2023 Algebra I Sample Items

1 What is the sum of $3x\sqrt{7}$ and $2x\sqrt{7}$?

1) $5x\sqrt{7}$
2) $5x^2\sqrt{7}$
3) $5x\sqrt{14}$
4) $5x^2\sqrt{14}$

2 What is an equation of the line that passes through the points $(2,7)$ and $(-1,3)$?

1) $y-2=\frac{3}{4}(x-7)$
2) $y-2=\frac{4}{3}(x-7)$
3) $y-7=\frac{3}{4}(x-2)$
4) $y-7=\frac{4}{3}(x-2)$

3 Rationalize: $\frac{3}{2\sqrt{6}}$

4 Use the method of completing the square to determine the exact values of x for the equation $x^2+6x-41=0$. Express your answer in simplest radical form.

5 Solve the following systems of equations algebraically for all values of x and y:

$$y=x^2+5x-17$$

$$x-y=5$$

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Answer Section

1 ANS: 1 PTS: 2 REF: fall2301ai NAT: N.RN.B.3
TOP: Operations with Radicals KEY: addition

2 ANS: 4

$$m = \frac{7-3}{2--1} = \frac{4}{3}$$

PTS: 2 REF: fall2302ai NAT: A.REI.D.10 TOP: Writing Linear Equations
KEY: other forms

3 ANS:

$$\frac{3}{2\sqrt{6}} \cdot \frac{\sqrt{6}}{\sqrt{6}} = \frac{3\sqrt{6}}{12}$$

PTS: 2 REF: fall2303ai NAT: N.RN.B.3 TOP: Operations with Radicals
KEY: division

4 ANS:

$$x^2 + 6x + 9 = 41 + 9$$

$$(x+3)^2 = 50$$

$$x + 3 = \pm\sqrt{50}$$

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

PTS: 4 REF: fall2304ai NAT: A.REI.B.4 TOP: Solving Quadratics
KEY: completing the square

5 ANS:

$x^2 + 5x - 17 = x - 5$ $-6 - y = 5$ $2 - y = 5$ $(-6,-11),(2,-3)$

$x^2 + 4x - 12 = 0$ $y = -11$ $y = -3$

$(x+6)(x-2) = 0$

$x = -6, 2$

PTS: 4 REF: fall2305ai NAT: A.REI.C.7 TOP: Quadratic-Linear Systems