Chapter 10 Practice Exercises (*Optional)

10-01 Sequences

Write the first 5 term of the sequence.

1. $a_n = -2n + 1$
2. $a_n = n^2 + n$
3. $a_n = (-1)^n \left(\frac{n}{n+2}\right)$
4. $a_1 = 2,\ a_n = 2a_{n-1} + 3$
5. $a_1 = -3,\ a_n = (a_{n-1})^2$

Write the rule for the n^{th} term.

6. 1, 5, 9, 13, 17, …
7. $\frac{1}{2}, \frac{3}{4}, \frac{5}{8}, \frac{7}{16}, \frac{9}{32}, \ldots$
8. 2, −5, 10, −17, 26, …
9. 3, 12, 48, 192, 768, …
10. $\frac{5}{3}, \frac{5}{2}, 3, \frac{10}{3}, \frac{25}{7}, \ldots$
11. Write a recursive rule for 5, −15, 45, −135, 405, …

Simplify the factorial expression.

12. $\frac{5!}{7!}$
13. $\frac{(n+1)!}{(n-1)!}$
14. $\frac{6!\cdot n!}{3!\cdot(n-1)!}$

Problem Solving

15. If you put 1 grain of rice on the first square on a chess board, 2 grains on the second square, 4 grains on the third square, and continue to double. How many grains will be on the 64th square? Write a rule for the n^{th} term of the sequence and then find the 64th term.

Mixed Review

16. (9-06) Use a matrix to find the equation of the line through (−3, 5) and (4, −2).
17. (9-05) Find cofactor C_{32}: $\begin{bmatrix} 3 & -1 & 2 \\ 0 & 2 & 1 \\ 5 & -4 & -3 \end{bmatrix}$
18. (9-04) Find the inverse matrix: $\begin{bmatrix} 3 & 2 \\ 0 & 1 \end{bmatrix}$
19. (8-01) Solve by substitution: $\begin{cases} y = 4x^2 \\ y = 3x \end{cases}$
20. (7-06) Graph the parametric equation: $\begin{cases} x = 3t^2 \\ y = \sqrt{t} \end{cases}$

10-02 Series

Evaluate the summation.

1. $\sum_{i=1}^{4} 3i$
2. $\sum_{i=2}^{6} i^2 + 1$
3. $\sum_{i=1}^{3} \frac{i}{10}$
4. $\sum_{i=3}^{5} 2^i$
5. $\sum_{n=1}^{6} 3(2)^{n-1}$
6. $\sum_{k=2}^{4} k^3$

Evaluate the infinite summation using partial fractions.

7. $\sum_{i=1}^{\infty} \frac{3}{10^i}$
8. $\sum_{n=1}^{\infty} 5\left(\frac{1}{10}\right)^n$

Evaluate the summations using the shortcut formulas.

9. $\sum_{i=1}^{30} i^2$
10. $\sum_{i=1}^{14} 2i - i^2$
11. $\sum_{n=1}^{10} n^5 + n^3$

Write the series as a summation.

12. 5 + 8 + 11 + 14 + ⋯ + 29
13. 1 + 4 + 9 + 16 + ⋯ + 144
14. 6 + 18 + 54 + 162 + ⋯ + 39366

Problem Solving

15. Let's say you are a religious person. At some point when you are young, you win 2 people for God. Each of those win 2 more people for God. Assuming that each person continues to win 2 more people, thus doubling the number of people. How many people will you be indirectly responsible for winning for God after the 10th generation?

Mixed Review

16. (10-01) Write the rule for the n^{th} term: 3, 7, 11, 15, …
17. (10-01) Write the first 4 terms of the sequence: $a_n = -4\left(\frac{1}{2}\right)^{n-1}$
18. (9-06) Use Cramer's Rule to solve: $\begin{cases} 2x - 4y = 3 \\ x + 3y = 4 \end{cases}$
19. (9-04) Find the inverse of $\begin{bmatrix} 1 & 3 & 1 \\ 0 & -2 & 2 \\ 0 & 0 & 1 \end{bmatrix}$
20. (6-03) Find the magnitude of ⟨4, −3⟩.

