

I. Determine whether each situation will produce a random sample. If not, explain why.

- 1.) pointing with your pencil at a class list with your eyes closed as a way to find a sample of students in your class *no - in a physical sense not random. tend to go towards middle of page.*
- 2.) calling every twentieth person listed in the telephone book to determine which political candidate is favored *yes, it's random.*
- 3.) finding the heights of all the boys in a freshmen physical education class to determine the average height of all the boys in your school *no - freshmen could be still ignoring*
- 4.) calling every twentieth registered voter to determine whether people own or rent their homes in your community. *no - registered voters more likely to have owned. could under represent renters.*
- 5.) predicting local election results by polling people in every twentieth residence in all different neighborhoods of your community *yes, it's random.*
- 6.) to find out why not many students are using the library, a school's librarian gives a questionnaire to every tenth student entering the library *no - polling only people coming into library (disruption from non-library students)*
- 7.) testing overall performance of tires on interstate highways only *no - tires should be tested on all surfaces.*
- 8.) selecting every 50th hamburger from a fast-food restaurant chain and determining its fat content to assess the fat content of hamburgers in fast-food restaurant chains throughout the country *no - other chains won't be represented*
- 9.) assigning all shift workers in a manufacturing plant a unique identification number, and then placing the numbers in a hat and drawing 30 at random to determine the annual average salary of the workers *yes - it's random.*
- 10.) surveying every tenth person who enters the mall to find out about music preferences in that part of the country *yes - it's random.*

II. Determine the margin of error to the nearest percent. Must show your work!!

- 11.) $p = 26\%$, $n = 100$ *about 9%.*
- 12.) $p = 55\%$, $n = 100$ *about 10%.*
- 13.) $p = 75\%$, $n = 500$ *about 4%.*
- 14.) $p = 49\%$, $n = 1500$ *about 3%.*
- 15.) $p = 96\%$, $n = 1000$ *about 1%.*
- 16.) $p = 65\%$, $n = 1500$ *about 2%.*

III. Complete each problem. Must show your work!!

- 17.) A poll asked people to name the most serious problem facing the country. Forty-six percent of the 800 randomly selected people said "crime". Find the margin of error. *ME = about 4%.*
- 18.) Although skim milk has as much calcium as whole milk, only 33% of the 2,406 adults surveyed in Shape Magazine said skim milk is a good calcium resource. Find the margin of error. *ME = about 2%.*
- 19.) Three hundred sixty-seven of the 425 high school students said pizza was the favorite food in the school cafeteria. What is the margin of error? *ME = about 3.3%.*
- 20.) According to a poll of teenagers, 43% said that they use a personal computer at home. If the margin of error is 4%, how many teenagers were polled? *613 people surveyed*
- 21.) A study by the University of Illinois in 1995 showed an increase in productivity by 10% of the employees who wore headsets and listened to music of their choice while they were working. The margin of error for the study was about 7%. How many employees participated in the study? *73 people surveyed*
- 22.) According to a Gallup Poll, 33% of shoppers planned to spend \$1000 or more during a recent holiday season. The margin of error was 3%. How many people were surveyed? *983 people surveyed*
- 23.) One hundred people were asked a yes-or-no question in an opinion poll. How many said "yes" if the margin of error was 9.6%? *36% or 64% said yes*
- 24.) In a poll conducted by ABC news, 1,020 people surveyed and asked if they supported raising the minimum wage. How many people said they support minimum wage if $ME = 2.4\%$? *18% or 82% support min wage*
- 25.) In a recent Harris poll, 1,010 people were surveyed said they considered being a physician to be a very prestigious occupation. How many people that the a physician was prestigious if $ME = 3.1\%$? *4% or 59% said occupation is prestigious.*

