
2015 STAAR Questions & TEKS Review

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1 INTRODUCTION

The following is my attempt to demonstrate the frustrating problems on the 3rd grade through 8th grade 2015 STAAR assessments that are testing process or methodology instead of testing knowledge. I have also included the Content and Process Standard TEKS for each test question identified and highlighted the wording in the TEKS that creates the need for the question.

2 SUMMARY

Before I completed this task and took all of the 2015 3rd-8th grade STAAR assessments, I was under the impression that the main problem with the TEKS was the process standards in the 2012 revision. After further review of the TEKS, I have found that the content standards are calling out specific methods to be used in solving problems. The Process Standards force multiple methods with the use of the word "Including" and the use of "And" instead of "Or." The Content Standards also call out multiple methods and need to be revisited. An example of this is when the content standard calls for the use of "objects and pictorial models, including number lines", or "using symbols, words, objects, and pictorial models," or like in 3rd grade (TEK 3.4 K) "using strategies based on objects; pictorial models, including arrays, area models, and equal groups; properties of operations; or recall of facts."

Many of these methods were also in the 2014 TEKS: 4th grade 2014 TEKS call for the use of the area model and arrays. Pictorial models are called out in the 2014 1st, 3rd and 4th grade.

In the 2012 TEKS the use of these alternate methods has dramatically increased. The K-5 Content Standards call for the use of area model (a method of multiplication) 9 times and the use of pictorial models 23 times. There are many more examples of these "process" or "methodology" questions in the 2015 released STAAR questions (and they only released about half of the question).

The Process Standards in the 2012 TEKS

- (1) Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:
 - (A) apply mathematics to problems arising in everyday life, society, and the workplace;
 - (B) use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution;
 - (C) select tools, **including** real objects, manipulatives, paper **and** pencil, and technology as appropriate, and techniques, **including** mental math, estimation, **and** number sense as appropriate, to solve problems;
 - (D) communicate mathematical ideas, reasoning, and their **implications using multiple representations**, including symbols, diagrams, graphs, and language as appropriate;

- (E) create and use representations to organize, record, and communicate mathematical ideas;
- (F) analyze mathematical relationships to connect and communicate mathematical ideas; and
- (G) display, explain, and justify mathematical ideas and arguments using precise mathematical language in written or oral communication.

Why are these methods called up in the TEKS? The short answer is “Reform Math” experts on the TEKS review/ re-write added this wording intentionally to ensure that the “Conceptual Understanding” of reform math education would be taught. The thinking was, if it is in the TEKS it will show up on the assessment—if it shows up on the assessment it will have to be added to the curriculum and be taught.

The argument of teaching conceptual understanding or knowledge and skills is a bogus dichotomy in mathematics education. Knowledge and skills should always be taught with the inclusion of conceptual understanding. This was well stated in H. Wu’s article “Basic Skills Versus Conceptual Understanding - A Bogus Dichotomy in Mathematics Education.” Here is a link to the article <http://www.aft.org/sites/default/files/periodicals/wu.pdf>.

Another good article that documents this raging battle in mathematics education is David Klein’s “A Brief History of American K-12 Mathematics Education in the 20th Century.” Here is a link to the article <http://www.csun.edu/~vcmth00m/AHistory.html>.

What is lost when using reform math (and having these multiple methods called up in the content standards and thus reflected in the STAAR assessment) is the fact that it takes much longer to teach **ALL** of the methods. Critical concepts get pushed out to older grades and students miss out an important part of math instruction – practice using the most efficient method.

Students that are taught with reform math tend to be about two years behind those students taught with more traditional approaches to math by the time they are in or exiting high school. It puts Calculus out of reach of most students in High School.

The TEKS should not force methodology. It is my hope that we can remove the reform math methodology from the TEKS and let the teachers know that teaching every method to all students is no longer required. A teacher should be able to decide what method each student will understand the most to teach a concept. Once the concept is understood and used to demonstrate the most efficient method for solving the problems, the student should not have to demonstrate the knowledge of a method.

Below are examples from the 2015 STAAR assessments.

3 STAAR 3RD GRADE MATH QUESTIONS

Question 6 is testing a student's understanding of pictorial models... Please note that the use of pictorial model is in the content standard, not the process standard. This TEK requires three methods; objects, pictorial models and number lines. It does not test a calculation. The use of the word represent means they just have to recognize the representation; object, pictorial models or number line.

TEK 3.3 F states: (Readiness Content Standard)

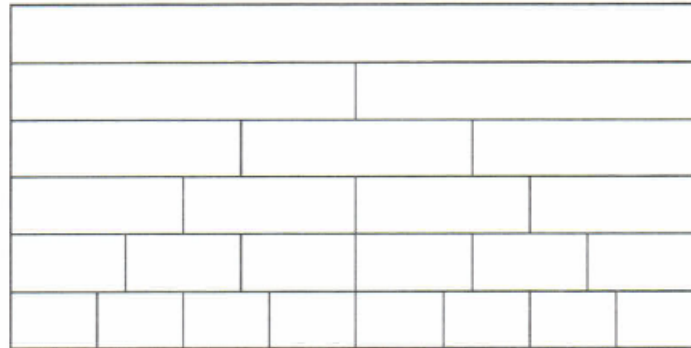
- (3) Number and operations. The student applies mathematical process standards to represent and explain fractional units. The student is expected to:
 - (F) **represent** equivalent fractions with denominators of 2, 3, 4, 6, and 8 using a variety of objects and **pictorial models**, including number lines;

TEK 3.1 A, B, E & F states: (Process Standard)

- (1) Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:
 - (A) apply mathematics to problems arising in everyday life, society, and the workplace;
 - (B) use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution and evaluating the problem-solving process and the reasonableness of the solution;
 - (E) create and use representations to organize, record, and communicate mathematical ideas;
 - (F) analyze mathematical relationships to connect and communicate mathematical ideas; and

- 6 Alyssa used fraction strips like the ones shown in the diagram in order to find equivalent fractions.

Fraction Strips



Which list shows only fractions that are equivalent to $\frac{1}{2}$?

A $\frac{2}{4}, \frac{3}{6}, \frac{4}{8}$

B $\frac{2}{4}, \frac{4}{6}, \frac{6}{8}$

C $\frac{1}{4}, \frac{1}{6}, \frac{1}{8}$

D $\frac{2}{3}, \frac{3}{4}, \frac{5}{6}$

Readiness

3.3 F

3.1 A B E F

Question 7 is testing equivalent fractions, but it does not test if the student understands the mathematics behind comparing fractions. It only tests that the student can recognize the same point on a number line or an area model.... The use of the word “represent” means they just have to recognize the representation; are model.

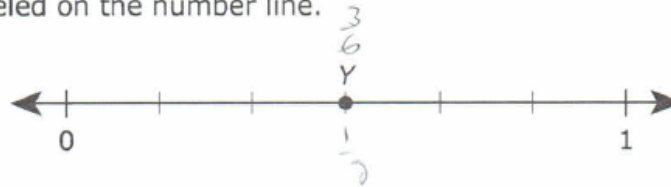
TEK 3.3 G states: (Supporting Content Standard)

- (3) Number and operations. The student applies mathematical process standards to represent and explain fractional units. The student is expected to:
 - (G) explain that two fractions are equivalent if and only if they are both **represented** by the same point on the **number line** or **represent the same portion of a same size whole for an area model**; and

TEK 3.1 B, E & G states: (Process Standard)

- (1) Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:
 - (B) use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution and evaluating the problem-solving process and the reasonableness of the solution;
 - (E) **create and use representations to organize**, record, and communicate mathematical ideas;
 - (G) display, explain, and justify mathematical ideas and arguments using precise mathematical language in written or oral communication.

- 7 Point Y is labeled on the number line.



Which statement is true?

- A** Point Y represents $\frac{3}{6}$ and $\frac{3}{4}$, because both fractions represent 3 equal parts of a whole.
- B** Point Y represents $\frac{3}{6}$ and $\frac{1}{2}$, because both fractions are exactly halfway between 0 and 1 on the number line.
- C** Point Y represents $\frac{4}{6}$ and $\frac{3}{6}$, because both fractions represent 6 equal parts of a whole.
- D** Point Y represents $\frac{4}{6}$ and $\frac{1}{2}$, because both fractions are exactly halfway between 0 and 1 on the number line.

Supporting

3.3 G

3.1 B E G

Question 8 is similar to question 7 in that there is no math behind the questioning, only understanding of models (symbols, words, objects and pictorial models)... The problem wording in this TEK is “applies mathematical process standards to represent and explain fractional units” and “justifying the conclusion using symbols, words, objects, and pictorial models.” This question could have also shown up with pictures and symbols.

TEK 3.3 H states: (Readiness Content Standard)

- (3) Number and operations. The student applies mathematical process standards to represent and explain fractional units. The student is expected to:
 - (H) compare two fractions having the same numerator or denominator in problems by reasoning about their sizes and justifying the conclusion using symbols, words, objects, and pictorial models.