10-03 Arithmetic Sequences and Series

Write the rule for the n^{th} term.

1. 12, 14, 16, 18, 20, …
2. 15, 20, 25, 30, 35, …
3. –4, –1, 2, 5, 8, …
4. The 6th term of an arithmetic sequence is 63, and the 10th term is 107.
5. The 12th term of an arithmetic sequence is –80, and the 20th term is –136.

Write the recursive rule for the sequence.

6. 4, 10, 16, 22, 28, …
7. 25, 12, –1, –14, –27, …
8. –50, –29, –8, 13, 34, …

Find the sum of the series.

9. 16 + 15 + 14 + 13 + ⋯ + −4
10. Find the 13th partial sum: 53 + 57 + 61 + 65 + 69 + ⋯
11. Find the 100th partial sum: −34 + −36 + −38 + −40 + −42 + ⋯
12. $\sum_{i=1}^{15} (8i - 50)$
13. $\sum_{n=1}^{20} (-4n + 3)$
14. $\sum_{k=1}^{50} (12k - 1)$

Problem Solving

15. You are saving money to buy your first car. You save $100 every month with a goal of $3000. (a) Write a rule for the n^{th} term for the amount of money you have saved. (b) How many months until you have saved your $3000? (c) And what kind of car do you want?

Mixed Review

16. (10-02) Evaluate $\sum_{i=4}^{8} (2i + 10)$.
17. (10-02) Evaluate $\sum_{n=1}^{25} 2n^2$.
18. (10-01) Write the first five terms of $a_n = n^2 - n$.
19. (9-06) Use Cramer's Rule to solve $\begin{cases} 2x - 3y = -4 \\ 4x + 5y = 14 \end{cases}$.
20. (9-04) Use an inverse matrix to solve $\begin{cases} 3x - 3y = 0 \\ 2x - y = 2 \end{cases}$.

10-04 Geometric Sequences and Series

1. Explain how to find the common ratio.

Is the sequence geometric? If so, what is the common ratio?

2. $3, -\frac{6}{5}, \frac{12}{25}, -\frac{24}{125}, \ldots$
3. 2, 12, 72, 432, …

Write the rule for the sequence. (a) explicit (b) recursive

4. $\frac{3}{2}, 1, \frac{2}{3}, \frac{4}{9}, \ldots$

5. –7, 14, –28, 56, …

6. 8, 20, 50, 125, …

Write the rule for the n^{th} term given the following two terms.

7. $a_3 = \frac{4}{3}, a_8 = \frac{128}{729}$

8. $a_4 = -50$, $a_{11} = -3906250$

Evaluate the sum.

9. 5 + 10 + 20 + 40 + 80 + … + 640

10. $\frac{5}{3} + \frac{5}{2} + \frac{15}{4} + \frac{45}{8} + \ldots + \frac{405}{32}$

11. $\sum_{i=1}^{7} \frac{1}{2}(3)^{i-1}$

12. $\sum_{k=1}^{5} 2\left(\frac{5}{2}\right)^{k-1}$

13. $\sum_{n=1}^{10} 10\left(\frac{1}{5}\right)^{n-1}$

14. $\sum_{n=1}^{\infty} 6\left(\frac{1}{4}\right)^{n-1}$

15. $\sum_{n=0}^{\infty} -4\left(\frac{2}{3}\right)^{n}$

Problem Solving

16. A Christian wants to spread her love for Jesus to others. She tells three people about Jesus who then they each tell three other people each. If each person tells three people about Jesus who then tell three more people. How many total people have been told about Jesus after the 10th set of people have been told about Him?

Mixed Review

17. (10-03) Is the sequence given by the rule $a_n = 3n + 5$ geometric, arithmetic, or neither?

18. (10-03) Evaluate $\sum_{n=1}^{15} 2n - 4$.

19. (10-02) Write the series in sigma notation: 2, 6, 18, 54, …, 486.

20. (10-01) Write the first five terms of the sequence $a_n = 3n + 1$.

10-05 Mathematical Induction

Substitute $k + 1$ into the expression and simplify.

