

Math
Released Item 2019

Algebra II

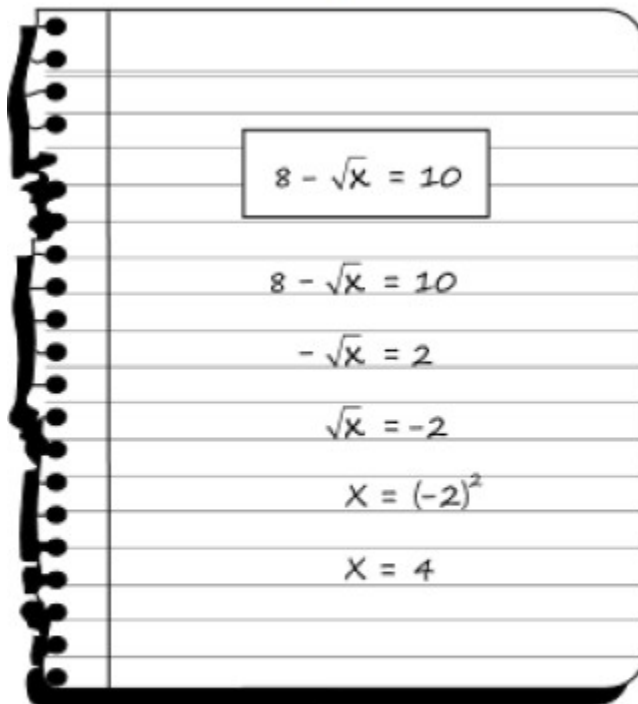
Justify Veracity of Solution
VF564797

Anchor Set
A1–A9

With Annotations

Prompt

Mark solved the equation in the box, using the steps shown.



Is the solution $x = 4$ correct? State yes or no, and justify your answer.

Enter your answer and your justification in the space provided.

Rubric

#12 VF564797 Rubric	
Score	Description
3	<p>Student response includes the following 3 elements.</p> <ul style="list-style-type: none">• Component 1 = 1 point<ul style="list-style-type: none">○ A simple statement of no without any explanation or justification somewhere in the response earns the answer point.○ A wrong answer cannot be justified. If a student answers only yes, no points can be earned for the entire task. (However, if the response says something like yes, the algebra is correct, but then goes on to show that the solution does not work in the original equation, the answer point can be earned back along with the reasoning.)• Component 2 = 1 point<ul style="list-style-type: none">○ Checking the solution in the equation <p>Sample Student Response:</p> <p>The solution is not correct because 4 does not create a true statement (or 4 creates an inconsistency) when substituted for x in the original equation, as shown.</p> $8 - \sqrt{4} = 10$ $8 - 2 = 10$ $6 \neq 10$ <p>Therefore, $x = 4$ is not a solution to the equation.</p> <ul style="list-style-type: none">• Component 3 = 1 point<ul style="list-style-type: none">○ Reasoning <p>Sample Student Response:</p> <p>Mark created an extraneous solution when he squared both sides of the equation. OR $\sqrt{x} = -2$ has no real number solution. Therefore, the original equation has no solution. OR Sometimes, when you use the method of raising both sides of an equation to an even power, you create unintended, or extraneous solutions.</p> <p>Note: The response can appeal to either the extraneous solution reason or the no real solution reason to earn the point. Both are not needed.</p>