TEK 3.1 A, B, E & F states: (Process Standard)

- (1) Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:
 - (A) apply mathematics to problems arising in everyday life, society, and the workplace;
 - (B) use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution and evaluating the problem-solving process and the reasonableness of the solution;
 - (E) create and use representations to organize, record, and communicate mathematical ideas;
 - (F) analyze mathematical relationships to connect and communicate mathematical ideas; and

- 8 Daniel shaded these two number lines to model two different fractions.



Based on the number lines, which comparison is true?

A $\frac{1}{3} > \frac{1}{2}$

B $\frac{1}{3} = \frac{1}{2}$

C $\frac{1}{3} < \frac{1}{2}$

D $\frac{2}{3} < \frac{1}{2}$

Readiness

3.3 H

3.1 A B E F

Question 11 is a good question testing straight forward math, but look at how the TEK is worded. There are actually 7 ways this TEK could have been tested; pictorial models, arrays, area models, and equal groups, properties of operations, or recall of facts. This particular test question is good, but the other five of seven methods that could have been tested are not good... Properties of operations or recall of facts are the only two methods here that will benefit the student in upper grade levels.

TEK 3.4 K states: (Readiness Content Standard)

- (4) Number and operations. The student applies mathematical process standards to develop and use strategies and methods for whole number computations in order to solve problems with efficiency and accuracy. The student is expected to:
- (K) solve one-step and two-step problems involving multiplication and division within 100 using strategies based on objects; pictorial models, including arrays, area models, and equal groups; properties of operations; or recall of facts.

TEK 3.1 A, B & F states: (Process Standard)

- (1) Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:
- (A) apply mathematics to problems arising in everyday life, society, and the workplace;
- (B) use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution and evaluating the problem-solving process and the reasonableness of the solution;
- (F) analyze mathematical relationships to connect and communicate mathematical ideas; and

- 11 A music teacher had 4 boxes of recorders. There were 9 recorders in each box. The music teacher gave an equal number of recorders to each of 6 classes. How many recorders did each class receive?

- A 7
☒ B 6
 C 30
 D 36

$$\begin{array}{r} 9 \\ \times 4 \\ \hline 36 \end{array}$$

$$\begin{array}{r} 6 \\ 6 \overline{)36} \\ \underline{-36} \\ 0 \end{array}$$

Readiness
 3.4 K
 3.1 A B F

Question 12 is testing the understanding of equations, but does not test that the student can solve the equation. The problem wording in this TEK is again the use of the word represent; “represent one- and two-step problems involving addition and subtraction of whole numbers to 1,000 using pictorial models, number lines, and equations.” The question should have been worded for the student to solve not represent and get rid of the multiple methods; pictorial models, number lines, and equations.

TEK 3.5 A states: (Readiness Content Standard)

- (5) Algebraic reasoning. The student applies mathematical process standards to analyze and create patterns and relationships. The student is expected to:
 - (A) represent one- and two-step problems involving addition and subtraction of whole numbers to 1,000 using pictorial models, number lines, and equations;

TEK 3.1 A, B, D & F states: (Process Standard)

- (1) Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:
 - (A) apply mathematics to problems arising in everyday life, society, and the workplace;
 - (B) use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution and evaluating the problem-solving process and the reasonableness of the solution;
 - (D) communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate;
 - (F) analyze mathematical relationships to connect and communicate mathematical ideas; and

- 12** There were 35 pretzels at a bakery. A baker made 20 more pretzels. The baker then sold 11 pretzels. Which equation shows how to find the number of pretzels there are now?

A $35 + 20 + 11 = \square$

B $35 - 20 + 11 = \square$

C $35 - 20 - 11 = \square$

(D) $35 + 20 - 11 = \square$

$35 + 20 - 11$

Readiness

3.5 A

3.1 A B D F

Question 13 is only testing the knowledge of arrays and not the mathematical importance of the array. The TEK says represent and solve, but the student only had to recognize the model, not solve the multiplication. This problem could have also tested knowledge of strip diagrams.

TEK 3.5 B states: (Readiness Content Standard)

- (5) Algebraic reasoning. The student applies mathematical process standards to analyze and create patterns and relationships. The student is expected to:
 - (B) **represent and solve one- and two-step multiplication and division problems** within 100 using **arrays, strip diagrams, and equations;**

TEK 3.1 A, B, E & F states: (Process Standard)

- (1) Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:
 - (A) apply mathematics to problems arising in everyday life, society, and the workplace;
 - (B) use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution and evaluating the problem-solving process and the reasonableness of the solution;
 - (E) create and use representations to organize, record, and communicate mathematical ideas;
 - (F) analyze mathematical relationships to connect and communicate mathematical ideas; and

- 13** Larry has 14 oranges. He will cut each of these oranges into 7 slices. Which array can be used to find the number of orange slices he will have?



$$\begin{array}{r} 2 \\ \times 7 \\ \hline 14 \end{array}$$



Readiness

3.5 B

3.1 A B E F

Question 20 is only testing if the student knows the definition of congruent and area. The question already states that the shaded areas are both $\frac{1}{4}$ and it is pretty clear the rectangles are the same size.

TEK 3.6 E states: (Supporting Content Standard)

- (6) Geometry and measurement. The student applies mathematical process standards to analyze attributes of two-dimensional geometric figures to develop generalizations about their properties. The student is expected to:
 - (E) decompose two congruent two-dimensional figures into parts with equal areas and express the area of each part as a unit fraction of the whole and recognize that equal shares of identical wholes need not have the same shape.

TEK 3.1 B, E & G states (Process Standard)

- (1) Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:
 - (B) use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution and evaluating the problem-solving process and the reasonableness of the solution;
 - (E) create and use representations to organize, record, and communicate mathematical ideas;
 - (G) display, explain, and justify mathematical ideas and arguments using precise mathematical language in written or oral communication.

20 The two figures shown are congruent, and one-fourth of each figure is shaded.



Figure M

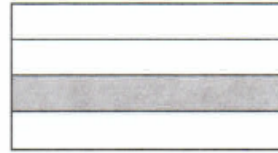


Figure N

Which statement about the shaded parts of these figures is true?

- A** The area of the shaded part of Figure M is greater than the area of the shaded part of Figure N.
- B** The area of the shaded part of Figure M is less than the area of the shaded part of Figure N.
- C** The area of the shaded part of Figure M is equal to the area of the shaded part of Figure N.
- D** None of the above

Testing definition
of congruent.

Supporting
3.6 E

3.1 BEG

4 STAAR 4TH GRADE MATH QUESTIONS

Problem 8 is an example of where they are testing the knowledge of a pictorial model and not if the student can subtract fraction.

What the student really needs to know at this point is the following:

$$\frac{6}{8} - \frac{4}{8} = \frac{2}{8} = \frac{1}{4}$$

The problem wording is again the use of “represent”. This TEK at least includes the word “solve.”

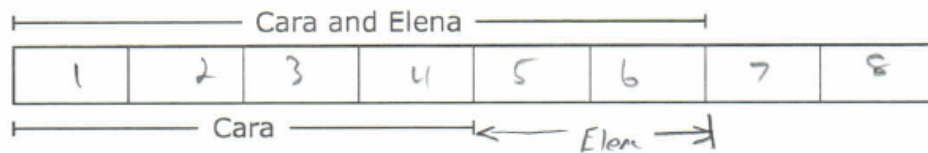
TEK 4.3 E states: (Readiness Content Standard)

- (3) Number and operations. The student applies mathematical process standards to represent and generate fractions to solve problems. The student is expected to:
 - (E) represent and solve addition and subtraction of fractions with equal denominators using objects and pictorial models that build to the number line and properties of operations;

TEK 4.1 A, B, E & F states (Process Standard)

- (1) Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:
 - (A) apply mathematics to problems arising in everyday life, society, and the workplace;
 - (B) use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution;
 - (E) create and use representations to organize, record, and communicate mathematical ideas;
 - (F) analyze mathematical relationships to connect and communicate mathematical ideas; and

- 8 Cara and Elena used fabric to make costumes for a talent show. Cara used $\frac{4}{8}$ of the fabric for her costume. The girls used $\frac{6}{8}$ of the fabric altogether.



What fraction of the fabric did Elena use?

A $\frac{10}{16}$

B $\frac{10}{8}$

C $\frac{2}{8}$

D $\frac{1}{2}$

Readiness

4.3 E

4.1 A B E F

Problem 12 is an example of an early introduction into Algebra. I don't think most 4th graders are ready for this, but at least they don't ask the students to solve for n.

The problem is the use of the word "represent.... using strip diagrams."