1. $\frac{n}{n+3}$

2. $\frac{n(n+1)}{4}$

Prove the sum formulas using mathematical induction.

3. $2 + 4 + 6 + 8 + \cdots + 2n = n(n + 1)$

4. $2 + 7 + 12 + 17 + \cdots + (5n - 3) = \frac{n}{2}(5n - 1)$

5. $1 + 2 + 4 + 8 + \cdots + 2^{n-1} = 2^n - 1$

6. $1 + 2 + 3 + 4 + \cdots + n = \frac{n(n+1)}{2}$

7. $\sum_{i=1}^{n} i(i+1) = \frac{n(n+1)(n+2)}{3}$

Prove the inequality using mathematical induction.

8. $2^n \geq 2n$ where $n \geq 2$

9. $n! > 2^n$ where $n \geq 4$

Prove the property using mathematical induction.

10. $(ab)^n = a^n b^n$

11. 3 is a factor of $n^3 + 3n^2 + 2n$

12. 5 is a factor of $6^n - 1$

Mixed Review

13. (10-04) Is $3(2)^{n-1}$ geometric, arithmetic, or neither?

14. (10-04) Write the rule for the n^{th} term of 3, 9, 27, 81, …

15. (10-03) Evaluate 3 + 6 + 9 + 12 + 15 + ⋯ + 39.

10-06 Binomial Theorem

Evaluate the combination.

1. ${}_3C_2$

2. ${}_6C_4$

3. $\binom{11}{4}$

4. $\binom{15}{7}$

5. $\binom{7}{7}$

Expand the binomial.

6. $(x + 5)^3$

7. $(x - 3)^5$

8. $(2x + y)^4$

9. $(2x - 5y)^5$

10. $(3a + 7b)^6$

Find the specific coefficient of the binomial expansion.

11. x^7 term in $(x + 4)^{15}$

12. $x^{13}y^7$ term in $(x + y)^{20}$

13. x^3y^{14} term in $(x - 2y)^{17}$

14. x^4y^6 term in $(4x - 3y)^{10}$

Expand and simplify the difference quotient $\frac{f(x+h) - f(x)}{h}$.

15. $f(x) = x^4$

Mixed Review

16. (10-05) Prove $5 + 7 + 9 + 11 + \cdots + (2n + 3) = n(n + 4)$.

17. (10-05) Prove $1 + 3 + 9 + 27 + \cdots + (3^{n-1}) = \frac{3^n - 1}{2}$.

18. (10-04) Write the rule for the n^{th} term: 512, 256, 128, 64, ….

19. (10-02) Evaluate $\sum_{n=1}^{10} 2n$.

20. (10-01) Write the first five terms of the sequence $a_{n+1} = 2a_n - 3; a_1 = 4$.

10-07 Counting Principles

Decide whether the addition principle or multiplication principle should be used, then solve the problem.

1. An ice cream shop offers a sundae with your choice of 1 of 5 flavors of ice cream and 1 of 3 flavors of syrup. How many different sundaes can be made?

2. An ice cream shop offers 10 flavors of ice creams and 3 flavors of sherbet. A customer can buy a single scoop of ice cream or sherbet. How many choices does the customer have?

3. An ice cream shop offers floats made with 1 flavor of ice cream and 1 flavor of pop. If they have 5 flavors of ice cream and 4 flavors of pop, how many different floats can they make?

Answer the Counting Principle questions.

4. A car manufacturer makes a model of car with 12 different colors of paint, 2 colors of interior fabric, and 3 exterior trim options. How many different looking cars can they produce?

5. Your crazy teacher gives you a 5 question multiple choice quiz over tomorrow's lesson. Of course you don't know the answers, so you guess on all the questions. If each question has 4 choices, how many different sets of answers could you choose?

6. How many different license plates can be made if each one is 1 letter followed by 3 digits if (a) with repetition and (b) without repetition?

7. A combination lock opens with a correct entry of 3 numbers chosen from 60 numbers. How many different lock combinations can there be if (a) the numbers can be repeated and (b) the numbers cannot be repeated?

