Solutions

Each answer shows the steps, then the **result**.

2.1

- $\bar{x}_1 - \bar{x}_2$

2.2

- if the interval contains 0, there is no significant difference; if not, there is

2.3

- $52 - 48 = 4$

3.1 B

- $\bar{x}_1 - \bar{x}_2$.

3.2 B

- may not differ.

3.3

(a)

- μ_1 (the interval is positive)

(b)

- no

(c)

- yes

3.4

(a)

- a two-sample t-interval for a difference of population means $\mu_A - \mu_B$
- random: the seedlings were randomly assigned to the fertilizers, so the groups are independent
- normal: $n_A = 35 \geq 30$ and $n_B = 32 \geq 30$, so the sampling distribution of $\bar{x}_A - \bar{x}_B$ is approximately normal

(b)

- $\bar{x}_A - \bar{x}_B = 24.6 - 21.9 = 2.7$ cm; $SE = \sqrt{\frac{4.2^2}{35} + \frac{3.8^2}{32}} = \sqrt{0.504 + 0.451} = 0.977$
- with calculator $df = 65.0$, $t^* = 1.997$: $2.7 \pm 1.997 \times 0.977 = 2.7 \pm 1.95$
- (**0.75**, **4.65**) cm; with the conservative $df = 31$, $t^* = 2.040$ gives (0.71, 4.69), also accepted

(c)

- we are 95% confident that the interval from 0.75 cm to 4.65 cm captures the true difference in mean six-week growth (fertilizer A minus fertilizer B) for seedlings like these

(d)

- yes: every value in the interval is positive (0 is not in it), so fertilizer A gives greater mean growth; random assignment lets us say the fertilizer caused it

3.5 B

- with $n < 30$ the normal condition needs each sample's distribution to show no strong skew or outliers; the sample of 12 is strongly skewed