MATH 130 Sample Exam 4

Use a #2 pencil. Calculators are allowed, but cell phones, i-pods, etc. are NOT acceptable. Please turn cell phones off.
Choose the alternative that best completes the statement or answers the question and mark your answer on the scantron form. Scantrons with no answers marked will receive a score of 0.

1. Kansas used three letters(excluding Q and X) followed by three digits on license plates. How many license plates are possible?

   A) 14,824
   B) 39,304
   C) 13,824,000
   D) 17,576,000
   E) None of the above.

   26 − 2 = 24 letters
   10 digits
   $24 \cdot 24 \cdot 24 \cdot 10 \cdot 10 \cdot 10 = 13,824,000$
   letters letters letters digits digits digits

2. A special menu offers a choice of 2 appetizers, 3 main dishes, 4 desserts, and 3 drinks. How many combinations are possible?

   A) 72
   B) 12
   C) 18
   D) 15
   E) None of the above.

   $2 \cdot 3 \cdot 4 \cdot 3 =$

3. What is the probability of rolling a 7 on a ten-sided die AND an 11 on a 12-sided die?

   A) $\frac{77}{120}$
   B) $\frac{1}{18}$
   C) $\frac{1}{77}$
   D) $\frac{11}{60}$
   E) $\frac{1}{120}$

   $\frac{1}{10}$ and $\frac{1}{12}$
   $\frac{1}{10} \cdot \frac{1}{12} = \frac{1}{120}$

4. Three coins are tossed. What is the probability of getting exactly 2 tails OR 2 heads?

   A) $\frac{1}{8}$
   B) $\frac{3}{4}$
   C) $\frac{9}{64}$
   D) $\frac{1}{2}$
   E) 1

   Sample Space for tossing 3 coins:
   {HHH, HHT, HTH, THH, TTH, THT, HTT, TTT}
   N = 8
   6 desired outcomes, 8 total
   $\frac{6}{8} = \frac{3}{4}$

Use the following to answer questions 5 to 7. At Ice Cream Palace they have a sundae bar. The options are as follows:

- **Ice Cream:** chocolate, vanilla, strawberry, butterscotch 4
- **Sauce:** hot fudge, caramel, strawberry, none 4
- **Topping:** rainbow sprinkles, whipped cream, none 3
- **Nuts:** walnuts, almonds, none 3

5. How many different sundaes are possible?

   A) 48
   B) 144
   C) 14
   D) 96
   E) 32

   $4 \times 4 \times 3 \times 3 =$

6. How many sundaes have strawberry ice cream and strawberry sauce?

   A) 9
   B) 12
   C) 2
   D) 6
   E) 16

   $1 \times 1 \times 3 \times 3$

7. What is the probability that someone will order a sundae with almonds?

   A) $\frac{1}{42}$
   B) $\frac{1}{3}$
   C) $\frac{1}{2}$
   D) $\frac{1}{4}$
   E) $\frac{1}{48}$

   $$\frac{4 \times 4 \times 3 \times 1}{4 \times 4 \times 3 \times 3}$$

8. The odds that Thundercat will win the next race are 4 to 9. What is the probability that Thundercat will win?

   A) 0.44
   B) 2.25
   C) 0.31
   D) 0.69
   E) None of the above.

   win ← → lose
   13 total

   $\frac{4}{13} \approx 0.30769 \approx 0.31$

9. There is a 3 in 10 chance that Miss Fancy Buttons will win the last race. What are the odds that Miss Fancy Buttons will win?

   A) 3 to 10
   B) 10 to 3
   C) 3 to 7
   D) 7 to 3
   E) None of the above.

   3 win
   10 total
   ---
   7 lose

10. The probability that Bombalurina will NOT will the Jellicle Jamboree is 1/97. What are the odds that Bombalurina WILL win?

lose ← 1 → total
96 win

A) 1 to 97
B) 99 to 1
C) 98 to 1
D) 1 to 96
E) 96 to 1

11. A gumball machine has three flavors of gumball: apple (A), berry (B) and cherry (C). Write out the sample space for the experiment of getting three random gumballs from the machine.

A) $\{AAA, AAB, AAC, ABB, ABC, ACC, BBB, BBC, BCC, CCC\}$
B) $\{AAB, AAC, ABB, ABC, ACC, BBC, BCC\}$
C) $\{AA, AB, AC, BB, BC, CC\}$
D) $\{AAA, AAB, AAC, ABA, ABB, ABC, ACA, ACB, ACC, BBA, BBB, BBC, BCA, BCB, BCC, CCA, CCB, CCC\}$
E) None of the above.

12. Your grade in a Natural Fibers Weaving course is based on the following weighted components and percentage scores for each component. What is your final grade in the class?

Unit	Weight	Score	Unit	Weight	Score
Basic Weaving	20%	99%	Understanding Spiderwebs	25%	77%
Native Grasses Weaving	10%	78%	Zero Waste Weaving	20%	94%
Animals That Weave	15%	83%	Edible Placemats	10%	88%

A) 88%
B) 68.9%
C) 86.9%
D) 51.58%
E) None of the above.

$.2(99)+.1(78)+.15(83)+.25(77)+.20(94)+.1(88)$
$=$

13. Rorbat is investing money to make a movie. He puts $550 in a savings account. There is a 27% chance his investment will increase in value by $80 in one year, and a 73% chance it will decrease in value by $100. What is Rorbat's expected gain or loss from his investment?