8. Four couples bought tickets in the same row to a concert. How many different ways can they sit in the row (a) if it does not matter where they sit and (b) each couple sits together?

Evaluate the permutation.

9. ${}_6P_4$

10. ${}_3P_2$

Problem Solving

11. A student club of 15 students is choosing its 5 officers. How many different arrangements of officers can there be?

12. A group of 20 runners are randomly assigned lanes for their race. In the first race 6 runners are chosen. How many different orders can the runners in the six lane be selected?

13. Three VeggieTales movies and 2 nature movies are going to be watched during the weekend. If the library has 9 VeggieTales and 10 nature movies to choose from, how many orders can the movies be watched?

14. How many distinguishable ways can the letters in BOOKKEEPER be arranged?

15. How many distinguishable ways can 3 identical starships, 2 identical planets, and 6 identical astronauts be arranged on a shelf?

16. There are 13 players on a certain basketball team. The coach has decided that all the players will play every game. How many different groups of 5 players can the team be organized into (the positions are not important because the players can play all positions equally well)?

17. Eight magazines are sitting on the end table. Freddi reads three of them. How many random groups of three magazines could Freddi have chosen?

18. Students are to work in groups of four for a special project. If the class has 20 students, how many different groups of four

could be created?

19. A store received a shipment of 12 calculators contains 4 defective units. In how many ways can a school purchase 4 calculators and receive (a) 4 good units, (b) 3 good units, and (c) at least 2 good units.

20. MegaMillions is a multistate lottery game. A player chooses 5 white balls from a set of 70 and 1 gold ball from a set of 25. The order that the balls are chosen is not important. (a) Find the number of possible winning MegaMillions numbers. (b) Find the number of possible winning MegaMillions numbers if they have to be chosen in order. (c) Compare this to a state lottery where the player chooses 6 balls from a set of 70.

Mixed Review

21. (10-06) Evaluate $\binom{9}{4}$.

22. (10-06) Expand $(2x + y)^4$.

23. (10-05) Prove $3 + 5 + 7 + 9 + \cdots + (2n + 1) = n(n + 2)$.

24. (10-04) Write the rule for the n^{th} term: 3, –12, 48, –192, ….

25. (10-03) Find the sum of $\sum_{n=1}^{50} 4n - 7$.

10-08 Probability

1. What is the difference between compound events and multiple events?

Three coins are flipped. Calculate the probability. (Hint: First list the sample space.)

2. Exactly 2 heads

3. 3 tails

One six-sided die is rolled. Calculate the probability.

4. Even number

5. A multiple of 3

One card is drawn from a standard 52-card deck. Calculate the probability.

6. A face card or a 10

7. A red card or an ace

Two six-sided dice are rolled. Calculate the probability.

8. Sum is 11

9. Sum is prime or even

Two marbles are drawn from 8 red marbles, 5 blue marbles, and 7 yellow marbles in a bag. Calculate the probability of drawing

10. A blue and a yellow (a) with replacement (b) without replacement

11. A red and another red (a) with replacement (b) without replacement

Problem Solving

12. Jill makes a free throw 90% of the time. What is the probability that she will miss a free throw?

13. Billy has a 0.23 probability of finishing his homework on time. What is the probability that his homework will be late?

14. The types of birds at my bird feeder in the morning and afternoon are given in the table.

	Sparrows	Woodpeckers	Doves	Total
Morning	26	4	2	32
Afternoon	33	5	3	41
Total	59	9	5	73

a. What is the probability that a random bird is a sparrow?
b. What is the probability that a random bird appears in the morning?
c. What is the probability that a random bird is a woodpecker that comes in the afternoon?

15. The percent of people following the major world religions is given the circle graph. Data is taken from Pew Research in 2010 when there were 6.9 billion people in the world.

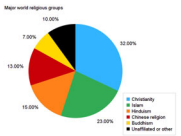


Figure 1: Major world religions. (wikimedia/Xyxyo)

a. Estimate the number of non-Christians.
b. A person is selected at random. What is the probability that they are a Muslim?
c. A person is selected at random. What is the probability that they are a Buddhist or Hindu?

