Precalc13.6

Use the binomial theorem to calculate probability

theoretical probability

experimental probability

activity: graphing calculator simulation

1 **LANDSCAPING** Refer to the application at the beginning of the lesson. Five mahogany trees are planted. What is the probability that at least 2 trees die?

11. **Cooking** In cooking class, 1 out of 5 soufflés that Sabrina makes will collapse. She is preparing 6 soufflés to serve at a party for her parents. What is the probability that exactly 4 of them do not collapse?

$$\left(\frac{4}{5} + \frac{1}{5}\right)^6$$

89%

4 good

$1\left(\frac{4}{5}\right)^6 \quad 6\left(\frac{4}{5}\right)^5\left(\frac{1}{5}\right) \quad 15\left(\frac{4}{5}\right)^4\left(\frac{1}{5}\right)^2 \quad 20 \quad 15 \quad 6 \quad 1$

26% + 39 + 15( )( )

24%

Maura guesses at all 10 questions on a true/false test. Find each probability.

17. P(7 correct)

18. P(at least 6 correct)

19. P(all correct)

20. P(at least half correct)

C T

$\left(\frac{1}{2} + \frac{1}{2}\right)^{10}$

$1(\ )^{10}$ $10(\ )^{9}$ $45(\ )^{8}$ $120\left(\frac{1}{2}\right)^{7}\left(\frac{1}{2}\right)^{3}$ 210

12%

Kyle guesses at all of the 10 questions on his multiple choice test. Find each probability if each question has 4 choices.

24. P(6 correct answers)

25. P(half answers correct)

26. P(from 3 to 5 correct answers)

$$\left(\frac{1}{4}+\frac{3}{4}\right)^{10}$$

C I

$1\left(\frac{1}{4}\right)^{35}$ 10 45 120 $210\left(\frac{1}{4}\right)^{5}\left(\frac{3}{4}\right)^{5}$

0.00001

1×10^{-22}

5%

Bobby wins 2 out of every 3 chess matches he plays with Marlene. What is the probability that he wins exactly 5 out of the next 6 matches?

$\left(\frac{2}{3} + \frac{1}{3}\right)^6$

Is this binary probability?

theoretical probability:

$1( )^6$ $\quad 6\left(\frac{2}{3}\right)^5\left(\frac{1}{3}\right)^1 \quad 10$

26.3% $\quad \frac{64}{243}$

experimental probability (simulation)

randInt(1,3,6)

W L W

1 2 3

1110100100

$\frac{5}{10} = 50\%$

WB 13.6
project