Alg 2 U5 SBAC Practice Name Key Date _____ Period ___

Part A: Radicals

1. **Convert** each expression from exponent form to radical form (or vice versa).

A) $8^{\frac{3}{2}}$ exponent form ↓ $\sqrt{8^2}^3$ radical form

B) $\sqrt[4]{15^3}$ radical form ↓ $15^{\frac{3}{4}}$ exponent form

C) $2.7^{\frac{3}{5}}$ exponent form ↓ $\sqrt[5]{2.7^3}$ radical form

Common misconceptions:

2. **Select** the expression equivalent to $\sqrt[3]{5^2} \bullet \sqrt[3]{5^5}$. $5^{\frac{2}{3}} \cdot 5^{\frac{5}{3}} = 5^{\left(\frac{2}{3}+\frac{5}{3}\right)} = 5^{\frac{7}{3}}$

A) ~~$5^{\frac{10}{9}}$~~ B) ~~$5^{\frac{10}{3}}$~~ C) $5^{\frac{7}{3}}$

common misconceptions: students might inappropriately apply the product rule with fractional exponents - converting to exponent form can help them track the powers and roots.

3. For each number, **select** whether the product of that number and $\sqrt{6}$ would result in a rational or irrational number.

	Rational	Irrational
$\sqrt{6} \cdot \sqrt{6} = 6$	☒	☐
$\sqrt{1} \cdot \sqrt{6} = \sqrt{6}$	☐	☒
$\sqrt{9} \cdot \sqrt{6} = \sqrt{54}$	☐	☒
$\sqrt{54} \cdot \sqrt{6} = \sqrt{324} = 18$	☒	☐
$6 \cdot \sqrt{6} = 6\sqrt{6}$	☐	☒
$16 \cdot \sqrt{6} = 16\sqrt{6}$	☐	☒

common misconceptions:
students might need a refresher on operations on the radicals.

4. For each expression, **select** whether the sum is rational or irrational.

	Rational	Irrational
$\sqrt{81} + \sqrt{16} = 9 + 4 = 13$	☒	☐
$\sqrt{31} + \sqrt{5}$	☐	☒
$\sqrt{5} + \sqrt{3}$	☐	☒
$2 + \left(-\sqrt{64}\right) = 2 + (-8) = -6$	☒	☐

Common misconceptions:
students might need a refresher on addition with radicals - for ex. they may sum $\sqrt{31}$ and $\sqrt{5}$ to $\sqrt{36}$.

Part B: Radical Functions [F-IF.4, F-IF.7, F-BF.3]

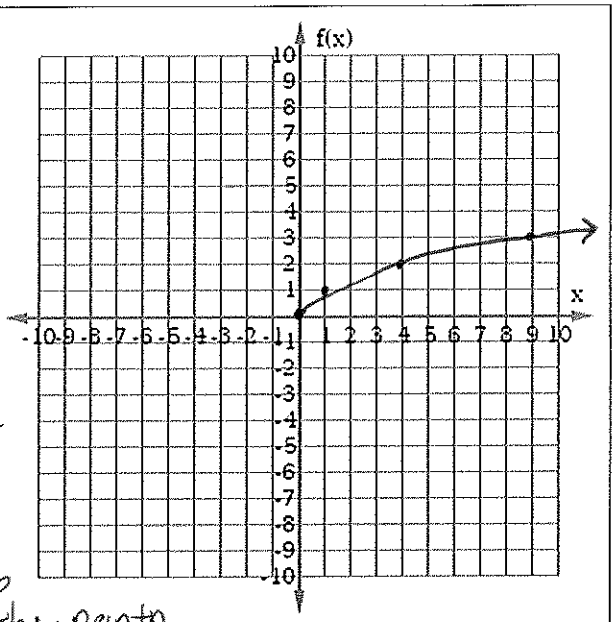
5. Consider the function $f(x) = x^{\frac{1}{2}}$. **Graph** the function, **state** the domain and range, and **describe** the end behavior.

Domain: $0 \leq x$

Range: $0 \leq y$

End Behavior: as $x \to \infty, y \to \infty$

x	f(x)
4	2
2	$\sqrt{2}$
1	1
0	0
-1	no solution



Common misconceptions:
Students might forget about the behavior of a radical function - having them set up a table can support them in working out the points

Part C: Solving Radical Equations [A-REI.2]

6. **Solve** the equations, **showing** your work and **justifying** your steps.

A) $\left(\sqrt{x+2}\right)^2 = (5)^2$

$x + 2 = 25$ square both sides

$-2 \quad -2$ subtraction property of eq.

$x = 23$

$\sqrt{23+2} = 5$

$\sqrt{25} = 5$ ✓ not extraneous

B) $\left(\sqrt{x+2}\right)^2 = (x+2)^2$

$x + 2 = x^2 + 4x + 4$ square both sides

$-x \quad -x$ subtraction

$2 = x^2 + 3x + 4$

$-2 \quad -2$ subtraction

$0 = x^2 + 3x + 2$

$0 = (x+2)(x+1)$ factor

$x = -2, -1$ ✓ ✓

$-2 \to 0 = 0$

$-1 \to 1 = 1$

not extraneous

7. **Circle** the step that contains the first mistake Sarah made, **then** solve the equation.

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

Step 1: $(3x-2)^2 = \left(\sqrt{x^2+5x+2}\right)^2$

Step 2: $9x^2 + 4 = x^2 + 5x + 2$ forgot the middle term

Step 3: $8x^2 + 4 = 5x + 2$

Step 4: $8x^2 - 5x + 4 = 2$

Step 5: $8x^2 - 5x + 2 = 0$

Step 6: $x = \dfrac{5 \pm \sqrt{5^2 - 4(8)(2)}}{2(8)}$

Step 7: $x = \dfrac{5 \pm \sqrt{-39}}{16}$

$(3x-2)^2 = \left(\sqrt{x^2+5x+2}\right)^2$

$9x^2 - 12x + 4 = x^2 + 5x + 2$

$-x^2 \qquad -x^2$

$8x^2 - 12x + 4 = 5x + 2$

$-5x \qquad -5x + 2$

$8x^2 - 17x + 4 = 2$

$-2 \quad -2$

$8x^2 - 17x + 2 = 0$

$x = \dfrac{17 \pm \sqrt{(-17)^2 - 4(8)(2)}}{2(8)}$

$x = \dfrac{17 \pm \sqrt{225}}{16}$

$x = \dfrac{17 \pm 15}{16}$

$x = 2, \frac{1}{8}$ ✓ extraneous

$4 = 4 \quad -1.625 = -1.625$

* students might forget to check for extraneous solutions.