Pre-Calculus Name: _____
Chapter 11 Review Packet

The problems are numbered (*Chapter number*).(*Section number*).(*Problem number*). Refer to your text for help or to seek similar problems for extra practice. Only use a calculator when you see the calculator symbol . Unless stated otherwise, round answers to three decimal places.

Write the first four terms of the sequence.

11.1.1. $a_n = 6(-2)^{2-n}$

11.1.2. $a_n = \frac{n^2}{3n+1}$

Write the first five terms of the sequence.

11.1.3. $a_1 = -3$, $a_n = 2n - a_{n-1}$

11.1.4. $a_1 = 24$, $a_n = -\frac{1}{2}a_{n-1}$

Evaluate the expression.

11.1.5. 4!

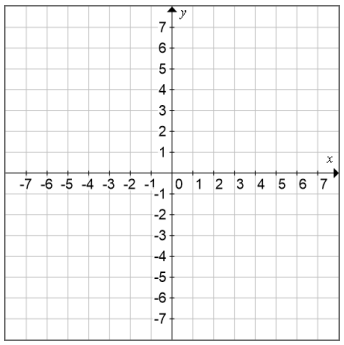
11.1.6. $\frac{48!}{50!}$

Write the first five terms of the sequence.

11.1.7. $a_n = \frac{n!}{2n}$

11.1.8. Graph the first five terms of the sequence.

$a_1 = 5$, $a_n = a_{n-1} - 3$



$a_n = a_1 + d(n - 1)$

Find the common difference for the arithmetic sequence.

11.2.1. {4, 11, 18, 25, …}

11.2.2. $\{4, \frac{5}{2}, 1, -\frac{1}{2}, \ldots\}$

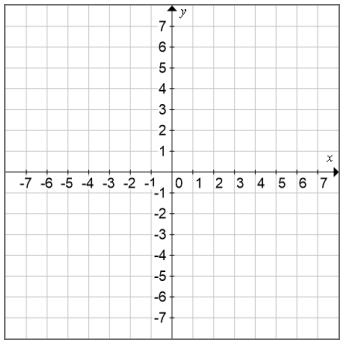
Write the first five terms of the arithmetic sequence given the first term and common difference.

11.2.3. $a_1 = -6$, $d = -9$

11.2.4. $a_1 = 11.3$, $d = 4.4$

11.2.5. Graph the first five terms of the arithmetic sequence.

$a_1 = -5,\ d = 2$



11.2.6. The first term of an arithmetic sequence is 8, and its common difference is 3. Find a_9.

□11.2.7. The first term of an arithmetic sequence is 138.4, and its common difference is −5.9. Find a_{53}.

Write an explicit formula for the arithmetic sequence.

11.2.8. {11, 2, −7, …}

11.2.9. {16.1, 17.3, 18.5, …}

Write a recursive formula for the arithmetic sequence.

11.2.10. {11, 2, −7, …}

11.2.11. {16.1, 17.3, 18.5, …}

Find the number of terms in the finite arithmetic sequence.

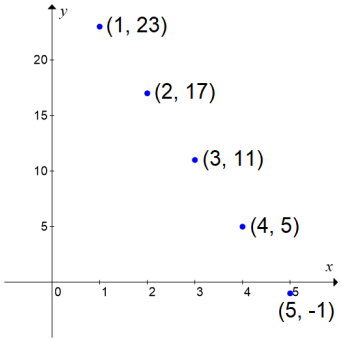
□11.2.12. $\left\{\frac{3}{7}, \frac{8}{7}, \frac{13}{7}, \cdots, 54\right\}$

□11.2.13. {232.7, 219.3, 205.9, … , −330.1}

□11.2.14. Given that an arithmetic sequence has $a_{23} = 213$ and $a_{35} = 309$, (a) find a_1, (b) find the common difference, and (c) write an explicit formula for the sequence.

