What technique is appropriate?

Look at Chapter 21, section Part III Summary, page 540-541.

Which type of parameter -- mean or proportion?

- Look at words
- Look at original data
  - Original data are typical numbers: mean.
  - Original data are "yes/no" "male/female" "succeed/fail" or other categorical variable with two values: proportion.

Mean – which type of problem?

- One sample
  - Population standard deviation (sigma) known: $\overline{X}$ has mormal dist'n. Chapters 14-15
  - Pop'n st dev unknown and estimated by sample st dev: $\overline{X}$ has t-dist'n. Ch. 17
- Two samples
  If comparing two sample means, then which design? (See problems 18.1-18.4)
  - Matched pairs: (section "Matched pairs t procedures" Problems in Ch. 17. A few in Ch. 18.)
  - Two independent samples (Most problems in Ch. 18)

Proportions – which type of problem?

- One sample
- Two sample

What question to answer:

- Find the probability that … (General: Ch. 11. Sample mean: Chapter 11. section "Central limit theorem." Sample proportion. Chapter 19. section "The sampling distribution of $\hat{p}$ ")
- Find the sample size needed .. (Estimate mean: Chapter 15 section "Planning studies: sample size for confidence intervals." Estimate proportion: Chapter 19 section "Choosing the sample size")
- "Estimate the (mean or proportion)" – Form a confidence interval
- "Does the data provide significant evidence that …?" or "Do the data provide good evidence that …?" -- Do a hypothesis test

Conditions (Where to look)

One mean. If we DO know the pop'n st dev, use normal table (*z*) and the work from chapters 14 and 15.

Conditions: Simple conditions: Ch. 14 "Ch. Intro", EXCEPT that we recall pictures for Central Limit Theorem from Ch 11 and **modify condition 2** as follows:

Pop'n normal – the dist'n of $\overline{X}$ is normal for all sample sizes.

Pop'n strongly skewed – the dist'n of $\overline{X}$ is normal if *n* at least 25

Pop'n not strongly skewed – the dist'n of $\overline{X}$ is normal for smaller *n*, maybe as small as ten or so.

One mean. If we don't know pop'n standard deviations, then $\overline{X}$ has *t* dist'n. Ch. 17. Conditions: Read and learn these in Ch. 17 section "Robustness."

Two means – Two samples, from a matched pairs design. Ch. 17

Method: Find differences and analyze those differences using one-sample techniques. Use $\overline{X}$ of differences, which has t dist'n.
Conditions: Same as for one-sample mean.

Two means - Two independent samples: Since we don't know pop'n standard deviations, then $\overline{X}_A - \overline{X}_B$ has *t* dist'n. Ch. 18 section "Robustness" (Pay most attention to the second paragraph: the sum of the two sample sizes.)

One proportion: The dist'n of $\hat{p}$ is normal (*z*). Ch. 19. "The sampling dist'n"

Conditions: . Two conditions:
(1) SRS
(2) sample size – depends on what technique. See the last part of the summary box in the section of the chapter for each of these.
a. Section: "Large-sample confidence intervals"
b. Section: "Accurate confidence intervals"
c. Section: "Significance tests"

Two proportions: The dist'n of $\hat{p}_B - \hat{p}_A$ is normal (*z*). Ch. 20

Conditions:
(1) SRS (Two independent separate SRS's from two pop'ns OR one SRS from one pop'n, which is then divided into two groups. Described in paragraph at end of "Large-sample conf intervals for comparing two proportions")
(2) sample size – depends on what technique.
a. Section: "Large-sample confidence intervals"
b. Section: "Accurate confidence intervals"
c. Section: "Significance tests"