Adv Function 1 - Margin of Error w/

$$ME = 2 \cdot \sqrt{\frac{p(1-p)}{n}}$$

11) $p = 26\%$, $n = 100$

$$ME = 2 \sqrt{\frac{.26(1-.26)}{100}}$$

$$ME = .0877$$

$$\boxed{ME = \text{about } 9\%}$$

12) $p = 55\%$, $n = 100$

$$ME = 2 \sqrt{\frac{.55(1-.55)}{100}}$$

$$ME = .0995$$

$$\boxed{ME = \text{about } 10\%}$$

13) $p = 75\%$, $n = 500$

$$ME = 2 \sqrt{\frac{.75(1-.75)}{500}}$$

$$ME = .0387$$

$$\boxed{ME = \text{about } 4\%}$$

14) $p = 49\%$, $n = 1500$

$$ME = 2 \sqrt{\frac{.49(1-.49)}{1500}}$$

$$ME = .0258$$

$$\boxed{ME = \text{about } 3\%}$$

15) $p = 96\%$, $n = 1000$

$$ME = 2 \sqrt{\frac{.96(1-.96)}{1000}}$$

$$ME = .0124$$

$$\boxed{ME = \text{about } 1\%}$$

16) $p = 65\%$, $n = 1500$

$$ME = 2 \sqrt{\frac{.65(1-.65)}{1500}}$$

$$ME = .0246$$

$$\boxed{ME \text{ about } 2\%}$$

17) $p = 46\%$, $n = 800$, $ME = ?$

$$ME = 2 \sqrt{\frac{.46(1-.46)}{800}}$$

$$ME = .03524$$

$$\boxed{ME = \text{about } 4\%}$$

18) $p = 33\%$, $n = 2404$, $ME = ?$

$$ME = 2 \sqrt{\frac{.33(1-.33)}{2404}}$$

$$ME = .0192$$

$$\boxed{ME = \text{about } 2\%}$$

19) $\frac{367}{425} = 86\% = p$

$$n = 425 \quad ME = ?$$

$$ME = 2 \sqrt{\frac{.86(1-.86)}{425}}$$

$$ME = .03366$$

$$\boxed{ME = \text{about } 3.37\%}$$

20) $p = 43\%$, $ME = 4\%$, $n = ?$

$$\frac{.04}{2} = 2 \sqrt{\frac{.43(1-.43)}{n}}$$

$$(.02)^2 = \left(\sqrt{\frac{.2451}{n}} \right)^2$$

$$4 \times 10^{-4} = \frac{.2451}{n}$$

$$n = \frac{.2451}{4 \times 10^{-4}} \rightarrow \boxed{n = 613 \text{ ppl surveyed}}$$

21) $p = 10\%$, $ME = 7\%$, $n = ?$

$$\frac{.07}{2} = 2 \sqrt{\frac{.1(1-.1)}{n}}$$

$$(.035)^2 = \left(\sqrt{\frac{.09}{n}} \right)^2$$

$$.001225 = \frac{.09}{n}$$

$$n = \frac{.09}{.001225} \rightarrow \boxed{n = 73 \text{ ppl surveyed}}$$

$$22) p = 33\%, ME = 3\%, n = ?$$

$$\frac{.03}{2} = \frac{2 \sqrt{\frac{.33(1-.33)}{n}}}{2}$$

$$(.015)^2 = \left(\sqrt{\frac{.2211}{n}} \right)^2$$

$$2.25 \times 10^{-4} = \frac{.2211}{n}$$

$$n = \frac{.2211}{2.25 \times 10^{-4}} \rightarrow \boxed{n = 983}$$

$$24) n = 1020, ME = 2.4\%, p = ?$$

$$\frac{.024}{2} = \frac{2 \sqrt{\frac{p(1-p)}{1020}}}{2}$$

$$(.012)^2 = \left(\sqrt{\frac{p-p^2}{1020}} \right)^2$$

$$1020 \times 1.44 \times 10^{-4} = \frac{p-p^2}{1020} \times 1020$$

$$.14688 = p - p^2$$

$$p^2 - p + .14688 = 0$$

$$\downarrow \quad \downarrow$$

$$\boxed{p = 15\% \quad p = 82\%}$$

of ppl supported min wage

$$23) n = 100, ME = 9.6\%, p = ?$$

$$\frac{.096}{2} = \frac{2 \sqrt{\frac{p(1-p)}{100}}}{2}$$

$$(.048)^2 = \left(\sqrt{\frac{p-p^2}{100}} \right)^2$$

$$100 \times .002304 = \frac{p-p^2}{100} \times 100$$

$$.2304 = p - p^2$$

$$p^2 - p + .2304 = 0$$

$$\downarrow \quad \downarrow$$

$$\boxed{p = 36\% \text{ or } p = 64\%}$$

of ppl said yes

$$25) n = 1010, ME = 3.1\%, p = ?$$

$$\frac{.031}{2} = \frac{2 \sqrt{\frac{p(1-p)}{1010}}}{2}$$

$$(.0155)^2 = \left(\sqrt{\frac{p-p^2}{1010}} \right)^2$$

$$1010 \times 2.4025 \times 10^{-4} = \frac{p-p^2}{1010} \times 1010$$

$$.2406525 = p - p^2$$

$$p^2 - p + .2406525 = 0$$

$$\downarrow \quad \downarrow$$

$$\boxed{p = 41\% \quad p = 59\%}$$

of ppl said physician was a prestigious occupation