

Math 30-2

Unit 3: Exam

Probability

Please have your calculator cleared by a staff member
Formula sheet attached

Name: _____

Mark: _____/23

Mathematics 30–2 Formula Sheet

Relations and Functions

Graphing Calculator Window Format

$$x: [x_{\min}, x_{\max}, x_{\text{scl}}]$$

$$y: [y_{\min}, y_{\max}, y_{\text{scl}}]$$

Exponents and Logarithms

$$y = a^x \leftrightarrow x = \log_a y$$

$$\log_b c = \frac{\log_a c}{\log_a b}$$

Laws of Logarithms

$$\log_a(M \cdot N) = \log_a M + \log_a N$$

$$\log_a\left(\frac{M}{N}\right) = \log_a M - \log_a N$$

$$\log_a(M^n) = n \log_a M$$

Exponential functions

$$y = a \cdot b^x$$

Sinusoidal functions

$$y = a \cdot \sin(bx + c) + d$$

$$\text{Period} = \frac{2\pi}{b}$$

Quadratic equations

$$\text{For } ax^2 + bx + c = 0$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Probability

$$n! = n(n-1)(n-2)\dots 3 \cdot 2 \cdot 1,$$

where $n \in N$ and $0! = 1$

$${}_nP_r = \frac{n!}{(n-r)!}$$

$${}_nC_r = \frac{n!}{(n-r)!r!}$$

$${}_nC_r = \binom{n}{r}$$

$$P(A \cup B) = P(A) + P(B)$$

$$P(A \cup B) = P(A) + P(B) - P(A \cap B)$$

$$P(A \cap B) = P(A) \cdot P(B)$$

$$P(A \cap B) = P(A) \cdot P(B | A)$$

Logical Reasoning

A' Complement

$\emptyset$ Empty set

$\cap$ Intersection

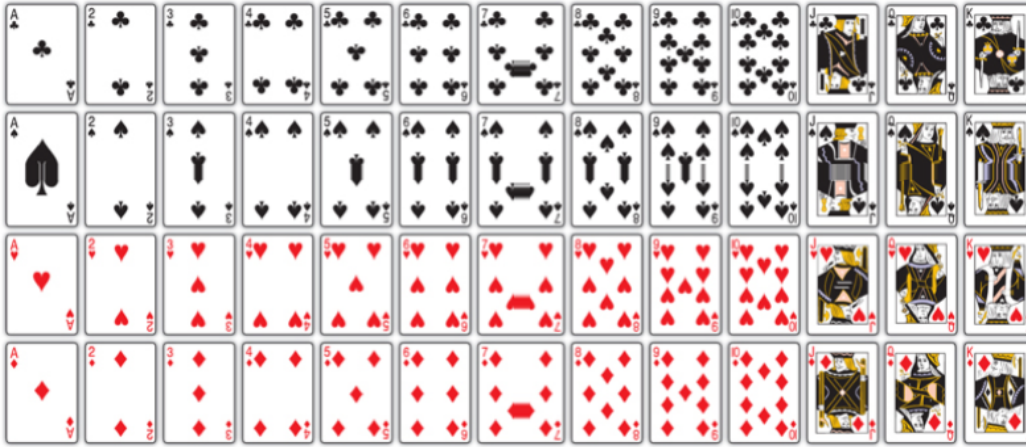
$\subset$ Subset

$\cup$ Union

Ch. 3 Probability Unit Exam

Use this for ALL card questions in the exam:

A standard deck of cards contains 52 cards as shown...



Multiple Choice

Identify the choice that best completes the statement or answers the question.

- _____ 1. Raymond has 12 coins in his pocket, and 9 of these coins are quarters. He reaches into his pocket and pulls out a coin at random. Determine the odds against the coin being a quarter.
- A. 1 : 4
B. 1 : 3
C. 3 : 4
D. 3 : 1
- _____ 2. A sports forecaster says that the odds for a team winning their next game is 3:2. Determine the probability that the team will win their next game.
- A. $\frac{2}{3}$ B. $\frac{3}{5}$ C. $\frac{3}{2}$ D. $\frac{2}{5}$

- _____ 3. Tia notices that yogurt is on sale at a local grocery store. The last eight times that yogurt was on sale it was available only three times. Determine the probability of yogurt being available this time.
- A. 0.220 B. 0.375 C. 0.460 D. 0.625
- _____ 4. Select the event that is mutually exclusive.
- A. Drawing a red card or drawing a diamond from a standard deck of 52 playing cards.
- B. Rolling a sum of 8 or rolling an even number with a pair of six-sided dice, numbered 1 to 6.
- C. Drawing a black card or drawing a Queen from a standard deck of 52 playing cards.
- D. Drawing a 3 or drawing an even card from a standard deck of 52 playing cards.
- _____ 5. Jake and Agnes are playing a board game using 2 fair 6 sided dice. If a player rolls a sum greater than 9 or a multiple of 6, the player gets a bonus of 50 points. Determine the probability of rolling a sum greater than 9.
- A. $\frac{1}{6}$ B. $\frac{1}{12}$ C. $\frac{1}{4}$ D. $\frac{11}{36}$
- _____ 6. Roena is about to draw a card at random from a standard deck of 52 playing cards. Determine the probability that she will draw a 7 or a red King.
- A. $\frac{3}{26}$ B. $\frac{4}{13}$ C. $\frac{2}{13}$ D. $\frac{1}{12}$