TEK 4.5 A states: (Readiness Content Standard)

(5) Algebraic reasoning. The student applies mathematical process standards to develop concepts of expressions and equations. The student is expected to:

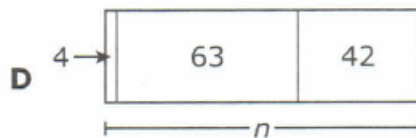
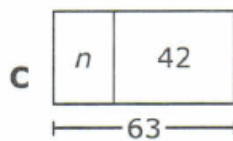
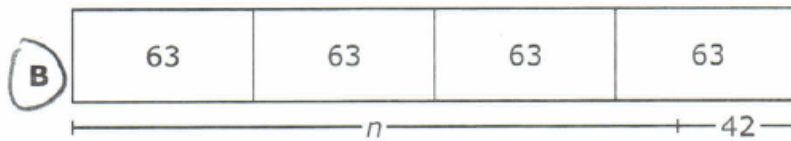
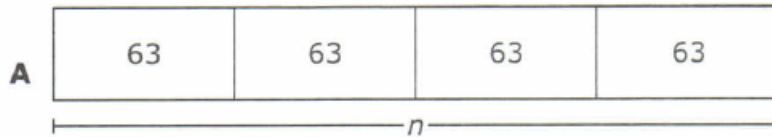
- (A) represent multi-step problems involving the four operations with whole numbers using strip diagrams and equations with a letter standing for the unknown quantity;

TEK 4.1 A, B, D & F states (Process Standard)

(1) Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:

- (A) apply mathematics to problems arising in everyday life, society, and the workplace;
- (B) use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution;
- (D) communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate;
- (F) analyze mathematical relationships to connect and communicate mathematical ideas; and

- 12** Madeline has 4 rolls of tape. Each roll contains 63 inches of tape. Madeline used 42 inches of tape for a project. Which diagram shows a way to find n , the number of inches of tape that Madeline has left?



$$4(63) = n + 42$$

Readiness

4.5 A

4.1 A B D F

Question 14 is an example of where algebra has been pushed down to 4th grade. This is above the skill level of most 4th graders. Do elementary school teachers have the training to teach algebra? Nowhere in this TEK does it say that there should be unknowns; in fact it says where dimensions are whole numbers. If a student misses this question, do they not understand perimeter or do they not understand the use of the unknown?

TEK 4.5 D states: (Readiness Content Standard)

(5) Algebraic reasoning. The student applies mathematical process standards to develop concepts of expressions and equations. The student is expected to:

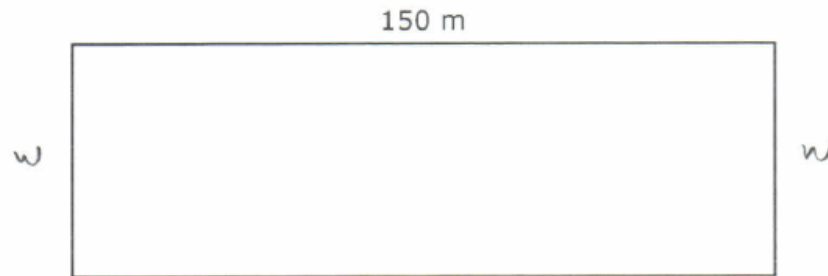
- (D) solve problems related to perimeter and area of rectangles where dimensions are whole numbers.

TEK 4.1 A, B, C, E & F states (Process Standard)

(1) Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:

- (A) apply mathematics to problems arising in everyday life, society, and the workplace;
- (B) use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution;
- (C) select tools, including real objects, manipulatives, paper and pencil, and technology as appropriate, and techniques, including mental math, estimation, and number sense as appropriate, to solve problems;
- (E) create and use representations to organize, record, and communicate mathematical ideas;
- (F) analyze mathematical relationships to connect and communicate mathematical ideas; and

- 14** The model shows a rectangular field with a length of 150 m. The perimeter of the field is 400 m.



What is the width of the field in meters?

A 250 m

B 100 m

C 125 m

D 50 m

$$\begin{array}{rcl} 2(150) + 2w & = & 400 \\ 300 + 2w & = & 400 \\ -300 & & -300 \end{array}$$

$$\frac{2w}{2} = \frac{100}{2}$$

$$w = 50 \text{ m}$$

Readiness

4.5 0

4.1 A B C E F

5 STAAR 5TH GRADE MATH QUESTIONS

Problem 2 is testing that the student can describe what the parenthesis means in an order of operations. I think solving the actual math problem demonstrates that the student understands order of operations. This is much more important than being able to describe in words what the parenthesis means... This gets back to the question of what is more important “knowledge and skills” or “conceptual understanding.” I think both are important, but if you had had to pick one I would fall on the side of “knowledge and skills.”

Some in the education community view a lack of “conceptual understanding” as what is wrong with math education today. That is not what is wrong with math education today. Students possessing a rote understanding of procedures they cannot perform is a far greater problem.

I would be less concerned of a student that can perform the calculation but not explain why the parentheses are done first than I would of a student that cannot perform the calculation but can explain the use of the parenthesis.

TEK 5.4 E states: (Supporting Content Standard)

- (4) Algebraic reasoning. The student applies mathematical process standards to develop concepts of expressions and equations. The student is expected to:
 - (E) describe the meaning of parentheses and brackets in a numeric expression;

TEK 5.1 B & G states (Process Standard)

- (1) Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:
 - (B) use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution;
 - (G) display, explain, and justify mathematical ideas and arguments using precise mathematical language in written or oral communication.

- 2 An expression is given.

$$3 \times (8 + 2) \div 2$$

Which statement is true about the parentheses in this expression?

- ☒ **A** The parentheses indicate that $8 + 2$ should be solved first.
- ☐ **B** The parentheses indicate that $8 + 2$ should be solved last.
- ☐ **C** The parentheses indicate that $2 \div 2$ should be solved last.
- ☐ **D** The parentheses indicate that 3×8 should be solved first.

Supporting

5.4 E

5.1 B G

Problem 4 covers TEK 5.3 and is an example of testing knowledge of a method of multiplying decimals. This method cannot be used in upper level math. It is fine to use this method/ process as a means to teach a concept, but it should not be tested as content knowledge because it doesn't help the student long term in upper level math. Try to use this method when thousandths or less...

The use of the word represent is what makes this problem about recognizing the model instead of performing the calculation.

A student that can perform the calculation but not understand the model would likely pick "A" as the answer because $80 \times 40 = 3,200$. They would be penalized for being able to do a calculation but not understand an area model.

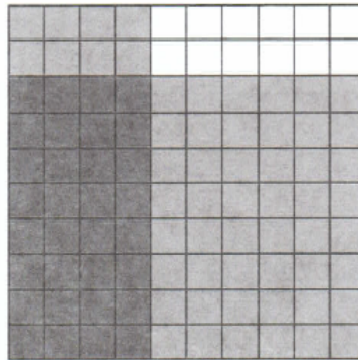
TEK 5.3 D states: (Supporting Content Standard)

- (3) Number and operations. The student applies mathematical process standards to develop and use strategies and methods for positive rational number computations in order to solve problems with efficiency and accuracy. The student is expected to:
 - (D) represent multiplication of decimals with products to the hundredths using objects and pictorial models, including area models;

TEK 5.1 B, D & F states (Process Standard)

- (1) Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:
 - (B) use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution;
 - (D) communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate;
 - (F) analyze mathematical relationships to connect and communicate mathematical ideas; and

- 4 The hundredths model in the figure is shaded to represent the multiplying of two numbers.



Area Model
Process

Which equation can be represented by the shaded parts of the model?

- A $80 \times 40 = 3,200$ ✓
 B $0.08 \times 0.04 = 0.32$ ✗
 C $0.80 \times 0.40 = 0.32$ ✓
 D $0.08 \times 0.04 = 0.032$ ✗

Supporting
 S.3 A
 S.1 B D F

Problem 6 is another example of testing the understanding of pictorial models. Pictorial models are fine to introduce a concept, but they are not very useful once you get into upper level math.

This problem should have just asked the student to divide (as shown below) but as you can see, the TEK requires testing representing quotients of decimals with objects and pictorial models:

$$\begin{array}{r} .52 \\ 5 \overline{) 2.60} \\ \underline{-25} \\ 10 \\ \underline{-10} \\ 0 \end{array}$$

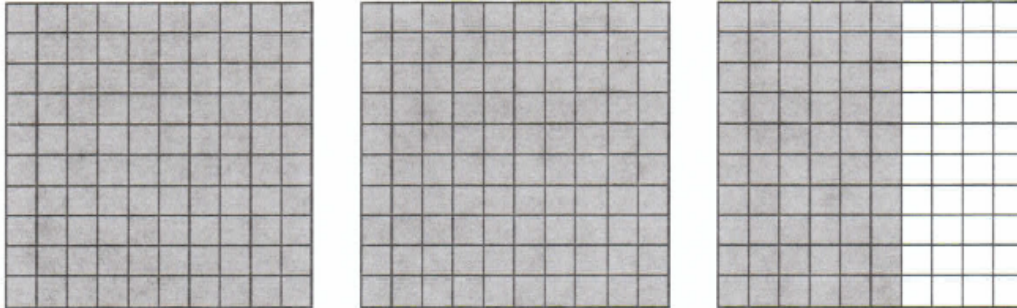
TEK 5.3 F states: (Supporting Content Standard)

- (3) Number and operations. The student applies mathematical process standards to develop and use strategies and methods for positive rational number computations in order to solve problems with efficiency and accuracy. The student is expected to:
- (F) **represent quotients of decimals** to the hundredths, up to four-digit dividends and two-digit whole number divisors, **using objects and pictorial models**, including area models;

