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How many AP Stats students are YouTubing?



According to YouTube analytics, 30% of all AP Statistics students are using YouTube as part of their AP Exam Review. To investigate this claim, the College Board is going to take a random sample of 80 AP Statistics students and use a survey to count the number that are using YouTube as part of their review.

Let X = the number of students in the survey that are using YouTube as part of their review.

1. Show that X is a binomial random variable.
2. What is the shape of the distribution of X ? Justify.
3. What is the mean and standard deviation of X ?
4. Find the probability that the sample has exactly 32 students who use YouTube.
5. Find the probability that the sample has at least 32 students who use YouTube.
6. College Board selected a random sample of 80 AP Statistics students and found that 32 of them were using YouTube. Does this result provide convincing evidence that more than 30% of AP Statistics students are using YouTube?

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Based on the College Board sample, 40% of AP Statistics students are using YouTube as part of their AP Exam Review. Assume now that this claim is true.

Mr. Wilcox decides to try and find 1 student who is using YouTube as part of their AP exam review. He will randomly select AP Statistics students one at a time until he finds a YouTuber.

Let Y = the number of students it takes to find a YouTuber

7. Show that Y is a geometric random variable.

8. What is the shape of the distribution of Y ? Justify.

9. What is mean and standard deviation of Y ?

10. Find the probability it takes exactly 5 students to find the first YouTuber.

11. Find the probability it takes at most 5 students to find the first YouTuber.

12. Suppose it takes Mr. Wilcox 6 students to find the first YouTuber. Does this result provide convincing evidence that less than 40% of AP Statistics students are using YouTube?

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Binomial and Geometric Random Variables

Important ideas:

Homework (AP Classroom)

A popular computer card game keeps track of the number of games played and the number of games won on that computer. The cards are shuffled before each game, so the outcome of the game is independent from one game to the next and is based on the skill of the player. Let X represent the number of games that have been won out of 100 games. Under which of the following situations would X be a binomial random variable?

- ☐ **A** All games were played by the same player, whose skill improved over the course of the 100 games
- ☐ **B** A group of 5 players of different skill levels were each allowed to play 20 games in a row.
- ☐ **C** A group of players of different skill levels were each allowed to play until they had lost 3 games and this resulted in 100 games played.
- ☐ **D** Two players of equal skill level each played one game a day for 50 days and their skill level did not change from day to day.
- ☐ **E** Two players of different skill levels competed by allowing one player to continue until a game was lost, then the other player to continue until a game was lost, and so on, until 100 games were played.