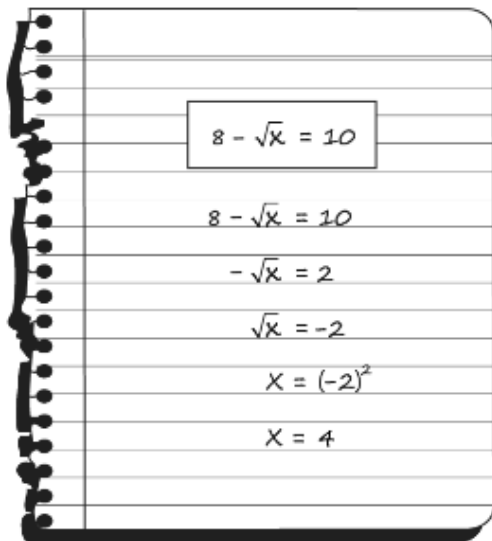
Rubric

	<p><i>Note: Credit for a correct answer of 'no' can be earned as long as the response does not include clear indication of inappropriate work, such as indication that the algebra in the prompt was flawed. Note that inappropriate work such as this is not the same as incorrect work, such as an attempt to check the solution given in the prompt that contains a calculation error.</i></p> <p><i>Some examples where credit for the first element is earned may include:</i></p> <ul style="list-style-type: none">• An answer of no is given with correct and appropriate work for the second or third elements, or;• An answer of no is given with incorrect but appropriate work for the second or third elements, or;• An answer of no is given with vague or incomplete work for the second or third elements that does not clearly indicate inappropriate operations, or;• An answer of no is given, by itself and without any further work (as per the first note of the rubric), or;• An answer of yes is given that specifically addresses the algebra in the prompt (and not the solution) with work that demonstrates that the solution does not work in the original equation (as per the second note of the rubric). <p><i>Some examples where credit for the first element is not earned may include:</i></p> <ul style="list-style-type: none">• An answer of no is given with inappropriate work for the second or third elements, or;• An answer of yes is given that specifically addresses the solution given in the prompt (and not the algebra).
2	Student response includes 2 of the 3 elements.
1	Student response includes 1 of the 3 elements.
0	Student response is incorrect or irrelevant.

A1

Score Point 3

Mark solved the equation in the box, using the steps shown.



Is the solution $x = 4$ correct? State yes or no, and justify your answer in the space provided.

No, if 4 is plugged in for x , it would be saying $8 - \sqrt{4} = 10$. That is equivalent to $8 - 2 = 10$, which is not true. There are no real solutions; 4 is extraneous.

Annotation

Anchor Paper 1 **Score Point 3**

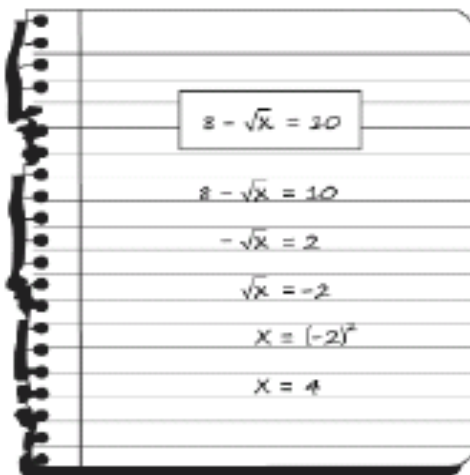
This response receives full credit. The student includes each of the three required elements:

- A correct answer is provided (No).
- The solution is correctly checked in the equation (if 4 is plugged in for x , it would be saying $8 - \sqrt{4} = 10$. That is equivalent to $8 - 2 = 10$, which is not true).
- Correct reasoning why 4 is not a correct solution is provided (There are no real solutions; 4 is extraneous).

A2

Score Point 2

Mark solved the equation in the box, using the steps shown.



Is the solution $x = 4$ correct? State yes or no, and justify your answer in the space provided.



No, because $\sqrt{4} = 2$, so $8 - 2$ doesn't equal 10. The correct answer is -2 .

- ▶ Numbers
- ▶ Arithmetic and Units
- ▶ Exponents, Roots, Logs
- ▶ Relations
- ▶ Geometry
- ▶ Groups
- ▶ Trigonometry
- ▶ Statistics

Annotation

Anchor Paper 2 **Score Point 2**

This response receives partial credit. The student includes two of the three required elements:

- A correct answer is provided (No).
- The solution is correctly checked in the equation (because $\sqrt{4} = 2$, so $8 - 2$ doesn't equal 10).
- The response does not provide reasoning why 4 is not a correct solution. The statement (The correct answer is -2) is incorrect and does not address the issue.

