

Tree Diagram Bellringer

Name: _____ Date: _____

1. You are at a carnival. One of the carnival games asks you to pick a door and then pick a curtain behind the door. There are 3 doors and 4 curtains behind each door. How many choices are possible for the player?
2. The 4 aces are removed from a deck of cards. A coin is tossed and one of the aces is chosen. What is the probability of getting heads on the coin and the ace of hearts? Draw a tree diagram to illustrate the sample space.
3. There are 3 trails leading to Camp A from your starting position. There are 3 trails from Camp A to Camp B. How many different routes are there from the starting position to Camp B? Draw a tree diagram to illustrate your answer.
4. A spinner has 4 equally likely regions numbered 1 to 4. The arrow is spun twice. What is the probability that the spinner will land on a 1 on the first spin and on a red region on the second spin? Draw a tree diagram to represent your answer.
5. There are two identical bottles. One bottle contains 2 green balls and 1 red ball. The other contains 2 red balls. A bottle is selected at random and a single ball is drawn. What is the probability that the ball is red?

Name: _____ Class: _____ Date: _____

ID: A

AFM 1-1 Bell Ringer

1. Verne has 8 math books to line up on a shelf. Jenny has 4 English books to line up on a shelf. In how many more orders can Verne line up his books than Jenny?
2. In how many ways can 13 basketball players be listed in a program?
3. A yogurt shop offers 7 different flavors of frozen yogurt and 12 different toppings. How many choices are possible for a single serving of frozen yogurt with one topping?
4. Suppose Ruth Ann has 3 routes she can choose from to get from school to the library, and 4 routes from the library to her home. How many routes are there from Ruth Ann's school to her home with a stop at the library?
5. The Booster Club sells meals at basketball games. Each meal comes with a choice of hamburgers, pizza, hot dogs, cheeseburgers, or tacos, and a choice of root beer, lemonade, milk, coffee, tea, or cola. How many possible meal combinations are there?
6. There are 11 students participating in a spelling bee. In how many ways can the students who go first, second, and third in the bee be chosen?

11-1 Standardized Test Prep

Permutations and Combinations

Multiple Choice

For Exercises 1–5, choose the correct letter.

1. You choose 5 apples from a case of 24 apples. Which best represents the number of ways you can make your selection?

(A) ${}_5C_{19}$ (B) ${}_{24}C_5$ (C) ${}_5P_{24}$ (D) ${}_{19}P_5$

2. Which is equivalent to ${}_7P_3$?

(F) 28 (G) 35 (H) 210 (I) 840

3. A traveler can choose from three airlines, five hotels, and four rental car companies. How many arrangements of these services are possible?

(A) 12 (B) 60 (C) 220 (D) 495

4. Which is equivalent to $a!(b)!$?

(F) $(ab)!$ (G) $(ab!)!$ (H) $ba!$ (I) $b!(a!)$

5. Which is equivalent to ${}_9C_5$?

(A) 126 (B) 3024 (C) 15,120 (D) 45,000

Short Response

6. You have a \$1 bill, a \$5 bill, a \$10 bill, a \$20 bill, a quarter, a dime, a nickel, and a penny. How many different total amounts can you make by choosing 6 bills and coins? Show your work.

AFM Worksheet
1-3 Factorial Notation

Name _____
Date _____ Period _____

Evaluate each expression.

1. a) $12!/11!$

b) $7!/3!$

c) $120!/118!$

d) $(n+1)!/n!$

e) $n!/(n-1)!$

f) $n!/(n-2)!$

g) $(n+1)!/(n-1)!$

h) Solve for n: $(n+1)!/n! = 15$

11-3 Standardized Test Prep

Probability of Multiple Events

Multiple Choice

For Exercises 1–4, choose the correct letter.

A store display shows two red shirts, one blue shirt, and three shirts with red and white stripes. The display also shows two pairs of blue jeans, one pair of white pants, and one pair of white shorts.

1. What is the probability of randomly selecting an item with white or red on it?

(A) $\frac{1}{4}$

(B) $\frac{3}{10}$

(C) $\frac{1}{2}$

(D) $\frac{7}{10}$

2. What is the probability of randomly selecting two items and getting a pair of blue jeans, putting them back in the display, and then randomly selecting a blue shirt?

(F) $\frac{1}{50}$

(G) $\frac{1}{45}$

(H) $\frac{2}{10}$

(I) $\frac{3}{10}$

3. What is the probability of randomly selecting a complete outfit (one shirt and one pair of jeans, pants, or shorts) on two picks?

