

# HW 1 Page 1

Thursday, August 27, 2020 11:32 AM

1. In 2020, there are 4 months with 30 days. 3 of those months have a 5th Tuesday. Therefore the probability of getting a 30 day month with a fifth Tuesday is  $3/4 = 0.75$
2. The probability of rolling a six sided die getting the resulting scenarios is
  - a.  $1/6 * 1/6 * 1/6 = 0.0046$
  - b.  $1/6 * 1/6 * 1/6 = 0.0046$
  - c.  $1/2 * 1/2 * 1/2 = 0.125$

3.

convicted in their first trial				
		yes	no	total
convicted in their second trial	yes	40%	30%	70%
	no	10%	20%	30%
	total	50%	50%	100%

- a. Given they were convicted in their second trial, the probability that they were convicted in their first trial would be  
 $p(2ndYes | 1stYes) = 0.4/0.5 = 0.8$
- b. No, anyone convicted in their first trial is more likely to be convicted in their second trial

4. .

	$24/25 +  p$ $1/25 +  n$	$48/10000$ $2/10000$
$1/200 +$ $199/200 -$		
	$49/50 -  n$ $1/50 -  p$	$199/10000$ $9751/10000$

- a.  $(1/200) * (1/25) = 0.0002$
- b.  $(48/247) = 0.1943$
- c. The test has a high rate of false positives, this is obviously an issue. To fix this issue, more tests should be administered in order to increase the confidence of the results. Th increased testing should be done as long as it actually sifts through the false positives and makes the results more accurate.

# HW 1 Page 2

Wednesday, September 9, 2020 5:35 PM

5.

		p	w	p * w	(w-μ) <sup>2</sup>	p*((w-μ) <sup>2</sup> )				
outcome	G>S, G<B	(1/2)*(2/3) = 1/3	1	0.33	0.11	0.037				
	G<S, G>B	(1/2)*(1/3) = 1/6	2	0.33	1.78	0.296				
	G>S, G>B	(1/2)*(1/3) = 1/6	6	1.00	28.44	4.741				
	G<S, G<B	(1/2)*(2/3) = 1/3	-3	-1.00	13.44	4.481				
				0.67		9.556	Var			
	p = probability					3.091	SD			
	w = weight									
	μ = expected value									

a. Convince your friend this a good deal but don't explain the probabilities.

6. .

- No
- $(.11+.06+.25+.01+.01) = 0.44$
- 18%
- 11%
- It appears that the moderately conservative democrats typically believe the earth is warming and conservative republicans believe the opposite
- 6%

7. .

- $19 / 100 = 19\%$
- $(19+41) / 100 = 60\%$
- $(19 + 12) / 100 = 31\%$  classical probability because we have explicit data and perform simple math from this data based on the sample
- $28 / (28 + 41) = 41\%$

8.

- $\mu = 22 * 1.8 = 39.6$   
 $\sigma^2 = 22 * 1.2^2 = 31.7$   
 $\sigma = 5.6$
- $\mu = 22 * (1000 * 1.8) = 39,600$   
 $\sigma^2 = 22 * (1000^2 * 1.2^2) = 31,700,000^2$   
 $\sigma = 5,629$

9.

- $\mu = (72*.7) + (95*.3) = 78.9$
- $\sigma^2 = ((12^2 *.7^2) + (4^2 *.3^2)) = 72$   
 $\sigma = 8.5$

10.

- .