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Practice   Tutorial

Additional Exercises Available Online

UNDERSTAND

PRACTICE

10. **Reason** Erin found the margin of error of a certain random sample. Suppose she triples the sample size. How is the margin of error affected?

11. **Make Sense and Persevere** A poll reports that 48% of voters are going to vote for Candidate A. The poll reports a margin of error of ±4%. Estimate the number of voters in the poll. Explain how you found your answer.

12. **Error Analysis** Describe and correct the error a student made in finding the range of reasonable means.

The nationwide mean height of players on a high school basketball team is 71 in., with standard deviation of 5 in. A random sample of 150 players was used to determine the range of reasonable means.

Margin of Error $= \dfrac{1}{\sqrt{150}} \approx 0.08$

Range of Means:
between $71 - 0.08 = 70.92$ in.
and $71 + 0.08 = 71.08$ in.

✗

13. **Higher Order Thinking** The students in Mr. Morrison's science class measured the heights of flowers in the school's playground area. The class took six random samples by measuring a group of flowers. The table shows the standard deviation of each sample. Use the information in the table to determine which was likely the smallest sample. Explain your reasoning.

Sample	Standard Deviation
A	1.45
B	2.03
C	1.12
D	1.35
E	2.78
F	1.84

14. Ryan selects a random sample of students from a high school. Students were asked how long it takes them to get ready for school. Use the sample data in the table to estimate the mean time to get ready for school. Estimate the proportion of juniors at the school. **SEE EXAMPLE 1**

Junior	45 min
Sophomore	30 min
Junior	15 min
Senior	25 min
Sophomore	60 min
Freshman	10 min
Sophomore	35 min
Junior	40 min
Senior	10 min
Freshman	30 min

15. Ryan's classmates each calculated the mean time it takes to get ready for school reported by a sample of 100 participants. Ryan created this histogram of the sample means. How many samples reported an average time to get ready between 11 and 20 min? Suggest a reasonable interval to estimate the population parameter. **SEE EXAMPLE 2**

Means of 50 Samples
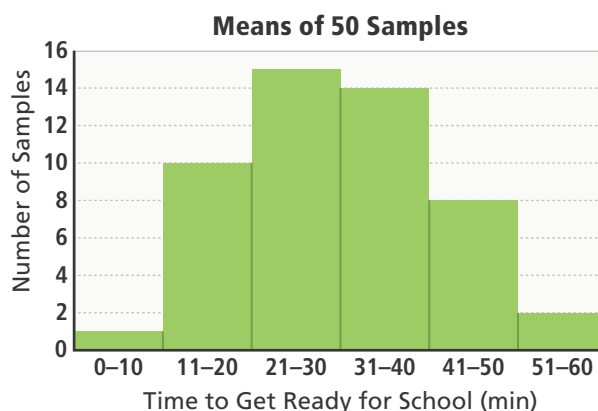
16. Jake makes 80% of the field goals he attempts. Suppose Jake attempts 100 field goals. Use technology to simulate 50 trials with 100 field goals each. Identify the range that contains the middle 95% of results. **SEE EXAMPLE 3**

17. The mean score on a statewide science test is 72, with standard deviation 12. Hailey believes that the scores in her school are considerably higher than the state average. A random sample of 100 students from Hailey's school showed a mean score of 76. Is Hailey correct in her belief? Explain. **SEE EXAMPLE 4**

APPLY

18. Reason A survey of 2,390 employees found that 7% are left-handed.

a. Find the margin of error for the sample. Round to the nearest percent.

b. Use the margin of error to find an interval that will likely include the population proportion of the employees that are left-handed.

19. Model With Mathematics Lydia wants proof of Mike's claim that he is a 40% three-point shooter in basketball. She observes him make 17 out of 50 three-point shots. Lydia used a random number generator to simulate the outcome of a random sample of shots.

16	22	53	51	62	81	69	68	59	29
69	71	29	83	79	34	67	82	64	50
30	79	68	94	33	24	6	28	91	59
33	59	42	89	13	56	15	6	75	97
83	6	89	55	39	61	69	17	20	89

a. What numbers could you use to represent successful three-point shots?

b. What numbers could you use to represent missed three-point shots?

c. What proportion of the random numbers generated were successful? Explain what this means regarding Mike's claim.

20. Make Sense and Persevere An app estimates phone usage by counting the number of times a phone screen is unlocked during the course of a day. A sample of 25 users is shown.

123	65	119	145	114
125	114	91	113	125
88	141	105	116	121
186	136	65	128	107
97	126	101	90	10

a. What is the mean and standard deviation?

b. Assuming the sample standard deviation matches the population standard deviation, what is the margin of error?

c. When Isabel says, "I check my phone at least 100 times a day," is she exaggerating, or could her claim be reasonable? Explain.

✓ ASSESSMENT PRACTICE

21. In a random survey of 60 customers, 46 prefer Cracker A. Fill in the blank with the correct value.

a. The sample proportion is about _____.

b. The margin of error is about _____.

c. The interval likely to contain the true population proportion is between _____ and _____.

22. SAT/ACT A manufacturing company wants to randomly sample customers about their satisfaction rating on products. The company will give a gift certificate worth $25 to every customer who completes the survey. How much will it cost the company to obtain a margin of error of ±5%?

Ⓐ $400   Ⓒ $4,000

Ⓑ $1,000   Ⓓ $10,000

23. Performance Task

The population of songbirds is often calculated using a *capture-tag-recapture* technique. This means birds are captured and then tagged. After being tagged, the birds are released. A group of researchers is investigating a ranger's claim about the percentage of songbirds that are tagged. They recapture 10 birds, and only 3 have tags.

> In one forest, a ranger claims that 50% of songbirds are tagged.

Part A Use a calculator or spreadsheet to simulate 25 samples with 10 birds recaptured by selecting 10 random numbers.

Part B After simulating 25 trials, analyze the proportion of successes in each trial and create a histogram to display the sampling distribution.

Part C Identify the range of values that contains the middle 95% of results. Does the ranger's claim seem reasonable?