17. The student squared x only instead of 1.98 and x. Here is the correct work:

$$1.98x = \sqrt{58 + y}$$
$$3.92x^2 = 58 + y$$
$$3.92x^2 - 58 = y$$

21.
$$\sqrt[3]{x} + 8 = 13$$
$$\sqrt[3]{x} = 5$$
$$\left(\sqrt[3]{x}\right)^3 = 5^3$$
$$x = 125$$

22.
$$\sqrt{4x} = 11$$
$$\left(\sqrt{4x}\right)^2 = 11^2$$
$$4x = 121$$
$$x = 30.25$$

23.
$$\sqrt{75 + x} - 6 = 14$$
$$\sqrt{75 + x} = 20$$
$$\left(\sqrt{75 + x}\right)^2 = 20^2$$
$$75 + x = 400$$
$$x = 325$$

24.
$$25 - \sqrt[4]{x} = 22$$
$$\sqrt[4]{x} = 3$$
$$\left(\sqrt[4]{x}\right)^4 = 3^4$$
$$x = 81$$

25.
$$x = 3\left(\sqrt[3]{15 + y}\right)$$
$$\frac{x}{3} = \sqrt[3]{15 + y}$$
$$\left(\frac{x}{3}\right)^3 = \left(\sqrt[3]{15 + y}\right)^3$$
$$\frac{x^3}{27} = 15 + y$$
$$\frac{x^3}{27} - 15 = y$$

27.

$$x = \frac{\sqrt{y-14.2}}{0.05}$$

$$0.05x = \sqrt{y - 14.2}$$

$$(0.05x)^2 = \left(\sqrt{y - 14.2}\right)^2$$

$$0.0025x^2 = y - 14.2$$

$$0.0025x^2 + 14.2 = y$$

29.

$$x = \sqrt{x+6}$$

$$x^2 = \left(\sqrt{x+6}\right)^2$$

$$x^2 = x + 6$$

$$x^2 - x - 6 = 0$$

$$(x-3)(x+2) = 0$$

$$x = 3 \text{ or } x = -2$$

$x = \sqrt{x+6}$ $\quad x = \sqrt{x+6}$

$3 = \sqrt{3+6}$ $\quad -2 = \sqrt{-2+6}$

$3 = \sqrt{9}$ $\quad -2 \neq \sqrt{4}$

The only solution is 3. The solution -2 is extraneous.

31. $4x = \sqrt{6x + 10}$

$(4x)^2 = \left(\sqrt{6x + 10}\right)^2$

$16x^2 = 6x + 10$

$16x^2 - 6x - 10 = 0$

$(x - 1)(16x + 10) = 0$

$x = 1$ or $x = -\frac{5}{8}$

$4x = \sqrt{6x + 10}$

$4(1) = \sqrt{6(1) + 10}$

$4 = \sqrt{16}$

$4x = \sqrt{6x + 10}$

$4\left(-\frac{5}{8}\right) = \sqrt{6\left(-\frac{5}{8}\right) + 10}$

$-\frac{5}{2} = \sqrt{-\frac{15}{4} + 10}$

$-\frac{5}{2} = \sqrt{-\frac{15}{4} + \frac{40}{4}}$

$-\frac{5}{2} \neq \sqrt{\frac{25}{4}}$

The only solution is 1. The solution $-\frac{5}{8}$ is extraneous.

33. $0.5\left(x^2 + 5x + 136\right)^{\frac{2}{3}} = 50$

$\left(x^2 + 5x + 136\right)^{\frac{2}{3}} = 100$

$\left(\left(x^2 + 5x + 136\right)^{\frac{2}{3}}\right)^{\frac{3}{2}} = (100)^{\frac{3}{2}}$

$x^2 + 5x + 136 = \left((100)^{\frac{1}{2}}\right)^3$

$x^2 + 5x + 136 = 1000$

$x^2 + 5x - 864 = 0$

$(x - 27)(x + 32) = 0$

$x = 27$ or $x = -32$

35. $\left(x^2+4x+5\right)^{\frac{3}{2}}+1=0$

$\left(x^2+4x+5\right)^{\frac{3}{2}}=-1$

$\left[\left(x^2+4x+5\right)^{\frac{3}{2}}\right]^{\frac{2}{3}}=(-1)^{\frac{2}{3}}$

$x^2+4x+5=1$

$x^2+4x+4=0$

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

$x=-2$

$\left((-2)^2+4(-2)+5\right)^{\frac{3}{2}}+1=0$

$(4-8+5)^{\frac{3}{2}}+1=0$

$1^{\frac{3}{2}}+1=0$

$2\neq 0$

There are no solutions.

37. $\sqrt{4x+5}-\sqrt{x+1}=1$

$\sqrt{4x+5}=\sqrt{x+1}+1$

$\left(\sqrt{4x+5}\right)^2=\left(\sqrt{x+1}+1\right)^2$

$4x+5=x+1+2\sqrt{x+1}+1$

$4x+5=x+2+2\sqrt{x+1}$

$3x+3=2\sqrt{x+1}$

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

$9x^2+18x+9=4(x+1)$

$9x^2+18x+9=4x+4$

$9x^2+14x+5=0$

$(9x+9)\left(x+\frac{5}{9}\right)=0$

$x=-1$ or $x=-\frac{5}{9}$

45. $\left(x^2+5x+25\right)^{\frac{3}{2}}=343$

$\left[\left(x^2+5x+25\right)^{\frac{3}{2}}\right]^{\frac{2}{3}}=(343)^{\frac{2}{3}}$

$x^2+5x+25=49$

$x^2+5x-24=0$

$(x+8)(x-3)=0$

$x=-8 \text{ or } x=3$