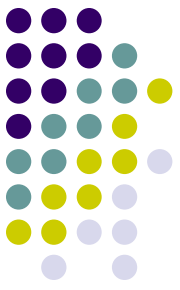# Tuesday, January 8, 2019

- Warm-up
  - An American roulette wheel has 38 slots with numbers 1 through 36, 0, and 00. Of the numbered slots, 18 are red, 18 are black, and 2 – the 0 and 00 – are green. When the wheel is spun, a metal ball is dropped onto the middle of the wheel. If the wheel is balanced, the ball is likely to settle in any of the numbered slots.
    - P(red) = $\frac{18}{38} \approx 0.473$
    - P(3 odds in a row) = $\left(\frac{18}{38}\right)^3 \approx 0.106$
    - P(the first black is the 4th spin) = $\left(\frac{20}{38}\right)\left(\frac{20}{38}\right)\left(\frac{20}{38}\right)\left(\frac{18}{38}\right) \approx 0.069$
    - P(at least one red in 5 spins) = $1 - P(no\ Reds) = 1 - \left(\frac{20}{38}\right)^5 \approx 0.959$

- Talk about Finals
- Greedy Pig
- Intro the next chapter

Objectives
Content: I will experiment with random variables and expected value.
Social: I will participate in class activities.
Language: I will listen for and write down key vocabulary: expected value, random variable, and the law of large numbers.

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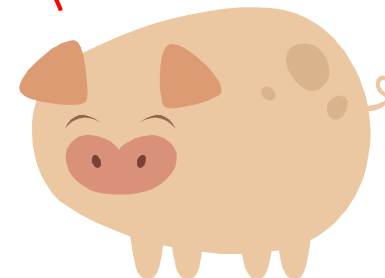
Final Exam

Fantasy Football
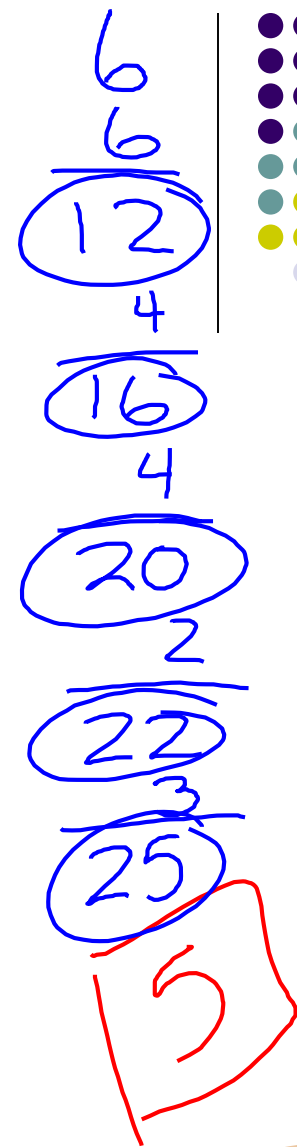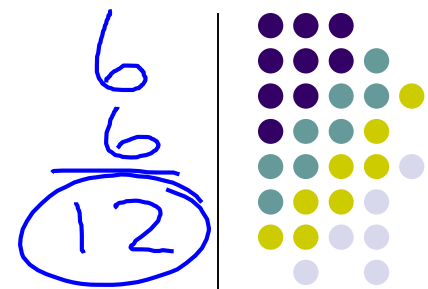
Greedy Pig

- Greedy Pig (whole class version)
  - Everyone stand up
  - When I roll a die, you get that many points
  - When you want to be done, sit down
  - If I roll a 5 before you sit down, you lose all of your points

$$\frac{6}{6}$$

$$12$$

$$\frac{4}{16}$$

$$\frac{4}{20}$$

$$\frac{2}{22}$$

$$\frac{3}{25}$$

$$5$$

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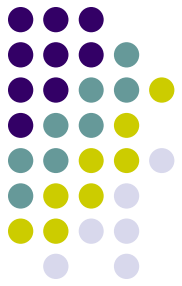
2, 6, 11

Greedy Pig
What is truly expected?

$$E(x) = \frac{1}{P(x)} = \frac{1}{\text{probability}}$$
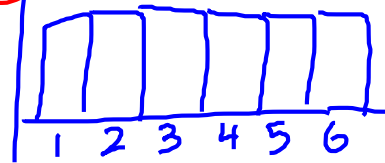
"expected value"

$P(5) = \frac{1}{6}$

$E(5) = \frac{1}{\frac{1}{6}}$

$1 \div \frac{1}{6}$

$1 \times \frac{6}{1} = \boxed{6}$

Geometric →▷ "wait time"
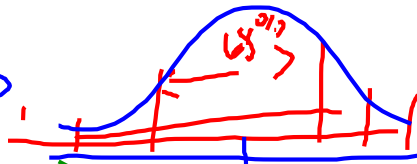how long until I roll a 5?

Binomial →▷ "out of a group"

uniform

1 2 3 4 5 6

Normal →▷

symmetric
unimodal

normal cdf
z-scores
%ile

-2
③
-1
④
-2
⑥
-3
⑨

→ 3 = ⑫ ·3 → ⑮ -2 → ⑰
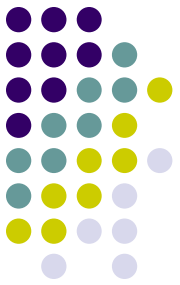+2
⑲ ·4 = ㉓ ⑮

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Preview the Next Unit

Homework

- 5 big ideas (formulas, vocabulary, concepts) from chapter 16