16. Francine is trying to test out of Spanish class, but she has never learned any Spanish. The test has ten multiple choice questions with five choices each.
a. What is the probability that she will randomly guess all ten questions correctly?
b. What is the probability that she will guess at least one answer correctly?

17. Two cards are drawn from a standard deck of cards. What is the probability of drawing two face cards without replacement?

18. A shipment of 12 calculators contains 4 defective units. What is the probability that a school which purchases 4 calculators will receive (a) 4 good units, (b) 3 good units, and (c) at least 2 good units.

19. In a certain NASA rocket, the guidance system and its backup function 99% of the time.
a. What is the probability of both systems functioning?
b. What is the probability of both systems failing?
c. What is the probability of at least one system functioning?

20. PowerBall is a multistate lottery game. A player chooses 5 white balls from a set of 69 and 1 red ball from a set of 26. The order that the balls are chosen is not important. Find the probability of winning PowerBall.

Mixed Review

21. (10-07) How many different orders can six books be arranged on a bookshelf?

22. (10-07) How many different license plates can be made if each one is 4 letters followed by 1 number?

23. (10-06) Expand $(x - 3y)^3$.

24. (10-05) Prove $1 + 2 + 4 + 8 + \cdots + 2^{n-1} = 2^n - 1$.

25. (10-04) Evaluate $\sum_{i=1}^{10} 2^{i-1}$.

10-Review

Take this test as you would take a test in class. When you are finished, check your work against the answers. On this assignment round your answers to three decimal places unless otherwise directed.

1. Write the first four terms of the sequence $a_n = n! - n$.

Write the explicit formula for the n^{th} term.

2. 256, 192, 144, 108, …

3. 20, 14, 8, 2, …

4. $\frac{3}{1}, \frac{4}{4}, \frac{5}{9}, \frac{6}{16}$

5. Simplify $\frac{3!n!}{4!(n-2)!}$

6. The 3rd term of an arithmetic sequence is –2 and the 10th term is –16. What is the 5th term?

7. The 2nd term of a geometric sequence is 4374 and the 7th term is 576. What is the 5th term?

Find the sum. Show your work.

8. $\sum_{k=1}^{3}(k-1)^2$

9. $\sum_{n=1}^{14} 2n^3$

10. $\sum_{i=1}^{21} -3i + 1$

11. $\sum_{n=1}^{15} 3(2)^{n-1}$

12. $\sum_{n=1}^{\infty} 5\left(\frac{3}{4}\right)^{n-1}$

13. Use mathematical induction to prove the sum formula $-4 + -1 + 2 + 5 + \cdots + (3n - 7) = \frac{3}{2}n^2 - \frac{11}{2}n$

14. Use the binomial theorem to expand $(3x + 2)^4$.

15. Find the coefficient of the term x^3 in $(x + 4)^5$.

16. Evaluate ${}_8C_3$.

17. Evaluate ${}_8P_3$.

18. How many different license plates can be be made if each is 2 letters followed by 2 digits?

19. Six people are going to a concert and are sitting in the same row. Fred has a broken leg and has to sit on the aisle and one of his 2 sisters wants to sit next him. How many different sitting arrangements can there be?

20. What is the probability that you will randomly guess the answers to 4 out of 4 T/F quiz questions?

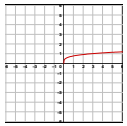
21. If two coins are flipped, what is the probability of getting 2 tails?

22. What is the probability of drawing a face card or a diamond from a standard 52-card deck?

Answers

10-01

1. $-1, -3, -5, -7, -9$
2. 2, 6, 12, 20, 30
3. $-\frac{1}{3}, \frac{1}{2}, -\frac{3}{5}, \frac{2}{3}, -\frac{5}{7}$
4. 2, 7, 17, 37, 77
5. -3, 9, 81, 6561, 43046721
6. $a_n = 4n - 3$
7. $a_n = \frac{2n-1}{2^n}$
8. $a_n = (-1)^{n-1} \cdot (n^2 + 1)$
9. $a_n = 3 \cdot 4^{n-1}$
10. $a_n = \frac{5n}{n+2}$
11. $a_1 = 5$, $a_n = -3a_{n-1}$
12. $\frac{1}{42}$
13. $(n + 1)n$
14. $120n$
15. $a_n = 2^{n-1}$; 9.22×10^{18} grains
16. $x + y = 2$
17. -3
18. $\begin{bmatrix} \frac{1}{3} & -\frac{2}{3} \\ 0 & 1 \end{bmatrix}$
19. $(0, 0), \left(\frac{3}{4}, \frac{9}{4}\right)$

20. 