Mark solved the equation in the box, using the steps shown.

$8 - \sqrt{x} = 10$

$8 - \sqrt{x} = 10$

$-\sqrt{x} = 2$

$\sqrt{x} = -2$

$x = (-2)^2$

$x = 4$

Is the solution $x = 4$ correct? State yes or no, and justify your answer in the space provided.

no because if you plug 4 back into the problem you do not get 10 as your solution. you get six because the square root of 4 is two and 8 minus 2 is 6 not ten.

Annotation

Anchor Paper 3 **Score Point 2**

This response receives partial credit. The student includes two of the three required elements:

- A correct answer is provided (no).
- The solution is correctly checked in the equation (if you plug 4 back into the problem you do not get 10 as your solution. you get six because the square root of 4 is two and 8 minus 2 is 6 not ten).

The response does not provide reasoning why 4 is not a correct solution. No attempt is made to explain that an extraneous solution has been created or that the original equation has no real solution.

Mark solved the equation in the box, using the steps shown.

The image shows a spiral-bound notebook with handwritten work. The first line is boxed and contains the equation $8 - \sqrt{x} = 10$. Below it, the student has written the following steps:
 $8 - \sqrt{x} = 10$
 $-\sqrt{x} = 2$
 $\sqrt{x} = -2$
 $x = (-2)^2$
 $x = 4$

Is the solution $x = 4$ correct? State yes or no, and justify your answer in the space provided.

Calculator interface showing a toolbar with the following buttons: undo, redo, clear, delete, plus, minus, multiply, divide, fraction, square root, power, square root, and equals. Below the toolbar is a button with the approximation symbol \approx .

no because $8 - \textit{the}$ square root of 4 does not equal 10

- ▶ Numbers
- ▶ Arithmetic and Units
- ▶ Exponents, Roots, Logs
- ▶ Relations
- ▶ Geometry
- ▶ Groups
- ▶ Trigonometry
- ▶ Statistics

Annotation

Anchor Paper 4

Score Point 2

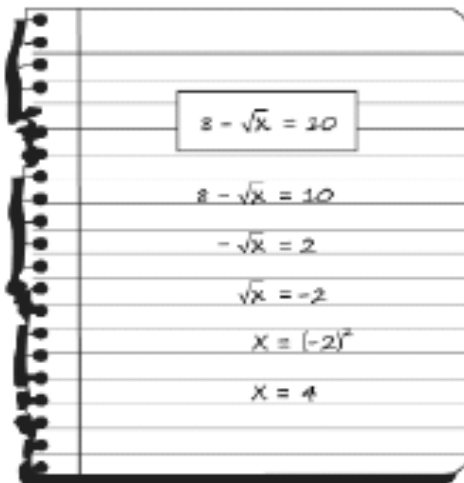
This response receives partial credit. The student includes two of the three required elements:

- A correct answer is provided (no).
- The solution is correctly checked in the equation (because $8 - \text{the square root of } 4 \text{ does not equal } 10$).

The response does not provide reasoning why 4 is not a correct solution. No attempt is made to explain that an extraneous solution has been created or that the original equation has no real solution.

A5
Score Point 1

Mark solved the equation in the box, using the steps shown.



$8 - \sqrt{x} = 20$
 $8 - \sqrt{x} = 10$
 $-\sqrt{x} = 2$
 $\sqrt{x} = -2$
 $x = (-2)^2$
 $x = 4$

Is the solution $x = 4$ correct? State yes or no, and justify your answer in the space provided.

