2.3.11

$$\sqrt{3} < x < \sqrt{5};$$
$$\sqrt{3} - 2 < x - 2 < \sqrt{5} - 2;$$
$$-\left(2 - \sqrt{3}\right) < x - 2 < \sqrt{5} - 2.$$

Since $\sqrt{5} - 2 < 2 - \sqrt{3}$ (check on a calculator if you want), use

$$\delta = \sqrt{5} - 2,$$

which is positive.

2.3.23

$$|f(x) - L| < \epsilon;$$
$$|x^2 - 4| < 0.5;$$
$$-0.5 < x^2 - 4 < 0.5;$$
$$3.5 < x^2 < 4.5.$$

Since everything here is positive, we can take square roots.

$$\sqrt{3.5} < |x| < \sqrt{4.5}.$$

Since $x \approx c = -2$, we can assume that $|x| = -x$.

$$\sqrt{3.5} < -x < \sqrt{4.5};$$
$$-\sqrt{3.5} > x > -\sqrt{4.5};$$
$$-\sqrt{4.5} < x < -\sqrt{3.5};$$
$$2 - \sqrt{4.5} < x + 2 < 2 - \sqrt{3.5};$$
$$-\left(\sqrt{4.5} - 2\right) < x - (-2) < 2 - \sqrt{3.5}.$$

Since $\sqrt{4.5} - 2 < 2 - \sqrt{3.5}$, use

$$\delta = \sqrt{4.5} - 2,$$

which is positive.

2.3.39

$$\left|\sqrt{x - 5} - 2\right| < \epsilon;$$
$$-\epsilon < \sqrt{x - 5} - 2 < \epsilon;$$
$$2 - \epsilon < \sqrt{x - 5} < 2 + \epsilon.$$

Since $\epsilon \approx 0$, everything here is positive, so we can take squares.

$$4 - 4\epsilon + \epsilon^2 < x - 5 < 4 + 4\epsilon + \epsilon^2;$$
$$9 - 4\epsilon + \epsilon^2 < x < 9 + 4\epsilon + \epsilon^2;$$
$$-4\epsilon + \epsilon^2 < x - 9 < 4\epsilon + \epsilon^2;$$
$$-(4\epsilon - \epsilon^2) < x - 9 < 4\epsilon + \epsilon^2.$$

Since $4\epsilon - \epsilon^2 < 4\epsilon + \epsilon^2$, use

$$\delta = 4\epsilon - \epsilon^2,$$

which is positive since $\epsilon \approx 0$.