Name: SOLUTIONS

Complex Numbers and Rational Exponents: Check Your Readiness

A.SSE.e3 Exponents

Do not use a calculator.

1. Select **all** the solutions to $x^2 = 16$. $x = \pm 4$

   A. 256

   B. 8

   C. 4

   D. -256

   E. -8

   F. -4

2. Find the value of each variable that makes the equation true.

   a. $3^4 \cdot 3^2 = 3^a$ $a = 6$

   b. $\frac{5^4}{5^3} = 5^b$ $b = 1$

   c. $4^c = 1$ $c = 0$

   d. $2^6 \cdot d^6 = 14^6$ $d = 7$

   e. $6^f = \frac{1}{6}$ $f = -1$

3. Evaluate each expression.

a. $\frac{1}{5} \cdot 20 = 4$

b. $\frac{5}{3} \cdot 6 = 10$

c. $\frac{3}{4} \cdot 9 \cdot \frac{4}{3} = 9$

d. $\frac{2}{3} \cdot \frac{1}{2} \cdot 3 = 1$

A.APR.1 add, subtract, multiply polynomials

4. $p = 2x - 3$ and $q = -3x + 5$

For each expression, write an equivalent expression in standard form.

a. $p+q = (2x-3)+(-3x+5) = -x+2$

b. $p-q = (2x-3)-(-3x+5) = 5x-8$

c. $pq = (2x-3)(-3x+5) = -6x^2+10x+9x-15$
$= -6x^2+19x-15$

5. Solve these equations.

a. $\sqrt{x} = 5$

$x = 25$

b. $\sqrt[3]{x} = 3$

$x = 27$

c. $\sqrt{x-3} = 9$

$x - 3 = 81$

$x = 84$

check $\sqrt{(84)-3} = 9$?

$\sqrt{81} = 9$

$9 = 9$ ✓

6. Order these expressions from least to greatest:

- $\sqrt[3]{-1} = -1$
- 0
- 5
- 6
- $\sqrt[3]{8} = 2$
- $3 < \sqrt{14} < 4$
- $\sqrt[3]{27} = 3$
- $5 < \sqrt{30} < 6$

List below from smallest to largest

$\sqrt[3]{-1}$

0

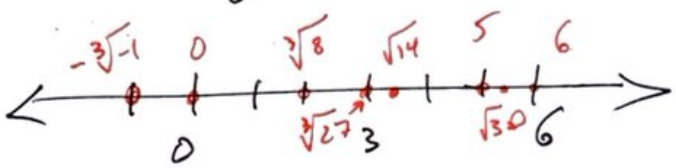
$\sqrt[3]{8}$

$\sqrt[3]{27}$

$\sqrt{14}$

$\sqrt{30}$

6



A.REI.4 Solve quadratics

7. Priya and Lin tried to solve the equation $3x^2 - 2x - 5 = 0$.

Priya wrote:

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$x = \frac{-2 \pm \sqrt{2^2 - 4(3)(-5)}}{2(3)}$$

$$x = \frac{-2 \pm \sqrt{4 - (-60)}}{6}$$

$$x = \frac{-2 \pm \sqrt{64}}{6}$$

$$x = 1 \quad \text{and} \quad x = -\frac{5}{3}$$

Lin wrote:

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$x = \frac{-(-2) \pm \sqrt{-2^2 - 4(3)(-5)}}{2(3)}$$

$$x = \frac{2 \pm \sqrt{-4 - (-60)}}{6}$$

$$x = \frac{2 \pm \sqrt{56}}{6}$$

$$x = \frac{-(-2) \pm \sqrt{(-2)^2 - 4(3)(-5)}}{2(3)}$$

$$= \frac{2 \pm \sqrt{64}}{6}$$

$$= \frac{2 \pm 8}{6}$$

$x = -1, \frac{5}{3}$

Do you agree with either of them? Explain your reasoning.

No. Both are wrong.

Priya incorrectly substituted $b = 2$ instead of $b = -2$ in the first step.

Lin incorrectly squared $b^2 = (-2)^2 = -4$.

The correct algebra is shown. $x = -1, \frac{5}{3}$

8. Han was solving the equation $x^2 + 6x - 10 = 0$ by completing the square, and he wrote:

$x^2 + 6x - 10 = 0$
$x^2 + 6x = 10$
$x^2 + 6x + 36 = 46$
$(x + 3)^2 = 46$
$x + 3 = \pm\sqrt{46}$
$x = -3 \pm \sqrt{46}$

$b = 6$

$\frac{b}{2a} = \frac{6}{2(1)} = 3$

$\left(\frac{b}{2a}\right)^2 = 9$

a. Han made a mistake. What was it?

He completed the square with $b = 6$ squared instead of $\frac{b}{2} = 3$ squared, 9.

b. Show how to solve the problem correctly.

$x^2 + 6x - 10 = 0$
$x^2 + 6x = 10$
$x^2 + 6x + 9 = 19$
$(x + 3)^2 = 19$
$x + 3 = \pm\sqrt{19}$
$x = -3 \pm \sqrt{19}$