I can prove or disprove that one triangle is similar to another (has the same angles and proportional side lengths)."

"I can find the sine and cosine of angles in right triangles."

"I can use the properties of circles to solve for angle measures and segment lengths."

#### Example Task:

A mono truss is a type of building support structure that is in the shape of a right triangle. Contractors often use mono trusses when building roofs for small structures such as garages and sheds. The vertical pieces of this truss form  $90^\circ$  angles with the horizontal pieces in order to maximize the stability. Observe the diagram of a mono truss below. Is  $\triangle ABC$  similar to  $\triangle ADE$ ? Explain your reasoning. Is it possible to determine the length of  $\overline{DE}$  from the given information? If so, calculate the length.



## Expected Behaviors in Math Class

Students will...

- Check into Google Classroom daily for announcements and to receive/turn in assignments.
- Attend live/recorded Zoom learning and support sessions, with the camera on when feasible.
- Consider available tools to help them solve problems (including hands-on tools and technology).
- Use technology and various applications to explore and deepen understanding.
- Explain their thinking and their process to solving a problem.
- Communicate ideas clearly verbally and in writing, using math vocabulary when appropriate.
- Decide if their answer is reasonable.
- Use examples and counterexamples to justify a conclusion.
- Apply mathematics to solve problems in everyday life.

## How Can I Support My Student in This Course?



### Access Google Classroom Daily

- ⇒ Look at the Stream for daily announcements and a weekly schedule.
- ⇒ View the Classwork for assignment information and support.
- ⇒ Accept the Guardian Access request sent to your email address for regular updates on your student's progress.



### Encourage Multiple Representations of the Problem

- ⇒ Ask your student to solve the problem in different ways, and to make connections between the different representations.
- ⇒ Ask your student to create visual representations help understand the concepts.



### Ask Questions

- ⇒ When your student is stuck, ask him/her questions like: "What is the question in the problem/task?" or "What do you understand/know from the task?" and "How do you know?" Listen while your student explains his/her mathematical reasoning and ask "Does your answer make sense?" based on the context of the problem or task.
- ⇒ Guide your student to participate in small group discussions via Zoom to get questions answered or to send a private message to his/her teacher using Google Classroom.



### Value Mistakes

- ⇒ Students are learning when they are making mistakes; create an environment where your student feels comfortable making a mistake and learning from it.



### Don't Simply Tell Them the Right Answer

- ⇒ Once students are aware that their answer is right, they are more likely to stop thinking about the math. Instead of telling students the right answer, ask them a question or have them draw a picture.



### Praise Effort

- ⇒ When your student gets a right answer, acknowledge how hard they must have worked and practiced.
- ⇒ When your student is stuck, acknowledge that sometimes math is challenging and that if they continue to practice and work hard, they will improve.

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For more information, visit [scusd.edu/math](https://scusd.edu/math) or contact [Mikila-Fetzer@scusd.edu](mailto:Mikila-Fetzer@scusd.edu), Math Coordinator