A) $51.40 gain
B) $51.40 loss
C) $21.60 gain
D) $21.60 loss
E) None of the above.

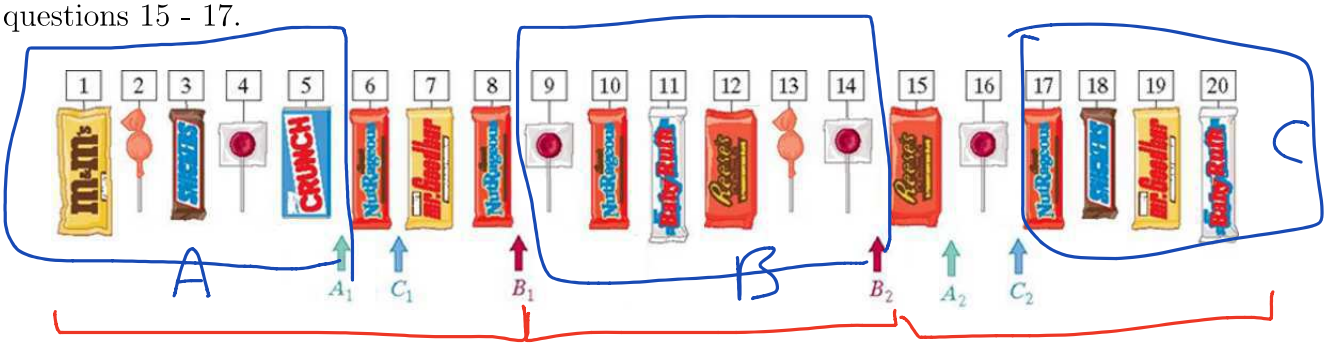
$.27(80) - .73(100) = -51.4$

14. Harry Potter decides to take out a $1200 term life insurance policy on his owl, Hedwig. Assuming that Harry maintains Hedwig in a life style to which she has been accustomed, the probability that Hedwig will survive another year is 0.95. The annual premium on the policy is $56. Who gets the better deal and why?

A) The insurance company, because their expected gain is $4.00.
B) Harry, because his expected gain is $60.00.
C) The insurance company, because their expected gain is $56.00.
D) Harry, because his expected gain is $1200.00.
E) None of the above.

HP: $-56+1200(.05)+.95(0)=4$
Harry's expected gain is $4.

Three players agree to divide the items below. Use the players' markers as indicated to answer questions 15 - 17.



15. Which of the following is NOT a fair share for player B?

(a) 

(b) 

(c) 

(d) 

(e) None of the above.

16. Using Method of Markers, what will player A receive?

(a) 

(b) 

(e) None of the above.

(c) 

(d) 

17. Using Method of Markers, what items will be left over?

(a) 

(b) 

(e) None of the above.

(c) 

(d) 

Use the following to answer questions 18 - 21.

Grandma May decides to move into a fancy new condo where she won't have room for all her things. She leaves her children to divide up her fine china, a Tiffany lamp, and her prized yard gnome collection. They decide to divide up the items using the method of sealed bids. Their bids on each of the items are as follows.

	Vincent	Valerie	Vanessa
Fine China	$1,500	$2,000	$1,700
Tiffany Lamp	$500	$800	$700
Yard Gnomes	$100	$20	$6

total bids 2100 2820 2406

fair shares 700 940 802

items: 100 2800 -0-

Difference 600 -1860 802

to Estate

Estate: 1860 - 600 - 802

= 458 ← Surplus

458/3 = 152.667

18. Who gets the Yard Gnomes?

A) Vincent
B) Valerie
C) Vanessa
D) Valerie and Vanessa split it.
E) None of the above.

19. What is Vanessa's fair share?

A) $700
B) $802
C) $1,040.67
D) $2,445
E) None of the above.

20. What is the surplus before the final allocation?

A) $1860
B) $458
C) $1402
D) $2,445
E) None of the above.

21. After the final allocation, how much money will Valerie have to pay in?

A) $1,707.33
B) $802
C) $954.67
D) $700
E) None of the above.

1860
- 152.667
1707.33

22. Which of the following numbers in the sequence ..., 13, 21, 35, 55, 89, ... is NOT a Fibonacci Number?

A) 13
B) 21
C) 35
D) 55
E) 89

Should be 34

$13+21=34$
$21+34=55$
$34+55=89$ etc.

23. Given that $F_{37} = 24,157,817$ and $F_{39} = 63,245,986$, find F_{38}.

A) 14,930,352
B) 31,622,993
C) 24,810,731
D) 39,088,169
E) None of the above.

$63,245,986 - 24,157,817 = 39,088,169$

$F_{38} = F_{39} - F_{37}$

24. Consider a rectangle with side lengths F_{14} and F_{15}. Which number below is closest to the ratio between the longer side and the shorter side?

A) F_{16}
B) 1.618
C) 2.41421
D) 15/14
E) 3:2

F_{14} and F_{15} are consecutive Fibonacci #'s. If you divide consecutive Fibonacci #'s, the ratio becomes indistinguishable from ϕ as the #'s get large enough.

$\phi \approx 1.618$