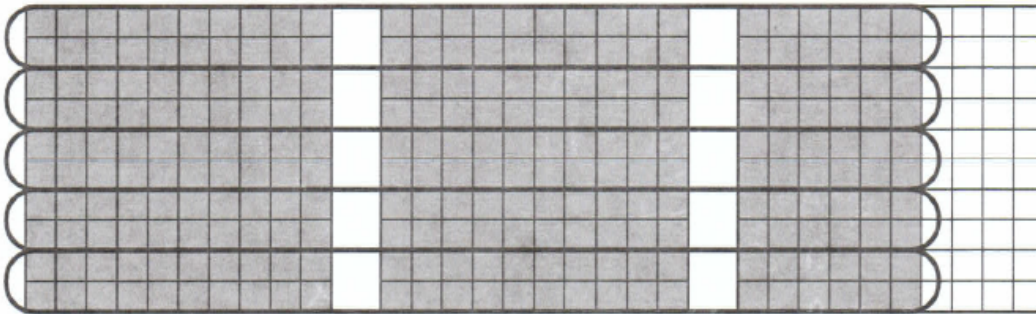
TEK 5.1 B, D & F states: (Process Standard)

- (1) Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:
- (B) use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution;
- (D) communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate;
- (F) analyze mathematical relationships to connect and communicate mathematical ideas; and

- 6 The model is shaded to represent two and sixty-hundredths.



This model represents an equation.



Which equation is represented by this model?

- A $2.50 \times 5 = 12.5$
- ☒ B $2.60 \div 5 = 0.52$
- C $52 \times 5 = 260$
- D $2.06 \div 5 = 0.412$

This is another example
of a process question.

Supporting

5.3 F

5.1 B O F

Problem 8 is another problem where the TEK requires pictorial models. The expectation is counting up the shaded squares of the model and not performing the calculation of adding fractions. The use of the word “represent” and “objects and pictorial models” are the problem in this TEK.

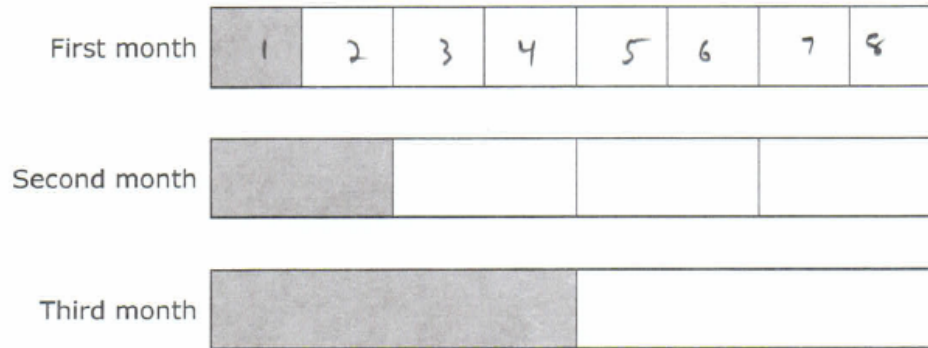
TEK 5.3 H states: (Supporting Content Standard)

- (3) Number and operations. The student applies mathematical process standards to develop and use strategies and methods for positive rational number computations in order to solve problems with efficiency and accuracy. The student is expected to:
 - (H) **represent and solve addition** and subtraction **of fractions with unequal denominators** referring to the same whole using **objects and pictorial models** and properties of operations;

TEK 5.1 A, B, E & F states: (Process Standard)

- (1) Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:
 - (A) apply mathematics to problems arising in everyday life, society, and the workplace;
 - (B) use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution;
 - (E) create and use representations to organize, record, and communicate mathematical ideas;
 - (F) analyze mathematical relationships to connect and communicate mathematical ideas; and

- 8 Mrs. Ali collected notebook paper from her students at the beginning of the school year. The model is shaded to show the fraction of this notebook paper that Mrs. Ali used in each of the three months.



What fraction of the notebook paper Mrs. Ali collected was used during these three months?

A $\frac{3}{8}$

B $\frac{7}{8}$

C $\frac{3}{14}$

D $\frac{1}{8}$

$$\frac{1}{8} + \frac{1}{4} + \frac{1}{2}$$

$$\frac{1}{8} + \frac{2}{8} + \frac{4}{8} = \frac{7}{8}$$

Supporting

5.3 H

5.1 A B E F

Problem 9 is another example of testing a method or process (represent.... using objects and pictorial models). The expectation is marking out 4 out of 6 of the squares in each column and counting the marked off squares of the model and not performing the calculation...

They should be taught how to convert the whole number into a fraction, simplify and then multiply the fractions to solve (as I have shown below). I believe that is what TEK 5.3 L covers (see next example, problem 11).

TEK 5.3 I states: (Supporting Content Standard)

- (3) Number and operations. The student applies mathematical process standards to develop and use strategies and methods for positive rational number computations in order to solve problems with efficiency and accuracy. The student is expected to:
 - (I) **represent and solve multiplication of a whole number and a fraction** that refers to the same whole **using objects and pictorial models**, including area models;

TEK 5.1 A, B, E & F states: (Process Standard)

- (1) Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:
 - (A) apply mathematics to problems arising in everyday life, society, and the workplace;
 - (B) use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution;
 - (E) create and use representations to organize, record, and communicate mathematical ideas;
 - (F) analyze mathematical relationships to connect and communicate mathematical ideas; and

- 9 Weather delayed $\frac{4}{6}$ of the 24 flights departing from an airport. All the departing flights are listed in the chart.

Departing Flights

Flight #48	Flight #111	Flight #90	Flight #38
Flight #112	Flight #222	Flight #134	Flight #46
Flight #23	Flight #564	Flight #56	Flight #116
Flight #12	Flight #72	Flight #765	Flight #677
Flight #17	Flight #86	Flight #89	Flight #422
Flight #65	Flight #329	Flight #88	Flight #499

How many flights departing from the airport were delayed by weather?

A 18

B 4

☒ C 16

D 8

$$\frac{4}{6} \times \frac{24}{1} = 16$$

Supporting

S.I I

S.I A B E F

Problem 11 covers TEK 5.3 L without all of the pictures and models. This is an example of good straight forward problem.

TEK 5.3 L states: (Readiness Content Standard)

- (3) Number and operations. The student applies mathematical process standards to develop and use strategies and methods for positive rational number computations in order to solve problems with efficiency and accuracy. The student is expected to:

(L) divide whole numbers by unit fractions and unit fractions by whole numbers.

TEK 5.1 A, B, & F states: (Process Standard)

- (1) Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:

- (A) apply mathematics to problems arising in everyday life, society, and the workplace;
 (B) use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution;
 (F) analyze mathematical relationships to connect and communicate mathematical ideas; and

11 Malia had 15 lb of birdseed. She fed her birds $\frac{1}{5}$ lb of birdseed every day until all the birdseed was gone. For how many days did Malia feed the birdseed to her birds?

A 20 days

B 3 days

C 90 days

D 75 days

$$\frac{15 \text{ lb}}{\frac{1}{5} \text{ lb/day}} = \frac{15 \text{ lb}}{1} \times \frac{5 \text{ day}}{1 \text{ lb}}$$

Readiness

5.3 L

5.1 A B F

$$\frac{15 \cancel{\text{lb}}}{1} \times \frac{5 \text{ day}}{1 \cancel{\text{lb}}}$$

$$\begin{array}{r} 15 \\ \times 5 \\ \hline 75 \end{array}$$

Problem 17 tests TEK 5.9 A.

Why does a TEK go into such specificity to require a student to know how to interpret a dot plot or stem-and-leaf plot? I have never used either of these in my career but use bar graphs and line graphs all the time.

It is interesting that once Common Core started showing up some parents noticed that within the same week there kids across 3 different grades were introduced to stem-and-leaf plots when they had never heard of this form of graph before (and why would you, since it is really a specific type of chart for probability and statistics). I guess because David Coleman and Jason Zimba decided all kids in all grades must know stem-and-leaf that is why it is showing up on Common Core an STAAR.

