

## Lesson 20 Practice Problems

1. Decide whether each number is rational or irrational.

$$10 \quad \frac{4}{5} \quad \sqrt{4} \quad \sqrt{10} \quad -3 \quad \sqrt{\frac{25}{4}} \quad \sqrt{0.6}$$

2. Here are the solutions to some quadratic equations. Select **all** solutions that are rational.

A.  $5 \pm 2$

B.  $\sqrt{4} \pm 1$

C.  $\frac{1}{2} \pm 3$

D.  $10 \pm \sqrt{3}$

E.  $\pm\sqrt{25}$

F.  $1 \pm \sqrt{2}$

3. Solve each equation. Then, determine if the solutions are rational or irrational.

a.  $(x + 1)^2 = 4$

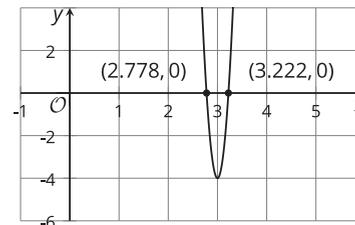
b.  $(x - 5)^2 = 36$

c.  $(x + 3)^2 = 11$

d.  $(x - 4)^2 = 6$

4. Here is a graph of the equation  $y = 81(x - 3)^2 - 4$ .

- a. Based on the graph, what are the solutions to the equation  $81(x - 3)^2 = 4$ ?



- b. Can you tell whether they are rational or irrational? Explain how you know.
- c. Solve the equation using a different method and say whether the solutions are rational or irrational. Explain or show your reasoning.

5. Match each equation to an equivalent equation with a perfect square on one side.

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| A. $x^2 - 9x = \frac{1}{2}$            | 1. $(x - 2.5)^2 = 17.25$                 |
| B. $x^2 + 6.4x - 8.9 = 0$              | 2. $(x - \frac{9}{2})^2 = \frac{83}{4}$  |
| C. $x^2 - 5x = 11$                     | 3. $(x - \frac{3}{7})^2 = \frac{10}{49}$ |
| D. $x^2 + 0.1x + 0.0005 = 0$           | 4. $(x + 0.05)^2 = 0.002$                |
| E. $x^2 - \frac{6}{7}x = \frac{1}{49}$ | 5. $(x + 3.2)^2 = 19.14$                 |
| F. $x^2 + 1.21x = 6.28$                | 6. $(x + 0.605)^2 = 6.646025$            |

(From Unit 7, Lesson 13.)

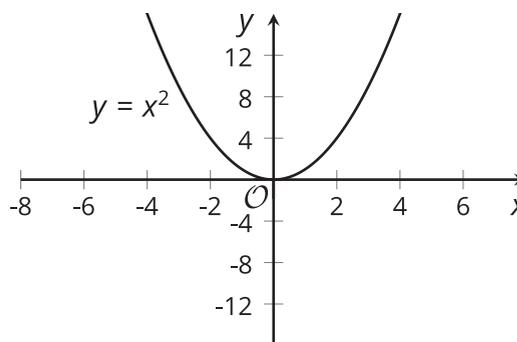
6. To derive the quadratic formula, we can multiply  $ax^2 + bx + c = 0$  by an expression so that the coefficient of  $x^2$  a perfect square and the coefficient of  $x$  an even number.

- Which expression,  $a$ ,  $2a$ , or  $4a$ , would you multiply  $ax^2 + bx + c = 0$  by to get started deriving the quadratic formula?
- What does the equation  $ax^2 + bx + c = 0$  look like when you multiply both sides by your answer?

(From Unit 7, Lesson 19.)

7. Here is a graph the represents  $y = x^2$ .

On the same coordinate plane, sketch and label the graph that represents each equation:



- $y = -x^2 - 4$
- $y = 2x^2 + 4$

(From Unit 6, Lesson 12.)

8. Which quadratic expression is in vertex form?

- $x^2 - 6x + 8$
- $(x - 6)^2 + 3$
- $(x - 3)(x - 6)$
- $(8 - x)x$

(From Unit 6, Lesson 15.)

9. Function  $f$  is defined by the expression  $\frac{5}{x-2}$ .

- Evaluate  $f(12)$ .
- Explain why  $f(2)$  is undefined.
- Give a possible domain for  $f$ .

(From Unit 4, Lesson 10.)