

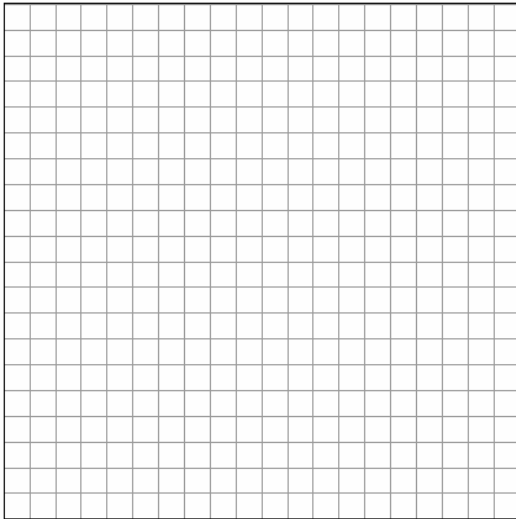
## Lesson 11-3: Solving Radical Equations

### Part 1: Solving Radical Equations

1. 010802b, P.I. A2.A.22  
What is the value of  $x$  in the equation  $\sqrt{3+x}-5=-2$ ?  
[A] 6      [B] 3      [C] 12      [D] 46
2. 010607b, P.I. A2.A.22  
If  $\sqrt{2x-1}+2=5$ , then  $x$  is equal to  
[A] 4      [B] 1      [C] 5      [D] 2
3. 080602b, P.I. A2.A.22  
What is the solution of the equation  $\sqrt{2x-3}-3=6$ ?  
[A] 39      [B] 42      [C] 6      [D] 3
4. 060214b, P.I. A2.A.22  
What is the solution set of the equation  $x=2\sqrt{2x-3}$ ?  
[A] {2}      [B] { }      [C] {2,6}      [D] {6}
5. 060528b, P.I. A2.A.22  
Solve for all values of  $q$  that satisfy the equation  $\sqrt{3q+7}=q+3$ .
6. 010323b, P.I. A2.A.22  
A wrecking ball suspended from a chain is a type of pendulum. The relationship between the rate of speed of the ball,  $R$ , the mass of the ball,  $m$ , the length of the chain,  $L$ , and the force,  $F$ , is  $R=2\pi\sqrt{\frac{mL}{F}}$ . Determine the force,  $F$ , to the *nearest hundredth*, when  $L=12$ ,  $m=50$ , and  $R=0.6$ .
7. 080528b, P.I. A2.A.22  
The lateral surface area of a right circular cone,  $s$ , is represented by the equation  $s=\pi r\sqrt{r^2+h^2}$ , where  $r$  is the radius of the circular base and  $h$  is the height of the cone. If the lateral surface area of a large funnel is 236.64 square centimeters and its radius is 4.75 centimeters, find its height, to the *nearest hundredth of a centimeter*.

8. 010532b, P.I. A2.A.22

The equation  $V = 20\sqrt{C + 273}$  relates speed of sound,  $V$ , in meters per second, to air temperature,  $C$ , in degrees Celsius. What is the temperature, in degrees Celsius, when the speed of sound is 320 meters per second? [The use of the accompanying grid is optional.]



9. 060205b, P.I. A2.A.22

The path of a rocket is represented by the equation  $y = \sqrt{25 - x^2}$ . The path of a missile designed to intersect the path of the rocket is represented by the equation  $x = \frac{3}{2}\sqrt{y}$ . The value of  $x$  at the point of intersection is 3. What is the corresponding value of  $y$ ?

- [A] 2      [B] -4      [C] -2      [D] 4

### Part 2: Solving Equations with Extraneous Solutions

10. 080104b, P.I. A2.A.22

The solution set of the equation  $\sqrt{x + 6} = x$  is

- [A]  $\{-2\}$       [B]  $\{3\}$       [C]  $\{\}$       [D]  $\{-2, 3\}$

11. 010305b, P.I. A2.A.22

What is the solution set of the equation

$$\sqrt{9x + 10} = x$$

- [A]  $\{9\}$       [B]  $\{10\}$   
[C]  $\{10, -1\}$       [D]  $\{-1\}$

12. 010427b, P.I. A2.A.22

Solve algebraically:  $\sqrt{x + 5} + 1 = x$

13. 060629b, P.I. A2.A.22

Solve algebraically for  $x$ :  $\sqrt{3x + 1} + 1 = x$

[1] A

[2] C

[3] B

[4] C

[4] -2 and -1, and appropriate work is shown.

[3] Appropriate work is shown, but one computational error is made.

or [3] Appropriate work is shown, but only one value of  $q$  is found.

[2] Appropriate work is shown, but two or more computational errors are made.

or [2] Appropriate work is shown, but one conceptual error is made, such as squaring only the left side of the equation.

[1] Appropriate work is shown, but one conceptual error and one computational error are made.

or [1] -2 and -1, but no work is shown.

[0] -2 or -1, but no work is shown.

or [0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an

[5] obviously incorrect procedure.

[2] 65,797.36, and appropriate work is shown.

[1] Appropriate work is shown, but one computational or rounding error is made.

or [1] An incorrect derivation of the equation is solved appropriately.

or [1] 65,797.36, but no work is shown.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously

[6] incorrect procedure.

[4] 15.13, and appropriate work is shown, such as solving the equation

$$236.64 = \pi(4.75)\sqrt{(4.75)^2 + h^2}.$$

[3] Appropriate work is shown, but one computational or rounding error is made.

[2] Appropriate work is shown, but two or more computational or rounding errors are made.

or [2] Appropriate work is shown, but one conceptual error is made.

[1] Appropriate work is shown, but one conceptual error and one computational or rounding error are made.

or [1] Correct substitution of values is made into the equation, but no further correct work is shown.

or [1] 15.13, but no work is shown.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously

[7] incorrect procedure.

[2] -17, and appropriate work is shown.

[1] Appropriate work is shown, but one conceptual error or one computational or graphing error is made.

or [1] -17, but no work is shown.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously

[8] incorrect procedure.

[9] D

[10] B

[11] B

- [4] 4, and appropriate work is shown.  
[3] Appropriate work is shown, but one computational error is made.  
or [3] Appropriate work is shown, but  $x = -1$  is not rejected.  
[2] Appropriate work is shown, but two or more computational errors are made.  
or [2] Appropriate work is shown, but one conceptual error is made.  
or [2] The correct quadratic equation is written in standard form, but no further correct work is shown.  
or [2] A quadratic equation of equal difficulty is solved appropriately.  
[1] Both sides of the equation are squared correctly, but no further correct work is shown.  
or [1] 4, but no work is shown.  
[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.
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- [4] 5, and appropriate algebraic work is shown.  
[3] Appropriate work is shown, but one computational error is made.  
or [3] 5 and 0, and appropriate work is shown, but the zero is not rejected.  
[2] Appropriate work is shown, but two or more computational errors are made.  
or [2] Appropriate work is shown, but one conceptual error is made, such as squaring  $x - 1$  incorrectly.  
or [2] 5, but a method other than an algebraic solution is used, such as graphing or trial and error with at least three trials and appropriate checks.  
or [2] A correct quadratic equation is written in standard form, such as  $0 = x^2 - 5x$ , but no further correct work is shown.  
or [2] An incorrect quadratic equation of equal difficulty is solved appropriately.  
[1] Appropriate work is shown, but one conceptual error and one computational error are made.  
or [1] An incorrect equation of a lesser degree of difficulty is solved appropriately.  
or [1] 5, but no work is shown.  
[0] 5 and 0, and no work is shown.  
or [0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.
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