TEK 5.9 A states: (Supporting Content Standard)

- (9) Data analysis. The student applies mathematical process standards to solve problems by collecting, organizing, displaying, and interpreting data. The student is expected to:
 - (A) represent categorical data with bar graphs or frequency tables and numerical data, including data sets of measurements in fractions or decimals, with dot plots or stem-and-leaf plots;

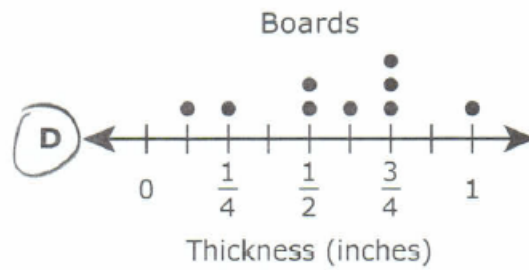
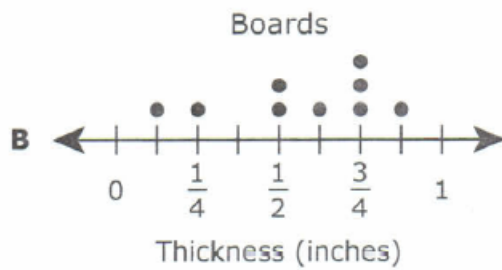
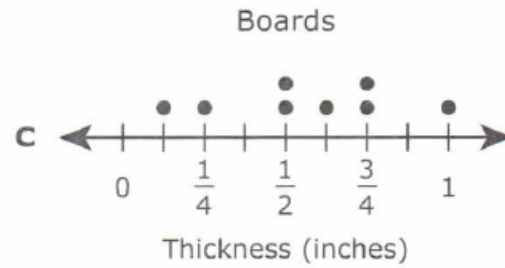
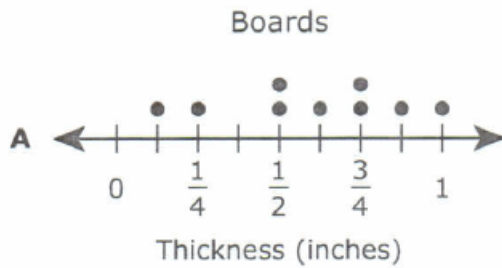
TEK 5.1 A, B, D & F states: (Process Standard)

- (1) Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:
 - (A) apply mathematics to problems arising in everyday life, society, and the workplace;
 - (B) use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution;
 - (D) communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate;
 - (F) analyze mathematical relationships to connect and communicate mathematical ideas; and

- 17** The thicknesses of the boards Dennis used for a construction project are listed below. These measurements are in inches.

$$\frac{1}{4}, \frac{3}{4}, \frac{1}{2}, \frac{3}{4}, \frac{1}{8}, 1, \frac{5}{8}, \frac{3}{4}, \frac{1}{2}$$

Which dot plot represents these measurements?



Supporting

5.9 A

5.1 A B D F

6 STAAR 6TH GRADE MATH QUESTIONS

Problem 1 is testing TEK 6.2A

I have never had to use or remember the definition of whole, integer or rational numbers. It is much more important to know how to use these numbers in calculations. Why are we wasting time memorizing classifications of numbers? It seems this question is designed more to test that the student knows what is a Venn diagram...

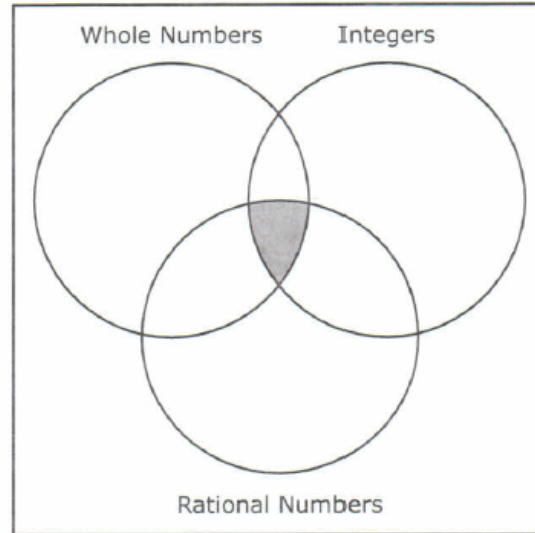
TEK 6.2 A states: (Supporting Content Standard)

- (2) Number and operations. The student applies mathematical process standards to represent and use rational numbers in a variety of forms. The student is expected to:
 - (A) classify whole numbers, integers, and rational numbers using a visual representation such as a Venn diagram to describe relationships between sets of numbers;

TEK 6.1 B, E & F (Process Standard)

- (1) Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:
 - (B) use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution;
 - (E) create and use representations to organize, record, and communicate mathematical ideas;
 - (F) analyze mathematical relationships to connect and communicate mathematical ideas; and

- 1 Three sets of numbers are shown in the Venn diagram.



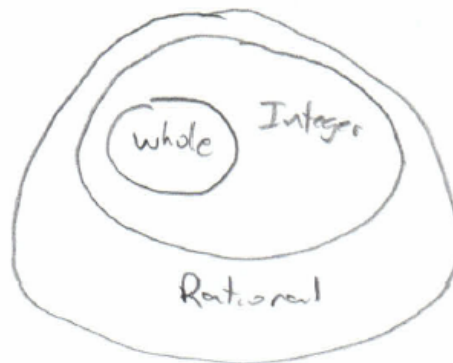
Which of these numbers can be placed in the shaded area of the diagram?

A -5

B 3.5

C $\frac{1}{2}$

D Not here



Supporting
6.2 A
6.1 B E F

Problem 3 is testing TEK 6.2 E.

This problem is just testing if the student understands that fractions are division problems and not that the student can actually perform the calculation or recall the math fact. This TEK is not very relevant in showing the student can perform the math. It is better to have the student solve division problems in each of the ways.

“Extend representations” is the problem wording in this TEK.

TEK 6.2 E states: (Supporting Content Standard)

(2) Number and operations. The student applies mathematical process standards to represent and use rational numbers in a variety of forms. The student is expected to:

(E) extend representations for division to include fraction notation such as a/b represents the same number as $a \div b$ where $b \neq 0$.

TEK 6.1 B & F (Process Standard)

(1) Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:

- (B) use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution;
- (F) analyze mathematical relationships to connect and communicate mathematical ideas; and

3 Which two expressions each represent $\frac{3}{12}$?

A $3\overline{)12}$ and $3 \div 12$

B $12\overline{)3}$ and $12 \div 3$

C $12\overline{)3}$ and $3 \div 12$

D $3\overline{)12}$ and $12 \div 3$

Supporting
6.2 E
6.1 B F

Problem 8 is testing TEK 6.3 A. The student does not have to perform the calculation; they only have to recognize the process. It would be better to show they understand the concept by actually working the problem. The Process Standard really doesn't mean anything if the student cannot perform the math.

TEK 6.3 A states: (Supporting Content Standard)

(3) Number and operations. The student applies mathematical process standards to represent addition, subtraction, multiplication, and division while solving problems and justifying solutions. The student is expected to:

(A) recognize that dividing by a rational number and multiplying by its reciprocal result in equivalent values;

TEK 6.1 B & F (Process Standard)

(1) Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:

(B) use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution;

(F) analyze mathematical relationships to connect and communicate mathematical ideas; and

8 Which expression is equivalent to $\frac{8}{9} \div \frac{3}{4}$?

A $\frac{8}{4} \cdot \frac{9}{3}$

B $\frac{8}{9} \cdot \frac{4}{3}$

C $\frac{9}{8} \cdot \frac{3}{4}$

D $\frac{9}{8} \cdot \frac{4}{3}$

$$\frac{8}{9} \cdot \frac{4}{3}$$

Supporting

6.3 A

6.1 B F

Problem 9 is testing TEK 6.3 B.

This TEK seems overly complicated and redundant if you just say the student must be able to multiple fractions. If the student knows how to perform the computation of multiplying fractions this should be enough. Why say “without computation” the student is expected to determine? The intent here is to have the student visually look at the fraction and see if it is greater than one or less than one... It is testing mental math and not if a student can perform a calculation. Not all students will be good at mental math, but if they can perform the calculation should they be penalized?

TEK 6.3 B states: (Supporting Content Standard)

- (3) Number and operations. The student applies mathematical process standards to represent addition, subtraction, multiplication, and division while solving problems and justifying solutions. The student is expected to:
 - (B) **determine, with and without computation**, whether a quantity is increased or decreased when multiplied by a fraction, including values greater than or less than one;

TEK 6.1 B & F (Process Standard)

- (1) Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:
 - (B) use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution;
 - (F) analyze mathematical relationships to connect and communicate mathematical ideas; and

- 9 In the expression shown p represents a rational number.

$$4p$$

What value of p makes the expression equal a number less than 4?

A $\frac{9}{8}$

B $\frac{19}{17}$

☒ C $\frac{7}{8}$

D $\frac{16}{16}$

Supporting
6.3 B
6.1 B F

Problem 10 is another example of testing a process or method instead of actually performing the calculation. Do 6th graders really need to use a number line to solve? Why is the emphasis on “model” instead of calculation? The use of the word represent is the problem in the TEK.

$$3 \times -4 = 12$$

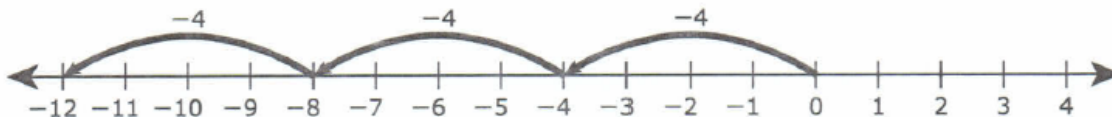
TEK 6.3 C states: (Supporting Content Standard)

- (3) Number and operations. The student applies mathematical process standards to represent addition, subtraction, multiplication, and division while solving problems and justifying solutions. The student is expected to:
- (C) **represent integer operations with concrete models** and connect the actions with the models to standardized algorithms;

TEK 6.1 B, D & F (Process Standard)

- (1) Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:
- (B) use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution;
- (D) communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate;
- (F) analyze mathematical relationships to connect and communicate mathematical ideas; and

10 Which expression is represented on the number line?



A $-12 \div -3$

B $0 - (-12)$

C $-3 \cdot -4$

☒ D $3(-4)$

Testing a
process, not
content
knowledge.