(A) $\frac{1}{24}$

(B) $\frac{1}{5}$

(C) $\frac{6}{25}$

(D) $\frac{4}{15}$

4. What is the probability of selecting an item with red or blue on it?

(F) $\frac{3}{20}$

(G) $\frac{3}{10}$

(H) $\frac{3}{5}$

(I) $\frac{4}{5}$

Short Response

5. There is a 50% chance of thunderstorms on Monday, a 50% chance on Tuesday, and a 50% chance on Wednesday. Assume these are independent events. What is the probability that there will be thunderstorms on Monday, Tuesday, and Wednesday? Show your work.

11-4 Standardized Test Prep

Conditional Probability

Multiple Choice

For Exercises 1–2, choose the correct letter.

A local bookstore classifies its books by type of reader, type of book, and cost. Use the table at the right for Exercises 1–2.

		< \$10	> \$10
Child	Fiction	120	255
	Nonfiction	35	60
Adult	Fiction	200	110
	Nonfiction	75	150

1. What is the probability that a book selected at random is a child’s book, given that it costs \$15?

- A $\frac{315}{1005}$
 B $\frac{470}{1005}$
 C $\frac{315}{575}$
 D $\frac{470}{575}$

2. What is the probability that a book selected at random is fiction, given that it costs \$6?

- F $\frac{320}{1005}$
 G $\frac{430}{1005}$
 H $\frac{120}{430}$
 I $\frac{320}{430}$

Extended Response

3. Of the photographs produced in one day at a photo shop, 25% are black-and-white, and the rest are in color. Portraits make up 65% of the black-and-white photos and 45% of the color photos. Let B, C, P, and N represent black-and-white, color, portrait, and not a portrait, respectively. Draw a tree diagram to represent this situation. What is the probability that a photo chosen at random is not a portrait? Show your work.

1-7 Study Guide and Intervention

The Binomial Theorem

Pascal's Triangle Pascal's triangle is the pattern of coefficients of powers of binomials displayed in triangular form. Each row begins and ends with 1 and each coefficient is the sum of the two coefficients above it in the previous row.

Pascal's Triangle	$(a + b)^0$					1
	$(a + b)^1$				1	1
	$(a + b)^2$			1	2	1
	$(a + b)^3$		1	3	3	1
	$(a + b)^4$	1	4	6	4	1
	$(a + b)^5$	1	5	10	10	5

Example Use Pascal's triangle to find the number of possible sequences consisting of 3 a s and 2 b s.

The coefficient 10 of the a^3b^2 -term in the expansion of $(a + b)^5$ gives the number of sequences that result in three a s and two b s.

Exercises

Expand each power using Pascal's triangle.

1. $(a + 5)^4$

2. $(x - 2y)^6$

3. $(j - 3k)^5$

4. $(2s + t)^7$

5. $(2p + 3q)^6$

6. $\left(a - \frac{b}{2}\right)^4$

7. Ray tosses a coin 15 times. How many different sequences of tosses could result in 4 heads and 11 tails?

8. There are 9 true/false questions on a quiz. If twice as many of the statements are true as false, how many different sequences of true/false answers are possible?

11-8 Standardized Test Prep

Binomial Distributions

Multiple Choice

For Exercises 1–5, choose the correct letter.

- The probability that a newborn baby at a certain hospital is male is 50%. What is the probability that exactly 2 of 3 babies born in the hospital on any day are male?
 A 37.5% B 50% C 66.7% D 75%
- The probability that a newborn baby at the hospital is female is 50%. What is the probability that at least 2 babies of 3 children born on a certain day are female?
 F 33.3% G 37.5% H 50% I 66.7%
- What is the fifth term of the expansion of $(2x - y)^8$?
 A $-1792x^5y^3$ B $-448x^3y^5$ C $256x^4y^4$ D $1120x^4y^4$
- A poll shows that 30% of voters favor an earlier curfew. Find the probability that all of five voters chosen at random favor an earlier curfew.
 F 0.24% G 1.5% H 4.1% I 16.7%
- The probability that a machine part is defective is 10%. Find the probability that no more than 2 out of 12 parts tested are defective.
 A 28% B 66% C 89% D 98%

Short Response

- A scientist runs an experiment 4 times. Each run has a 65% chance of success. Calculate and graph the distribution of binomial probabilities for the experiment.