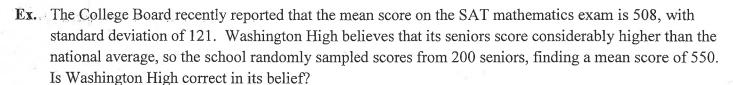
Name KEY
Algebra 2: 11.5 Margin of Error – Guided Notes
* Gathering data for an entire can be quite challenging (and expensive).
s a result, studies often rely on samples to provide statistic (proportions, means,
medians, etc.) that they can use to estimate corresponding population
Ex. Heights of High School Students Ex. The table below contains sample data for a 6-sided
· Sample of 200 students die rolled 30 times.
funds the arg height 416426 sample finds 2
Finds the arg height $\frac{4 + 6 + 2 \cdot 6}{6 + 6 \cdot 6 \cdot 2 \cdot 2}$ valled $\frac{1}{30} = 20\%$
4 4 5 5 2 1
* can use sample statistics 4 5 2 1 3 2 can estimate the to estimate pop. parameter 3 6 6 3 1 1 any 6 sided die
to estimate pop. parameter 3 6 6 3 1 1 any 6 sided die
volled so times
yulds a 2 20%.
* The accuracy of these estimates depends on the of the sample and how well the sample
represents the population. The greater the size of the sample, the closer the statistic should be to the parameter being estimated.
Ex: Free Throw Accuracy (see textbook, pg. 584)
Complete Distriction
mpling Distribution: a sampling distribution is a distribution made up of (such as
means or proportions) from different samples of the same population.
- As the number of samples, the shape of the sampling distribution begins to look
like a distribution, and the distribution will more accurately reflect the population
pavameter
*Recall: The Empirical Rule states that 95 /. % of the values in a normal distribution fall within 2
Standard deviations of the mean.
* So, it follows that 9 % of all sample results fall within 2 standard deviations
of the population parameter being evaluated.
Margin of Error:
* The margin of error gives the <u>maximum</u> expected <u>lifterence</u> between the sample
result and the population parameter.
σ = population standard deviation
$M0E = \pm \frac{\lambda}{\lambda} \sigma$ $n = \text{sample size}$
* We will be using MOE to identify a <u>range of reasonable means</u> .

* A "reasonable mean" is a sample mean that is within the range indicated by the MOE.



a. Calculate the margin of error for the sample's SAT data.

MOE =
$$\frac{1}{\sqrt{121}} = \frac{1}{\sqrt{17.111}} = \frac{1}{\sqrt{$$

b. Find the range of reasonable means for SAT scores with samples of size 200.

c. Is Washington High correct?

d. Suppose the sample size was decreased by half. How does that affect the margin of error?

e. Suppose the sample size was decreased to a quarter. How does that affect the margin of error?
$$W = 7$$

Suppose the sample size was doubled. How does that affect the margin of error?

MOE increased by
$$59 = 2$$

When sample size

 $\frac{1}{50}$

The mean distance all students live from Issaquah High School is 2.8 miles, with a standard deviation of 0.4 miles. A sample of 40 IHS students reports a mean distance of 1.3 miles.

a. Calculate the margin of error for the sample's distance data.

$$M0E = \pm 2(0.4) = \pm .126$$

b. Find the range of reasonable mean distances with samples of size 40.

c. Does the sample accurately reflect the student body at IHS? Why or why not?