Calculator interface showing a row of buttons: \leftarrow , \rightarrow , C , \times , $+$, $-$, \times , \div , $\frac{\square}{\square}$, $\frac{\square}{\square}$, y^x , $\sqrt{\square}$, $=$. Below this row is a button with the approximation symbol \approx .

no x does not equal 4 because
when its plugged into the calculator
it equals 6

- ▶ Numbers
- ▶ Arithmetic and Units
- ▶ Exponents, Roots, Logs
- ▶ Relations
- ▶ Geometry
- ▶ Groups
- ▶ Trigonometry
- ▶ Statistics

Annotation

Anchor Paper 5

Score Point 1

This response receives partial credit. The student includes one of the three required elements:

- A correct answer is provided (no).

The response provides a vague check of the solution in the equation (when its plugged into the calculator it equals 6). The response does not indicate the calculations used to find the value of $8 - \sqrt{x}$. Note that a scoring decision was made stating that when a response explains that a calculator was used to derive an answer, a description of either the key entries or the calculation or solutions process must be given in enough detail to be duplicated in order to earn credit.

The response does not provide reasoning why 4 is not a correct solution.

Mark solved the equation in the box, using the steps shown.

The image shows a spiral-bound notebook with handwritten work. The work is as follows:

$$8 - \sqrt{x} = 10$$
$$8 - \sqrt{x} = 10$$
$$-\sqrt{x} = 2$$
$$\sqrt{x} = -2$$
$$x = (-2)^2$$
$$x = 4$$

Is the solution $x = 4$ correct? State yes or no, and justify your answer in the space provided.

no

Annotation

Anchor Paper 6

Score Point 1

This response receives partial credit. The student includes one of the three required elements:

- A correct answer is provided (no). Note that when the correct answer is given without any explanation or justification somewhere in the response, credit for this element is still received according to the first note in the rubric.

The response does not provide a check of the solution in the equation.

The response does not provide reasoning why 4 is not a correct solution.

A7

Score Point 0

Mark solved the equation in the box, using the steps shown.

The image shows a spiral-bound notebook with handwritten work. The first step is the equation $8 - \sqrt{x} = 10$ enclosed in a rectangular box. Below this, the student has written the following steps:

$$8 - \sqrt{x} = 10$$
$$-\sqrt{x} = 2$$
$$\sqrt{x} = -2$$
$$x = (-2)^2$$
$$x = 4$$

Is the solution $x = 4$ correct? State yes or no, and justify your answer in the space provided.

No $x \neq 4$ I believe $x = \sqrt{2}i$ because the negative two in Mark's fourth step should not have been squared and should have had the square root taken out of it.

Annotation

Anchor Paper 7

Score Point 0

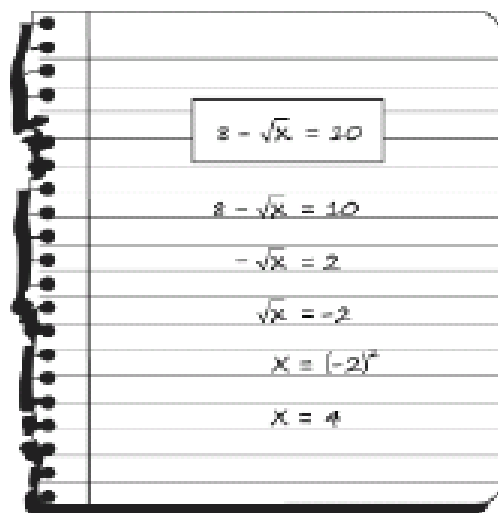
This response receives no credit. The student includes none of the three required elements:

The response provides an answer (No) but supports this answer with an incorrect statement (I believe $x = \sqrt{2}i$ because the negative two in Mark's fourth step should not have been squared and should have had the square root taken out of it). This statement discusses the algebra demonstrated in the prompt, which is incorrect. Contrast this response with Anchor Papers 5 and 6.

The response does not provide a check of the solution in the equation.

The response does not provide reasoning why 4 is not a correct solution.

Mark solved the equation in the box, using the steps shown.



Is the solution $x = 4$ correct? State yes or no, and justify your answer in the space provided.



