

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.

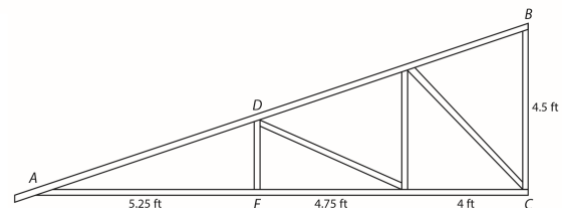
"I can prove or disprove that one triangle is similar to another (has the same angles and proportional side lengths)."

"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° 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 DE from the given information? If so, calculate the length.



Expected Behaviors in Math Class

Students will...

- Consider available tools to help them solve problems and deepen understanding (including hands-on tools and technology).
- Look for patterns and connections.
- Explain their thinking and their process for solving a problem.
- Make predictions and estimations.
- Decide if an answer is reasonable.
- Justify conclusions.
- Communicate ideas clearly verbally and in writing, using math vocabulary when appropriate.
- Apply mathematics to solve problems in everyday life.

How Can I Support My Student in This Course?



Access Google Classroom Regularly (if Applicable)

- ⇒ Look at the Stream for daily announcements and a weekly schedule.
- ⇒ View the Classwork for assignment information and support.



Encourage Multiple Strategies and Representations of the Problem

- ⇒ Ask your student to solve the problem in different ways.
- ⇒ Encourage the use of different representations (e.g., symbols, words, or pictures/visuals), and have them make connections between representations.



Ask Questions & Encourage Your Student to Ask Questions

- ⇒ When your student is stuck, don't simply tell them the correct answer. Ask questions like:
 - "What is the question in the problem/task?"
 - "What do you understand/know from the task?"
 - "How do you know?" Listen while your student explains their mathematical reasoning and ask, "Does your answer make sense?" based on the context of the problem or task.
- ⇒ Encourage your student to write down questions to bring to their teacher or peer the next day.



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.



Acknowledge Effort over Answers and Speed

- ⇒ Celebrate how hard your student is working, whether their answer is correct or not.
- ⇒ When your student is stuck, remind them that learning can be challenging, and if they continue to practice and work hard, they will improve.

For more information, visit scusd.edu/math or contact Mikila-Fetzer@scusd.edu, Director of PL, Science, EdTech, PE, & Mathematics
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