- _____ 7. Select the event that is independent.
- A. Drawing a 10 from a standard deck of 52 playing cards and then drawing another card, without replacing the first card.
 - B. Rolling a 4 and rolling a 5 with a pair of six-sided dice, numbered 1 to 6.
 - C. Choosing a number between 1 and 20 with the number being a multiple of 3 and also a multiple of 9.
 - D. Drawing a diamond from a standard deck of 52 playing cards and then drawing another diamond, without replacing the first card.
- _____ 8. Hilary draws a card from a well-shuffled standard deck of 52 playing cards. Then she draws another card from the deck without replacing the first card. Determine the probability that both cards are hearts.
- A. $\frac{1}{20}$ B. $\frac{1}{8}$ C. $\frac{1}{12}$ D. $\frac{1}{17}$
- _____ 9. Rashid goes to the gym and does two different cardio workouts each day. His choices include using a treadmill, a stepper, a stationary bike, an elliptical walker, and running the track. Determine the probability, to the nearest percent, that the next time Rashid goes to the gym he will use the stepper and then run the track.
- A. 1% B. 8% C. 5% D. 14%
- _____ 10. A five-different colour spinner with equal parts is spun, and a 6 sided regular die is rolled. Determine the probability, to the nearest hundredth of a percent, of spinning yellow and rolling a 6.
- A. 2.42% B. 3.33% C. 6.13% D. 7.75%

- _____ 11. Select the independent event.
- A. $P(A) = 0.21$, $P(B) = 0.57$, and $P(A \cap B) = 0.122$
 - B. $P(A) = 0.8$, $P(B) = 0.52$, and $P(A \cap B) = 0.423$
 - C. $P(A) = 0.74$, $P(B) = 0.85$, and $P(A \cap B) = 0.629$
 - D. $P(A) = 0.46$, $P(B) = 0.9$, and $P(A \cap B) = 0.416$
- _____ 12. Rino has six loonies, four toonies, and two quarters in his pocket. He needs two loonies for a parking meter. He reaches into his pocket and pulls out two coins at random. Determine the probability that both coins are loonies.
- A. 0.163
 - B. 0.184
 - C. 0.227
 - D. 0.259
- _____ 13. Nine boys and twelve girls have signed up for a trip. Only six students will be selected to go on the trip. Determine the probability that there will be equal numbers of boys and girls on the trip.
- A. 0.1723
 - B. 0.2261
 - C. 0.2735
 - D. 0.3406
- _____ 14. Four boys and three girls will be riding in a van. Only two people will be selected to sit at the front of the van. Determine the probability, to the nearest hundredth of a percent, that only boys will be sitting at the front.
- A. 28.57%
 - B. 33.45%
 - C. 39.06%
 - D. 46.91%

_____ 15. Kayla plays the following notes from a particular scale on her piano in this order.

G D E B F

If Jasmine plays the same 5 notes as Kayla in random order, then the probability that she plays the first 3 in the same order as Kayla is

A. $\frac{1}{{}_5C_3}$

C. $\frac{3}{{}_5C_3}$

B. $\frac{1}{{}_5P_3}$

D. $\frac{3}{{}_5P_3}$

Numeric Response: Fill in responses on the Numerical Response bubble sheet provided:

1. A game has three possible outcomes: A , B , and C . If $P(A) = 0.6$ and $P(B) = 0.2$, what is the probability of event C , to the nearest tenth?

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2. Rowan is the coach of a junior ultimate team. Based on the team's record, it has a 80% chance of winning on calm days and a 60% chance of winning on windy days. Tomorrow, there is a 60% chance of high winds. There are no ties in ultimate. What is the probability, rounded to the nearest percent, that Rowan's team will win tomorrow?

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Name: _____

ID: A

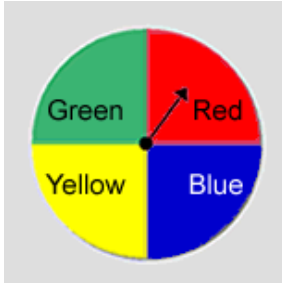
3. Sonja has letter tiles that spell MICROWAVE. She has selected four of these tiles at random. Determine, to the nearest percent, the probability that the tiles she selected are two consonants and two vowels.
- .
4. A computer manufacturer knows that, in a box of 175 computer chips, 5 will be defective. Max will draw 2 chips at random, from a box of 175, and not replace them. Determine, to the nearest hundredth, the probability that Max will draw 2 non-defective chips.
- .
5. A paper bag contains a mixture of three types of treats: 12 granola bars, 10 fruit bars, and 8 cheese strips. Suppose that you play a game in which a treat is randomly taken from the bag and replaced, and then a second treat is drawn from the bag. You are allowed to keep the second treat only if it was the same type as the treat that was drawn the first time. Determine the probability (as a percentage, rounded to the nearest tenth) that you will be able to keep a fruit bar.
- .

Name: _____

ID: A

Problem

1. A 4 different colored equal spinner is spun and a fair 6 sided die is rolled.



- A) Show the sample space or the list of possible outcomes for the situation above:
(1 mark)
- B) What is the probability, as a fraction, of spinning red and rolling an even number? (1 mark)
- C) What is the probability, as a fraction, of NOT spinning red and NOT rolling an even number?
(1 mark)