\approx

$x = 4$ is incorrect.

$$8 - \sqrt{x} = 10$$

$$-\sqrt{x} = 2$$

$$-\sqrt{x} = \sqrt{2}$$

$$-x = \sqrt{2}$$

$$x = i\sqrt{2}$$

- ▶ Numbers
- ▶ Arithmetic and Units
- ▶ Exponents, Roots, Logs
- ▶ Relations
- ▶ Geometry
- ▶ Groups
- ▶ Trigonometry
- ▶ Statistics

Annotation

Anchor Paper 8

Score Point 0

This response receives no credit. The student includes none of the three required elements:

The response provides an answer ($X = 4$ is incorrect) but supports this answer with an incorrect value for x ($x = i\sqrt{2}$) and an incorrect solution process with multiple errors. This work addresses the algebra demonstrated in the prompt, which is incorrect. Contrast this response with Anchor Papers 5 and 6. Compare to Anchor Paper 8.

The response does not provide a check of the solution in the equation.

The response does not provide reasoning why 4 is not a correct solution.

Mark solved the equation in the box, using the steps shown.

The image shows a spiral-bound notebook with handwritten work. The work is as follows:

$$8 - \sqrt{x} = 10$$
$$8 - \sqrt{x} = 10$$
$$-\sqrt{x} = 2$$
$$\sqrt{x} = -2$$
$$x = (-2)^2$$
$$x = 4$$

Is the solution $x = 4$ correct? State yes or no, and justify your answer in the space provided.

no because you cant move the negative that is in front of the \sqrt{x} over to the two.

Annotation

Anchor Paper 9

Score Point 0

This response receives no credit. The student includes none of the three required elements:

The response provides an answer (no) but supports this answer with an incorrect statement (you cant move the negative that is in front of the \sqrt{x} over to the two). This statement discusses the algebra demonstrated in the prompt, which is incorrect. Contrast this response with Anchor Papers 5 and 6. Compare to Anchor Papers 8 and 9.

The response does not provide a check of the solution in the equation.

The response does not provide reasoning why 4 is not a correct solution.

Practice Set

P1–P10

No Annotations Included

Mark solved the equation in the box, using the steps shown.

$8 - \sqrt{x} = 10$

$8 - \sqrt{x} = 10$

$-\sqrt{x} = 2$

$\sqrt{x} = -2$

$x = (-2)^2$

$x = 4$

Is the solution $x = 4$ correct? State yes or no, and justify your answer in the space provided.

it is not correct because he should not have squared -2 , he should have square rooted -2 .

Mark solved the equation in the box, using the steps shown.

The image shows a spiral-bound notebook with handwritten work. The work is as follows:

$$8 - \sqrt{x} = 10$$
$$8 - \sqrt{x} = 10$$
$$-\sqrt{x} = 2$$
$$\sqrt{x} = -2$$
$$x = (-2)^2$$
$$x = 4$$

Is the solution $x = 4$ correct? State yes or no, and justify your answer in the space provided.

No, $8 - 4$ does not equal 10

Mark solved the equation in the box, using the steps shown.

$8 - \sqrt{x} = 10$

$8 - \sqrt{x} = 10$

$-\sqrt{x} = 2$

$\sqrt{x} = -2$

$x = (-2)^2$

$x = 4$

Is the solution $x = 4$ correct? State yes or no, and justify your answer in the space provided.

No because $8 - \sqrt{4}$ does not equal 10. $\sqrt{4}$ equals 2. That would mean that $8 - 2 = 6$ not 10.

Mark solved the equation in the box, using the steps shown.

$$8 - \sqrt{x} = 10$$
$$8 - \sqrt{x} = 10$$
$$-\sqrt{x} = 2$$
$$\sqrt{x} = -2$$
$$x = (-2)^2$$
$$x = 4$$

Is the solution $x = 4$ correct? State yes or no, and justify your answer in the space provided.

No because in the 4th step , the person squared the -2 , but you are suppose to divide

Mark solved the equation in the box, using the steps shown.