10-02

1. 30
2. 95
3. $\frac{3}{5}$
4. 56
5. 189
6. 99
7. $\frac{1}{3}$
8. $\frac{5}{9}$
9. 9455
10. -805
11. 223850
12. $\sum_{i=1}^{9}(3i+2)$
13. $\sum_{i=1}^{12} i^2$
14. $\sum_{i=1}^{9} 2\cdot 3^i$
15. 2046 people
16. $a_n = 4n - 1$
17. $-4, -2, -1, -\frac{1}{2}$
18. $\left(\frac{5}{2}, \frac{1}{2}\right)$
19. $\begin{bmatrix} 1 & \frac{3}{2} & -4 \\ 0 & -\frac{1}{2} & 1 \\ 0 & 0 & 1 \end{bmatrix}$
20. 5

10-03

1. $a_n = 2n + 10$
2. $a_n = 5n + 10$
3. $a_n = 3n - 7$
4. $a_n = 11n - 3$
5. $a_n = -7n + 4$
6. $a_1 = 4$, $a_n = a_{n-1} + 6$
7. $a_1 = 25$, $a_n = a_{n-1} - 13$
8. $a_1 = -50$, $a_n = a_{n-1} + 21$
9. 126
10. 1001
11. –13300
12. 210
13. –780
14. 15250
15. $a_n = 100n$; 30 months
16. 110
17. 11050
18. 0, 2, 6, 12, 20
19. (1, 2)
20. (2, 2)

10-04

1. Take a term and divide it by the previous term.
2. Yes; $-\frac{2}{5}$
3. Yes; 6
4. $a_n = \frac{3}{2}\left(\frac{2}{3}\right)^{n-1}$; $a_1 = \frac{3}{2}, a_n = \frac{2}{3}a_{n-1}$
5. $a_n = -7(-2)^{n-1}$; $a_1 = -7, a_n = -2a_{n-1}$
6. $a_n = 8\left(\frac{5}{2}\right)^{n-1}$; $a_1 = 8, a_n = \frac{5}{2}a_{n-1}$
7. $a_n = 3\left(\frac{2}{3}\right)^{n-1}$
8. $a_n = -\frac{2}{5}(5)^{n-1}$
9. 1275
10. about 34.635
11. $\frac{1093}{2}$
12. $\frac{1031}{8}$
13. about 12.500
14. 8
15. –12
16. 88572
17. Arithmetic (because it is linear)
18. 180
19. $\sum_{n=1}^{6} 2(3)^{n-1}$
20. 4, 7, 10, 13, 16

10-05

1. $\frac{k+1}{k+4}$
2. $\frac{k^2+3k+2}{4}$
3. Show work and final step should have $k^2 + 3k + 2$
4. Show work and final step should have $\frac{5k^2+9k+4}{2}$
5. Show work and final step should have $2^{k+1} - 1$
6. Show work and final step should have $\frac{k^2+3k+2}{2}$
7. Show work and final step should have $\frac{k^3+6k^2+11k+6}{3}$
8. Show work
9. Show work
10. Show work
11. Show work
12. Show work
13. geometric because it is exponential
14. $a_n = 3^n$
15. 273

