

## High-Quality Mathematics Items Module (High School)

The pages that follow contain a selection of items from chapter assessments in High School. These items are representative of the range available in many textbook series. This activity is designed to help teachers think about how they can revise chapter tests to better align to the Standards. Each item below can be revised to more closely embody the characteristics described in the High-Quality Mathematics Items Modules.

1. Solve all of the items.
2. Take a close look at each item, thinking about what the modules explain about expectations of high-quality mathematics items. Focus on the following features:
  - a. Does the item align to the aspect of rigor targeted in the Standards? (Principle 2)
  - b. Does the item align to the grade-level expectations? (Principle 3)
  - c. Does the item address the central concern of the identified standard? (Principle 4)
  - d. If the item aligns to a Standard for Mathematical Practice, is the item appropriate to the grade? (Principle 7)
  - e. Does the item type/format of the item match the content? (Principle 8)
3. Using the chart below, record your thoughts about which Alignment Principle(s) can be used to improve each item.
4. With the Alignment Principle in mind, revise the item.
5. After time for individual reflection, discuss your findings and your proposed revision with your colleagues.

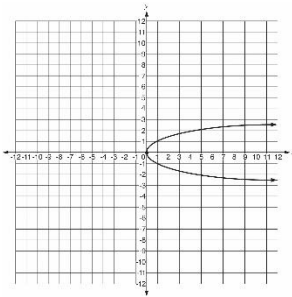
## Answer Key:

Standard	Item	Assessment Principle?	Revised Item
HS.N-CN.A.2 Use the relation $i^2 = -1$ and the commutative, associative, and distributive properties to add, subtract, and multiply complex numbers.	Which expression is equivalent to $\frac{5}{3+i}$ ?  a) $\frac{15}{8} - \frac{5}{8}i$  b) $\frac{5}{3} - 5i$  c) $\frac{3}{2} - \frac{1}{2}i$  d) $15 - 5i$		

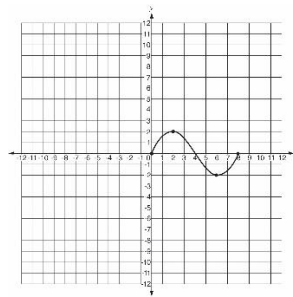
HS.F-IF.A.1 Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If  $f$  is a function and  $x$  is an element of its domain, then  $f(x)$  denotes the output of  $f$  corresponding to the input  $x$ . The graph of  $f$  is the graph of the equation  $y = f(x)$ .

Use the vertical line test to determine which graph represents  $y$  as a function of  $x$ .

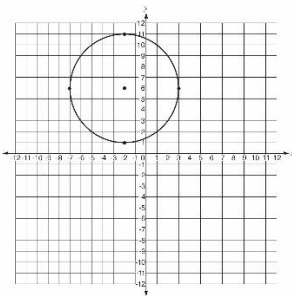
a)



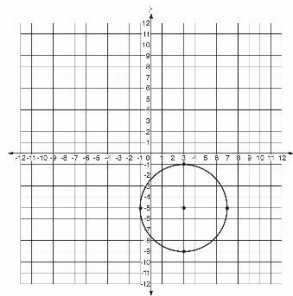
b)



c)



d)



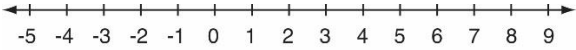
<p>HS.G-GPE.A.1 Derive the equation of a circle of given center and radius using the Pythagorean Theorem; complete the square to find the center and radius of a circle given by an equation.</p>	<p>Which of the following shows the equation of the circle with a center located at (4, -1) and has a point on the circle at (5,3)?</p> <p>a) <math>(x-4)^2 + (y+1)^2 = 17</math></p> <p>b) <math>(x+4)^2 + (y-1)^2 = \sqrt{17}</math></p> <p>c) <math>(x-4)^2 + (y+1)^2 = \sqrt{17}</math></p> <p>d) <math>(x+4)^2 + (y-1)^2 = 17</math></p>		
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HS.S-ID.B.6a  
Fit a function to the data; use functions fitted to data to solve problems in the context of the data. Use given functions or choose a function suggested by the context. *Emphasize linear, quadratic, and exponential models.*

The table shows the number of trees planted in Santa Fe since 2005.

Years since 2005	1	3	5	7	9
# of trees planted (in thousands)	0.8	10.6	44.4	116.6	241.6

Write a cubic function to model the data.

<p>HS.A-REI.B.3 Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.</p>	<p>Find the solution set. Justify each step and graph your solution.</p> <table border="1"> <thead> <tr> <th><math>21x + 28 &lt; 10 - 3x</math></th> <th>Justification</th> </tr> </thead> <tbody> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </tbody> </table> <p>Solution set: _____</p> 	$21x + 28 < 10 - 3x$	Justification														
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<p>MP.7 Look for and make use of structure.</p>	<p>Judy is working at a retail store over summer break. A customer buys a \$50 shirt that is on sale for 20% off. Judy computes the discount, then adds sales tax of 10%, and tells the customer how much he owes. The customer insists that Judy first add the sales tax and then apply the discount. He is convinced that this way he will save more money because the discount amount will be larger.</p> <p>Is the customer right?</p>																

STUDENT  
ACHIEVEMENT  
PARTNERS

ACHIEVE THE CORE