Supporting
6.3 C
6.1 B D F

Problem 14 is testing TEK 6.5 B. It is an okay problem, but the TEK calls for solving proportional relationships using “concrete and pictorial models,” so this problem could have been worse...

TEK 6.5 B states: (Readiness Content Standard)

- (5) Proportionality. The student applies mathematical process standards to solve problems involving proportional relationships. The student is expected to:
- (B) solve real-world problems to find the whole given a part and the percent, to find the part given the whole and the percent, and to find the percent given the part and the whole, **including the use of concrete and pictorial models**; and

TEK 6.1 A, B & F (Process Standard)

- (1) Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:
- (A) apply mathematics to problems arising in everyday life, society, and the workplace;
- (B) use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution;
- (F) analyze mathematical relationships to connect and communicate mathematical ideas; and

- 14** The last time Brea played softball, she hit the ball 35% of the times she was at bat. Based on this information, how many times will Brea hit the ball the next time she plays softball if she is at bat 20 times?

- A 4
B 7
 C 15
 D 6

$$\begin{array}{r} .35 \\ \times 20 \\ \hline 7.00 \end{array}$$

Readiness

6.5 B
 6.1 A B F

Problem 17 is testing TEK 6.9 B.

Number lines? In 6th grade? There is a much more efficient method of communicating mathematical solutions. What is wrong with equations and inequalities as I have shown below? The problem wording in this TEK is the use of “represent solutions... on number lines.”

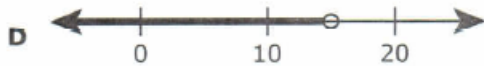
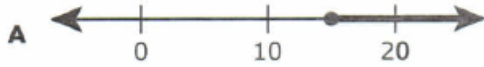
TEK 6.9 B states: (Supporting Content Standard)

- (9) Expressions, equations, and relationships. The student applies mathematical process standards to use equations and inequalities to represent situations. The student is expected to:
 - (B) represent solutions for one-variable, one-step equations and inequalities on number lines; and

TEK 6.1 A, B, D & F (Process Standard)

- (1) Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:
 - (A) apply mathematics to problems arising in everyday life, society, and the workplace;
 - (B) use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution;
 - (D) communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate;
 - (F) analyze mathematical relationships to connect and communicate mathematical ideas; and

- 17 Aiko is selling books for \$12 each. She wants to make more than \$180 in book sales. The inequality $12b > 180$ can be used to determine the number of books, b , she must sell in order to meet her goal. Which number line best represents the solution to the inequality?



$$\frac{12b}{12} > \frac{180}{12}$$

$$b > 15$$

Supporting

6.9 B

6.1 A B D F

$$\begin{array}{r} 15 \\ 12 \overline{)180} \\ \underline{12} \\ 60 \\ \underline{60} \\ 0 \end{array}$$

7 STAAR 7TH GRADE MATH QUESTIONS

Problem 1 is testing TEK 7.2 A. I have the same complaint about these questions as I did for 6th grade. I believe this question is testing the process standard to “use representations to organize, record, and communicate mathematical ideas.” The use of numbers in calculations is more important than using visual representations to describe relationships...

This is another example where “conceptual understanding” of numbers seems to be more important than demonstrating “knowledge and skills” by performing calculations with those numbers...

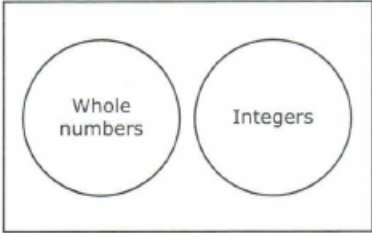
TEK 7.2 A states: (Supporting Content Standard)

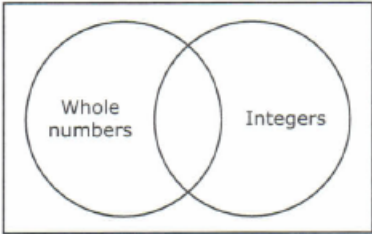
- (2) Number and operations. The student applies mathematical process standards to represent and use rational numbers in a variety of forms. The student is expected to extend previous knowledge of sets and subsets **using a visual representation to describe relationships** between sets of rational numbers.

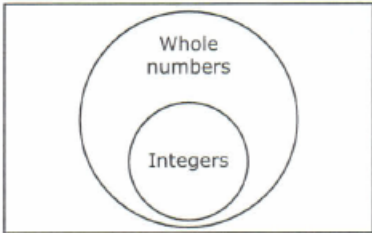
TEK 7.1 B, E & G states: (Process Standard)

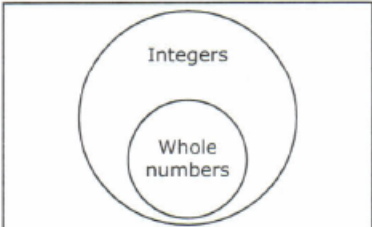
- (1) Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:
 - (B) use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution;
 - (E) **create and use representations to organize, record, and communicate mathematical ideas;**
 - (G) display, explain, and justify mathematical ideas and arguments using precise mathematical language in written or oral communication.

- 1 Which Venn diagram correctly describes the relationship between whole numbers and integers?

A  , because whole numbers and integers have no numbers in common

B  , because some whole numbers are not integers

C  , because all integers are whole numbers

D  , because all whole numbers are integers

Supporting
7.2 A
7.1 B E G

Problem 2, 3 and 4 are all problems testing probability and statistics. This is skill that has been moved down into middle school. Previously "Probability and Statistics" has been a college level course required for specific degree plans. Problem 4 is a good example of the complexity of probability.

TEK 7.6 I states: (Readiness Content Standard)

- (6) Proportionality. The student applies mathematical process standards to use probability and statistics to describe or solve problems involving proportional relationships. The student is expected to:
- (I) determine experimental and theoretical probabilities related to simple and compound events using data and sample spaces.

TEK 7.1 A, B & F states: (Process Standard)

- (1) Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:
- (A) apply mathematics to problems arising in everyday life, society, and the workplace;
- (B) use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution;
- (F) analyze mathematical relationships to connect and communicate mathematical ideas; and

- 4 Mildred has a bag of coins. The bag contains 10 dimes, 5 nickels, and 1 penny. She will randomly select 2 coins from the bag one at a time without replacement. What is the probability that Mildred will select a dime first and then a penny?

A $\frac{83}{120}$

B $\frac{11}{16}$

C $\frac{5}{128}$

D $\frac{1}{24}$

$$\frac{10}{16} \cdot \frac{1}{15} = \frac{10}{240} = \frac{1}{24}$$

Readiness

7.6 I

7.1 A B F

Problem 5 is an example of a good two step question. With the exception of stating “The student applies mathematical process standards” and “justifying solutions” the TEK is good (although I do not see the need to have this “B” in the TEK when “A” covers the same thing...

TEK 7.3 B states: (Readiness Content Standard)

- (3) Number and operations. The student applies mathematical process standards to add, subtract, multiply, and divide while solving problems and justifying solutions. The student is expected to:
- (B) apply and extend previous understandings of operations to solve problems using addition, subtraction, multiplication, and division of rational numbers.

TEK 7.1 A, B & F states: (Process Standard)

- (1) Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:
- (A) apply mathematics to problems arising in everyday life, society, and the workplace;
- (B) use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution;
- (F) analyze mathematical relationships to connect and communicate mathematical ideas; and

- 5 The 17 students on the math team want to raise \$483.62 to buy practice books. They have already raised \$218.25. If each student raises the same amount, how much more money must each student raise?

- (A) \$15.61
- B \$12.84
- C \$28.45
- D \$41.29

Readiness
7.3 B
7.1 A B F

$$\begin{array}{r} 483.62 \\ - 218.25 \\ \hline 265.37 \end{array}$$

$$\begin{array}{r} 15.61 \\ 17 \overline{) 265.37} \\ \underline{-17} \\ 95 \\ \underline{-85} \\ 103 \\ \underline{-102} \\ 17 \end{array}$$

Problem 10 is testing TEK 7.10 B. Do 7th grade students really need to be using number lines? This is not the clearest way to express inequalities, but it is stressing what is in the Process Standards... The wording in the content standard that is problematic is “represent solutions... on number lines.”

