Math 0093, Fall 2000: Solutions to Quiz 4

Marks

1. $(\dfrac{8x^{-1/3}y^2}{xy^{1/2}})^{-1/2} = \dfrac{8^{-1/2}x^{1/6}y^{-1}}{x^{-1/2}y^{-1/4}} = \dfrac{x^{2/3}}{2\sqrt{2}y^{3/4}}$

2. $\dfrac{x+1}{2-\sqrt{x}} = \dfrac{x+1}{2-\sqrt{x}}\dfrac{2+\sqrt{x}}{2+\sqrt{x}} = \dfrac{(x+1)(2+\sqrt{x})}{4-x}$

3.

$$\sqrt{2x-1}+\sqrt{x+2}=1$$
$$\sqrt{2x-1}=1-\sqrt{x+2}$$
$$2x-1=1-2\sqrt{x+2}+x+2$$
$$2x-1=x+3-2\sqrt{x+2}$$
$$x-4=-2\sqrt{x+2}$$
$$(x-4)^2=4(x+2)$$
$$x^2-8x+16=4x+8$$
$$x^2-12x+8=0$$

$x = \dfrac{12\pm\sqrt{144-32}}{2} = \dfrac{12\pm\sqrt{112}}{2} = \dfrac{12\pm4\sqrt{7}}{2} = 6\pm2\sqrt{7}$. Checking these on a calculator, we find that the left-hand side is 8.29 if $x = 6+2\sqrt{7}$ and is 2.29 if $x = 6-2\sqrt{7}$. Neither is 1, so there is no solution.

4. The x-coordinate of the vertex is $x = \dfrac{-3}{2(-1)} = \dfrac{3}{2}$. The y-coordinate is $-(\dfrac{3}{2})^2+3\dfrac{3}{2}-1 = -\dfrac{9}{4}+\dfrac{9}{2}-1 = \dfrac{5}{4}$.

The vertex is $(\dfrac{3}{2},\dfrac{5}{4})$. The y-intercept is -1 and the x-intercepts are $x = \dfrac{-3\pm\sqrt{9-4}}{-2} = \dfrac{3\pm\sqrt{5}}{2}$.