10-06

1. 3
2. 15
3. 330
4. 6435
5. 1
6. $x^3 + 15x^2 + 75x + 125$
7. $x^5 - 15x^4 + 90x^3 - 270x^2 + 405x - 243$
8. $16x^4 + 32x^3y + 24x^2y^2 + 8xy^3 + y^4$
9. $32x^5 - 400x^4y + 2000x^3y^2 - 5000x^2y^3 + 6250xy^4 - 3125y^5$
10. $729a^6 + 10206a^5b + 59535a^4b^2 + 185220a^3b^3 + 324135a^2b^4 + 302526ab^5 + 117649b^6$
11. 421724160
12. 77520
13. 11141120
14. 39191040
15. $4x^3 + 6x^2h + 4xh^2 + h^3$
16. Show work
17. Show work
18. $a_n = 512(1/2)^{n-1}$
19. 110
20. 4, 5, 7, 11, 19

10-07

1. Multiplication principle; 15
2. Addition principle; 13
3. Multiplication principle; 20
4. 72
5. 1024
6. 26000; 18720
7. 216000; 205320
8. 40320; 384
9. 360
10. 6
11. ${}_{15}P_5 = 360{,}360$
12. ${}_{20}P_6 = 27{,}907{,}200$
13. ${}_9P_3 \cdot {}_{10}P_2 = 45{,}360$
14. $\frac{10!}{2!2!3!} = 151{,}200$
15. $\frac{11!}{3!2!6!} = 4620$
16. ${}_{13}C_5 = 1287$
17. ${}_8C_3 = 56$
18. ${}_{20}C_4 = 4845$
19. ${}_8C_4 = 70$; ${}_8C_3 \cdot {}_4C_1 = 224$; ${}_8C_2 \cdot {}_4C_2 + {}_8C_3 \cdot {}_4C_1 + {}_8C_4 = 462$
20. ${}_{70}C_5 \cdot {}_{25}C_1 = 302{,}575{,}350$; ${}_{70}P_5 \cdot {}_{25}P_1 = 3.63\times10^{10}$; ${}_{70}C_6 = 131{,}115{,}985$; a lot fewer options
21. 126
22. $16x^4 + 32x^3y + 24x^2y^2 + 8xy^3 + y^4$
23. Show work and final step is $k^2 + 4k + 3$
24. $a_n = 3(-4)^{n-1}$
25. $\frac{50}{2}(-3 + 193) = 4750$

10-08

1. A compound event is 1 event with 2 accepted outcomes. Multiple events are more than one event.
2. $\frac{3}{8} = 0.375$
3. $\frac{1}{8} = 0.125$
4. $\frac{1}{2} = 0.5$
5. $\frac{1}{3} \approx 0.333$
6. $\frac{4}{13} \approx 0.308$
7. $\frac{7}{13} \approx 0.538$
8. $\frac{1}{18} \approx 0.056$
9. $\frac{8}{9} \approx 0.889$
10. $\frac{7}{80} \approx 0.088$; $\frac{7}{76} \approx 0.092$
11. $\frac{4}{25} = 0.16$; $\frac{14}{95} \approx 0.147$
12. 0.1
13. 0.77
14. 0.808; 0.438; 0.068
15. 4.69 billion; 0.23; 0.22
16. $\approx 1.02\times10^{-7}$; ≈ 0.893
17. ≈ 0.050
18. 0.141; 0.453; 0.933
19. 0.9801; 0.0001; 0.9999
20. $\frac{1}{292{,}201{,}338} \approx 3.42 \times 10^{-9}$
21. 720
22. 4,569,760
23. $x^3 - 9x^2y + 27xy^2 - 27y^3$
24. Show work and last step is $2\cdot 2^k - 1$
25. 1023

10-Review

1. 0, 0, 3, 20
2. $a_n = 256\left(\frac{3}{4}\right)^{n-1}$
3. $a_n = -6n + 26$
4. $a_n = \frac{n+2}{n^2}$
5. $\frac{n(n-1)}{4}$
6. –6
7. 1296
8. 5
9. 22,050
10. –672
11. 98,301
12. 20
13. Show work and final step is $\frac{3k^2-5k-8}{2}$
14. $81x^4 + 216x^3 + 216x^2 + 96x + 16$
15. 160
16. 56
17. 336
18. 67,600
19. 48
20. 0.0625
21. 0.25
22. ≈ 0.423