

## Student Screenshots

### Solving equations with two radicals

1.1 1.2 1.3 1.4 ▶ RAD AUTO REAL

An example is worked out with CAS.

There are several "tricky" steps that involve different algebra commands.

The graph will confirm your solution(s).

See if you can replicate the process while solving another problem.

1.1 1.2 1.3 1.4 ▶ RAD AUTO REAL

$$\sqrt{3 \cdot x + 1} - \sqrt{x + 4} = 1$$

$$\sqrt{3 \cdot x + 1} = \sqrt{x + 4} + 1$$

$$(\sqrt{3 \cdot x + 1} = \sqrt{x + 4} + 1)^2 \quad 3 \cdot x + 1 = (\sqrt{x + 4} + 1)^2$$

$$\text{expand}((\sqrt{x + 4} + 1)^2) \quad 2 \cdot \sqrt{x + 4} + x + 5$$

$$3 \cdot x + 1 = 2 \cdot \sqrt{x + 4} + x + 5 \quad 3 \cdot x + 1 = 2 \cdot \sqrt{x + 4} + x + 5$$

$$(3 \cdot x + 1 = 2 \cdot \sqrt{x + 4} + x + 5) - x - 5 \quad 2 \cdot x - 4 = 2 \cdot \sqrt{x + 4}$$

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1.1 1.2 1.3 1.4 ▶ RAD AUTO REAL

$$(3 \cdot x + 1 = 2 \cdot \sqrt{x + 4} + x + 5) - x - 5 \quad 2 \cdot x - 4 = 2 \cdot \sqrt{x + 4}$$

$$\frac{2 \cdot x - 4 = 2 \cdot \sqrt{x + 4}}{2} \quad x - 2 = \sqrt{x + 4}$$

$$(x - 2 = \sqrt{x + 4})^2 \quad (x - 2)^2 = x + 4$$

$$((x - 2)^2 = x + 4) - x - 4 \quad x^2 - 5 \cdot x = 0$$

$$\text{solve}(x^2 - 5 \cdot x = 0, x) \quad x = 0 \text{ or } x = 5$$

1/10

1.1 1.2 1.3 1.4 ▶ RAD AUTO REAL

©Now test each solution for truth. Done

$\sqrt{3 \cdot 0 + 1} - \sqrt{0 + 4} = 1$	false
$\sqrt{3 \cdot 5 + 1} - \sqrt{5 + 4} = 1$	true

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1.1 1.2 1.3 1.4 ▶ RAD AUTO REAL

Graph both sides to see where the graphs intersect. Copy and paste the radical side into f1(x)=

$f1(x) = \sqrt{3 \cdot x + 1} - \sqrt{x + 4}$   
 $f2(x) = 1$

1: Tools  
2: View  
3: Graph Type  
4: Window  
5: Trace

6: Points & Lines  
7: Measurement  
8: Shapes  
9: Construction  
A: Transformation

1: Point  
2: Point On  
3: Intersection Point(s)  
4: Line  
5: Segment  
6: Ray  
7: Tangent  
8: Vector

radical side into f1(x)=

-10.77

1.2 1.3 1.4 1.5 ▶ RAD AUTO REAL

Next problem with two radicals. You will try this time, with the help of CAS. Be sure to isolate a radical, then square both sides. Repeat until all radicals are gone. Then, test for truth. Last, check the graph for verification of the intersection point(s).

1.3 1.4 1.5 1.6 ▶ RAD AUTO REAL

$$\sqrt{x + 5} - \sqrt{x - 3} = 2$$

$$\sqrt{x + 5} = \sqrt{x - 3} + 2$$

©Isolate one radical first Done

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1.3 1.4 1.5 1.6 RAD AUTO REAL

$$\text{expand}((\sqrt{x-3}+2)^2) \quad 4\sqrt{x-3}+x+1$$

$$x+5=4\sqrt{x-3}+x+1 \quad x+5=4\sqrt{x-3}+x+1$$

$$(x+5=4\sqrt{x-3}+x+1)-x-1 \quad 4=4\sqrt{x-3}$$

$$\frac{4=4\sqrt{x-3}}{4} \quad 1=\sqrt{x-3}$$

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1.3 1.4 1.5 1.6 RAD AUTO REAL

$$(x+5=4\sqrt{x-3}+x+1)-x-1 \quad 4=4\sqrt{x-3}$$

$$\frac{4=4\sqrt{x-3}}{4} \quad 1=\sqrt{x-3}$$

$$(1=\sqrt{x-3})^2 \quad 1=x-3$$

$$(1=x-3)+3 \quad 4=x$$

10/99

1.4 1.5 1.6 1.7 RAD AUTO REAL

©Test each solution for truth. Done

$$\sqrt{4+5-\sqrt{4-3}}=2 \quad \text{true}$$

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1.5 1.6 1.7 2.1 RAD AUTO REAL

Graph the second problem here. Find and label any point(s) of intersection.

$f1(x)=\sqrt{x+5}-\sqrt{x-3}$   
 $f2(x)=2$

1.5 1.6 1.7 2.1 RAD AUTO REAL

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$f1(x)=\sqrt{x+5}-\sqrt{x-3}$   
 $f2(x)=2$