TEK 7.10 B states: (Supporting Content Standard)

(10) Expressions, equations, and relationships. The student applies mathematical process standards to use one-variable equations and inequalities to represent situations. The student is expected to:

(B) represent solutions for one-variable, two-step equations and inequalities on number lines; and

TEK 7.1 B, D & F states: (Process Standard)

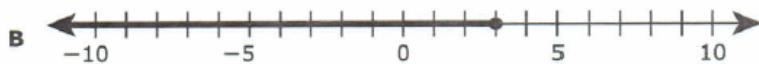
(1) Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:

(B) use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution;

(D) communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate;

(F) analyze mathematical relationships to connect and communicate mathematical ideas; and

10 Which number line represents the solution to the inequality $-7x - 13 \geq 8$?



$$\begin{array}{r} -7x - 13 \geq 8 \\ +13 \quad +13 \end{array}$$

$$\begin{array}{r} -7x \geq 21 \\ \underline{-7} \quad \underline{-7} \end{array}$$

$$x \leq -3$$

Supporting
7.10 B
7.1 B D F

Problem 11 is testing a process (model) and not content knowledge. These types of models are fine to teach a concept, but students by this grade should be able to use the standard algorithm to quickly solve this problem. That is what should be tested, not that they can recognize a model. The content standard TEK calls for "model" and "solve." I think the model portion of this TEK should be removed so that it is not tested.

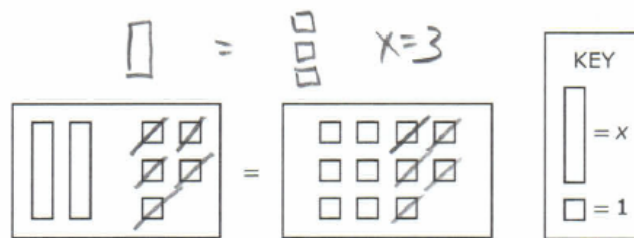
TEK 7.11 A states: (Readiness Content Standard)

- (11) Expressions, equations, and relationships. The student applies mathematical process standards to solve one-variable equations and inequalities. The student is expected to:
- (A) **model** and solve one-variable, two-step equations and inequalities;

TEK 7.1 B, E & F states: (Process Standard)

- (1) Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:
- (B) use a problem-solving **model** that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution;
- (E) create and use representations to organize, record, and communicate mathematical ideas;
- (F) analyze mathematical relationships to connect and communicate mathematical ideas; and

11 The model represents an equation.



What value of x makes the equation true?

- (A) 3
B 8
C 6
D 4

Readiness
7.11 A
7.1 B E F

Should be this way!

$$\begin{array}{r}
 2x + 5 = 11 \\
 -5 \quad -5 \\
 \hline
 2x = 6 \\
 \frac{2x}{2} = \frac{6}{2} \\
 x = 3
 \end{array}$$

Testing
a process,
not content
Knowledge.

Problem 15 is testing TEK 7.5 C. This seems to be a very specific example of a workplace problem, but the underlying mathematics is multi step multiplication and division of fractions... Why do the TEKS need to get this specific? Understanding scale drawings is a skill needed for architecture and drafting.

TEK 7.5 C states: (Readiness Content Standard)

- (5) Proportionality. The student applies mathematical process standards to use geometry to describe or solve problems involving proportional relationships. The student is expected to:
- (C) solve mathematical and **real-world problems involving similar shape and scale drawings.**

TEK 7.1 A, B & F states: (Process Standard)

- (1) Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:
- (A) **apply mathematics to problems arising in** everyday life, society, and **the workplace;**
- (B) use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution;
- (F) analyze mathematical relationships to connect and communicate mathematical ideas; and

15 In the scale used on a blueprint, $\frac{1}{4}$ inch represents 2 feet. On the blueprint what is the length of a room with an actual length of 20 feet?

A 10 in.

B 5 in.

C $\frac{1}{2}$ in.

D $2\frac{1}{2}$ in.

$$\frac{\frac{1}{4} \text{ in}}{2 \text{ ft}} = \frac{\frac{1}{8} \text{ in}}{4 \text{ ft}}$$

Readiness
7.5 C
7.1 A B F

$$\left(\frac{1}{8} \frac{\text{in}}{\text{ft}}\right)(20 \text{ ft}) \quad 8 \overline{) 20} \quad 2 \frac{4}{8} = 2 \frac{1}{2}$$

Problem 22 is testing TEK 7.12 A, or as I say, does the student know what a dot plot is? This TEK is too specific and not very useful.

TEK 7.12 A states: (Readiness Content Standard)

(12) Measurement and data. The student applies mathematical process standards to use statistical representations to analyze data. The student is expected to:

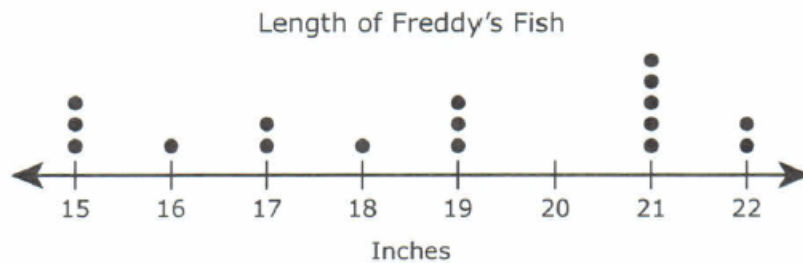
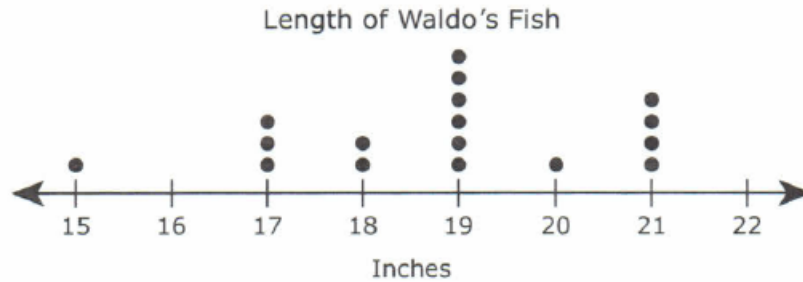
- (A) **compare two groups of numeric data using comparative dot plots** or box plots by comparing their shapes, centers, and spreads;

TEK 7.1 A, B, E & G states: (Process Standard)

(1) Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:

- (A) apply mathematics to problems arising in everyday life, society, and the workplace;
- (B) use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution;
- (E) **create and use representations to organize, record, and communicate mathematical ideas;**
- (G) display, explain, and justify mathematical ideas and arguments using precise mathematical language in written or oral communication.

- 22 Waldo and Freddy caught fish one weekend. The dot plots show the lengths of the fish they caught.



Which statement about the lengths of the fish caught by Waldo and Freddy appears to be true?

- ☒ A The data for Waldo's fish and the data for Freddy's fish are skewed to the right.
- ☒ B The median length of the fish caught by Waldo is greater than the median length of the fish caught by Freddy.
- ☒ C The range of the length of the fish caught by Freddy is greater than the range of the length of the fish caught by Waldo.
- ☒ D The data for Waldo's fish and the data for Freddy's fish are approximately symmetrical.

Readiness

7.12 A

7.1. A B E G

8 STAAR 8TH GRADE MATH QUESTIONS

Problem 1 is testing TEK 8.2 A.

This is another example of a TEK that is just not all that useful in the real world. Every single STAAR practice test started with this very question of Venn diagrams and definition/classification of numbers. Every student I gave it too was immediately discouraged. Who remembers the definition of real, integer, whole, counting (this is a new category they added since I went to school), imaginary, rational, irrational and natural?

Can any one of the math experts give me a real word example of the use or need to know the definition of these numbers?

The problem wording in this TEK is “using a visual representation.” This is supposed to give the student “conceptual understanding,” but it doesn’t really help them in performing calculations.

TEK 8.2 A states: (Supporting Content Standard)

- (2) Number and operations. The student applies mathematical process standards to represent and use real numbers in a variety of forms. The student is expected to:
 - (A) extend previous knowledge of sets and subsets using a visual representation to describe relationships between sets of real numbers;

TEK 8.1 B, E & G states: (Process Standard)

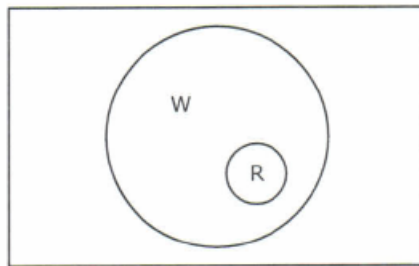
- (1) Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:
 - (B) use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution;
 - (E) create and use representations to organize, record, and communicate mathematical ideas;
 - (G) display, explain, and justify mathematical ideas and arguments using precise mathematical language in written or oral communication.

- 1 Which Venn diagram correctly describes the relationship between Set R and Set W?

$R = \{\text{real numbers}\}$
 $W = \{\text{whole numbers}\}$

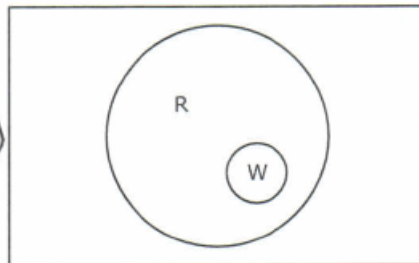
Supporting
 8.2 A
 8.1 B E G

A



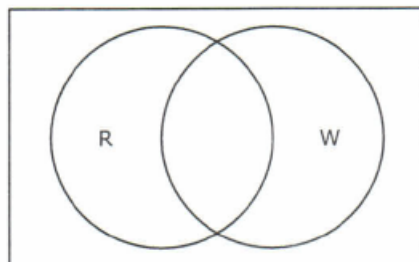
, because all real numbers are whole numbers

B



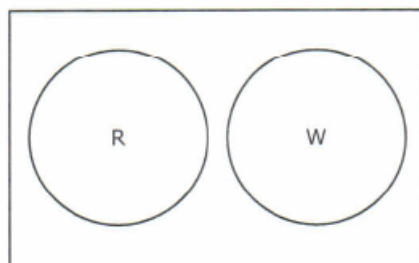
, because all whole numbers are real numbers

C



, because some whole numbers are not real numbers

D



, because whole numbers and real numbers have no elements in common

Problem 6 is testing TEK 8.5 G.