Handwritten work on a spiral notebook showing the solution of the equation $8 - \sqrt{x} = 10$. The steps are:

$$8 - \sqrt{x} = 10$$
$$8 - \sqrt{x} = 10$$
$$-\sqrt{x} = 2$$
$$\sqrt{x} = -2$$
$$x = (-2)^2$$
$$x = 4$$

Is the solution $x = 4$ correct? State yes or no, and justify your answer in the space provided.

no; when you plug in 4 for x you get $\sqrt{4}$ which equals 2. you subtract 2 from 8 to get 6. $6 = 10$ is not correct

Mark solved the equation in the box, using the steps shown.

$8 - \sqrt{x} = 10$

$8 - \sqrt{x} = 10$

$-\sqrt{x} = 2$

$\sqrt{x} = -2$

$x = (-2)^2$

$x = 4$

Is the solution $x = 4$ correct? State yes or no, and justify your answer in the space provided.

Incorrect

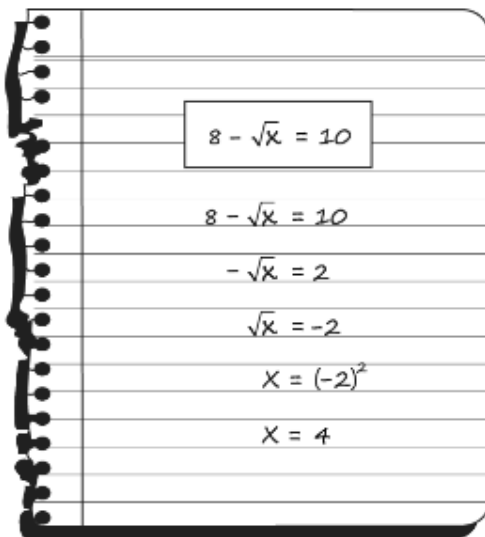
Mark solved the equation in the box, using the steps shown.

$$8 - \sqrt{x} = 10$$
$$8 - \sqrt{x} = 10$$
$$-\sqrt{x} = 2$$
$$\sqrt{x} = -2$$
$$x = (-2)^2$$
$$x = 4$$

Is the solution $x = 4$ correct? State yes or no, and justify your answer in the space provided.

no $8 - \sqrt{4} \square = 6$
 $\sqrt{4} \square = 2$
 $8 - 2 = 6$
so the answer is no

Mark solved the equation in the box, using the steps shown.



$8 - \sqrt{x} = 10$

$8 - \sqrt{x} = 10$

$-\sqrt{x} = 2$

$\sqrt{x} = -2$

$x = (-2)^2$

$x = 4$

Is the solution $x = 4$ correct? State yes or no, and justify your answer in the space provided.

no its not when you put it in your calculator its wrong

Mark solved the equation in the box, using the steps shown.

$8 - \sqrt{x} = 10$

$8 - \sqrt{x} = 10$

$-\sqrt{x} = 2$

$\sqrt{x} = -2$

$x = (-2)^2$

$x = 4$

Is the solution $x = 4$ correct? State yes or no, and justify your answer in the space provided.

No, the correct answer is not 4. it is -4 . Mark lost his negative when he squared the -2 , and -2^2 is -4 not 4.

Mark solved the equation in the box, using the steps shown.

$8 - \sqrt{x} = 10$

$8 - \sqrt{x} = 10$

$-\sqrt{x} = 2$

$\sqrt{x} = -2$

$x = (-2)^2$

$x = 4$

Is the solution $x = 4$ correct? State yes or no, and justify your answer in the space provided.

No because when 4 replaces the x in the \sqrt{x} it becomes $8 - \sqrt{4} = 10$. It would further be simplified to $8 - 2 = 10$. 6 does not equal 10, so 4 is not a solution.

Practice Set

Paper	Score
P1	0
P2	1
P3	2
P4	0
P5	2
P6	1
P7	2
P8	1
P9	0
P10	2