This problem is an example of the deeper “conceptual understanding” that the new TEKS are trying to provide, but can anyone tell me what is the practical application of the answer of this problem?

This problem is testing if the student can understand the definition of a function in a diagram format; each input (also known as domain) can only have one output (also known as codomain or range).

TEK 8.5 G states: (Readiness Content Standard)

- (5) Proportionality. The student applies mathematical process standards to use proportional and non-proportional relationships to develop foundational concepts of functions. The student is expected to:
 - (G) identify functions using sets of ordered pairs, tables, mappings, and graphs;

TEK 8.1 B, E & F states: (Process Standard)

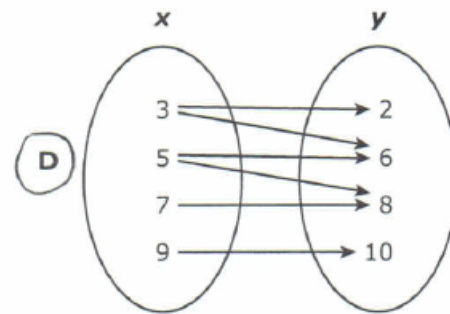
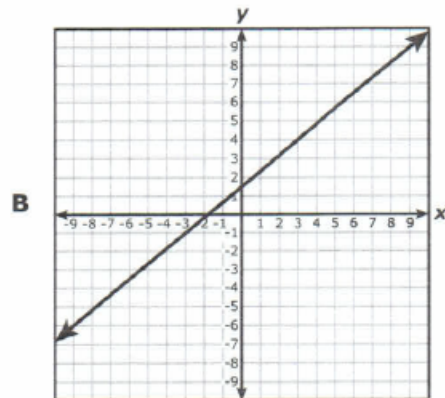
- (1) Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:
 - (B) use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution;
 - (E) create and use representations to organize, record, and communicate mathematical ideas;
 - (F) analyze mathematical relationships to connect and communicate mathematical ideas; and

6 Which representation does **not** show y as a function of x ?

A

x	1	3	5	7
y	-6	-18	-30	-42

C $\{(2, -2), (3, -2), (7, -2), (11, -2)\}$



Readiness

8.5 G

8.1 B E F

Problem 9 is testing TEK 8.8 B.

This TEK is not required. The student should be able to solve the word problem and demonstrate the understanding. The way this TEK is written the student doesn't even have to solve for the unknown. The word problem should be solved as follows:

$$340 + 5x = 650 - 8x$$

$$13x = 310$$

$$x = \frac{310}{13} = 23.847$$

Does making the student write a word problem give them "conceptual understanding?"

TEK 8.8 B states: (Supporting Content Standard)

(8) Expressions, equations, and relationships. The student applies mathematical process standards to use one-variable equations or inequalities in problem situations. The student is expected to:

(B) write a corresponding real-world problem when given a one-variable equation or inequality with variables on both sides of the equal sign using rational number coefficients and constants;

TEK 8.1 A, B,D & G states: (Process Standard)

(1) Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:

- (A) apply mathematics to problems arising in everyday life, society, and the workplace;
- (B) use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution;
- (D) communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate;
- (G) display, explain, and justify mathematical ideas and arguments using precise mathematical language in written or oral communication.

- 9 Which situation can be represented by this equation?

$$340 + 5x = 650 - 8x$$

- A** Sierra has a bucket that originally contained 340 fl oz of water and is being filled at a rate of 5 fl oz per minute. Brian has a bucket that originally contained 650 fl oz of water and is being drained at a rate of 8 fl oz per minute. What is x , the number of minutes that need to pass in order for the two buckets to contain the same amount of water?
- B** Sierra started with savings of \$340 and spends \$8 of her savings every week. Brian started with savings of \$650 and adds \$5 to his savings every week. What is x , the number of weeks that need to pass in order for Sierra and Brian to have the same amount of savings?
- C** Sierra started with 340 cans of food for a food drive. She collects 5 more cans every day. Brian started with 650 cans of food for the food drive. He collects 8 more cans every day. What is x , the number of days that need to pass in order for Sierra and Brian to have the same number of cans of food?
- D** Sierra earns 345 points on each level of a video game. Brian earns 642 points on each level of the same video game. What is x , the number of levels that Sierra and Brian would have to play in order for them to have an equal number of points?

Supporting
8.8 B
8.1 A B D G

Problem 10 is testing TEKS 8.8 C. Unlike problem 9 above, this problem is straight forward. But why does the TEK say “model” at all? This problem could have been one that was not straight forward because of the use of the word model.

TEK 8.8 C states: (Readiness Content Standard)

- (8) Expressions, equations, and relationships. The student applies mathematical process standards to use one-variable equations or inequalities in problem situations. The student is expected to:
 - (C) **model** and solve one-variable equations with variables on both sides of the equal sign that represent mathematical and real-world problems using rational number coefficients and constants; and

TEK 8.1 B & F states: (Process Standard)

- (1) Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:
 - (B) use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution;
 - (F) analyze mathematical relationships to connect and communicate mathematical ideas; and

10 What value of x makes this equation true?

- A 4
- B 14
- C 24**
- D 6

$$\begin{array}{l}
 0.6x - 5 = 0.1x + 7 \\
 -0.1x + 5 \quad -0.1x + 5 \\
 \hline
 0.5x = 12 \\
 \hline
 x = 24
 \end{array}$$

Readiness
8.8 C
8.1 B F

Problem 11 is testing TEKS 8.9 A. This really doesn't need to be an 8th grade TEK. The concept of two equations having the same solution is an Algebra I concept, so if we are looking to streamline and reduce the number of TEKS we could strike this one.

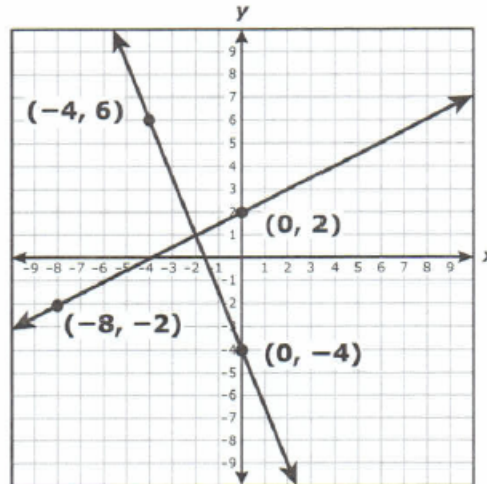
TEK 8.9 A states: (Supporting Content Standard)

- (9) Expressions, equations, and relationships. The student applies mathematical process standards to use multiple representations to develop foundational concepts of simultaneous linear equations. The student is expected to identify and verify the values of x and y that simultaneously satisfy two linear equations in the form $y = mx + b$ from the intersections of the graphed equations.

TEK 8.1 B, E & F states: (Process Standard)

- (1) Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:
- (B) use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution;
 - (E) create and use representations to organize, record, and communicate mathematical ideas;
 - (F) analyze mathematical relationships to connect and communicate mathematical ideas; and

- 11 The two lines graphed on the coordinate grid each represent an equation.



Which ordered pair represents a solution to both equations?

- A $(-4, 0)$
- B $(-2, 1)$**
- C $(0, -4)$
- D $(1, -2)$

Supporting

8.9 A

8.1 B E F

Problem 16 is supposed to be testing the use of the Pythagorean Theorem, but this problem doesn't require the use of the Pythagorean Theorem to solve because $4+6=10$. The measurements could not represent a triangle much less a right triangle...

TEK 8.7 C states: (Readiness Content Standard)

- (7) Expressions, equations, and relationships. The student applies mathematical process standards to use geometry to solve problems. The student is expected to:
 - (C) use the **Pythagorean Theorem** and its converse to solve problems; and

TEK 8.1 B, C & F states: (Process Standard)

- (1) Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:
 - (B) use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution;
 - (C) select tools, including real objects, manipulatives, paper and pencil, and technology as appropriate, and techniques, including mental math, estimation, and number sense as appropriate, to solve problems;
 - (F) analyze mathematical relationships to connect and communicate mathematical ideas; and

16 Which measurements could **not** represent the side lengths of a right triangle?

- A 6 cm, 8 cm, 10 cm
- B 12 cm, 35 cm, 37 cm
- ☒ C 4 cm, 6 cm, 10 cm
- D 10 cm, 24 cm, 26 cm

Readiness

8.7 C

8.1 B C F