□11.2.15. Given that an arithmetic sequence has $a_5 = 9$ and $a_{22} = -61.4$, (a) find a_1, (b) find the common difference, and (c) write an explicit formula for the sequence.

11.2.16. Write an explicit formula for the sequence pictured.



$a_n = a_1 r^{n-1}$

Find the common ratio for the geometric sequence.

11.3.1. {27, 36, 48, 64, …}

11.3.2. $\{20, -5, \frac{5}{4}, -\frac{5}{16}, \ldots\}$

11.3.3. Write the first five terms of the geometric sequence given that $a_1 = \frac{3}{25}$ and $r = -5$.

□11.3.4. The first term of a geometric sequence is 4,194,304 and its common ratio is $\frac{1}{4}$. Find a_9.

□11.3.5. The first term of a geometric sequence is 13 and its common ratio is −3. Find a_{12}.

Write an explicit formula for the geometric sequence.

11.3.6. $\{25, 10, 4, \frac{8}{5}, \ldots\}$

11.3.7. $\{\frac{1}{3}, -1, 3, -9, \ldots\}$

Write a recursive formula for the geometric sequence.

11.3.8. $\{25, 10, 4, \frac{8}{5}, \ldots\}$

11.3.9. $\{\frac{1}{3}, -1, 3, -9, \ldots\}$

□11.3.10. Given that a geometric sequence has $a_3 = 800$ and $a_6 = 409.6$, (a) find the common ratio, (b) find a_1, and (c) write an explicit formula for the sequence.

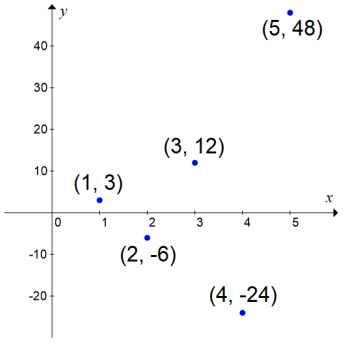
□11.3.11. Given that a geometric sequence has $a_8 = -468{,}750$ and $a_{11} = 58{,}593{,}750$, (a) find the common ratio, (b) find a_1, and (c) write an explicit formula for the sequence.

Find the number of terms in the finite geometric sequence.

□11.3.12. {5, −15, … , 2,657,205}

□11.3.13. {3000, 3300, … , 5314.683}

11.3.14. Write an explicit formula for the sequence pictured.



$S_n = \frac{n}{2}(a_1 + a_n)$ $S_n = \frac{a_1(1-r^n)}{1-r}$ $S_\infty = \frac{a_1}{1-r}$

Find the indicated sum.

11.4.1. $\sum_{i=1}^{5} (i-1)^2$

11.4.2. $\sum_{k=1}^{6} 3k - 2$

Express the arithmetic series using summation notation.

11.4.3. $37 + 32 + 27 + 22 + 17 + 12 + 7$

11.4.4. $3 + 7 + 11 + \cdots + 87$

Express the geometric series using summation notation.

11.4.5. $2 - 6 + 18 - 54 + 162 - 486$

□11.4.6. $3 + 6 + 12 + \cdots + 49{,}152$

Use the formula to find the sum of the arithmetic series.

□11.4.7. $7 + 11 + 15 + \cdots + 239$

□11.4.8. $18.3 + 16.1 + 13.9 + \cdots - 120.3$

Use the formula to find the sum of the geometric series.

□11.4.9. $7 - 14 + 28 - 56 + 112 - 224$

□11.4.10. $\frac{2}{5} + 2 + 10 + \cdots + 781{,}250$

Use the formula for the sum of a geometric series to find the indicated sum.

□11.4.11. $\sum_{i=1}^{7} 9(-4)^{i-1}$

□11.4.12. $\sum_{i=1}^{9} 5^{k-2}$

□11.4.13. Find S_8 for the geometric series $6 - 18 + 54 - \cdots$

□11.4.14. In the beginning of each year you invest $1,700 in an account which earns a 4.9% APR compounded annually. You do this each year for 30 years. How much is in your account at the end of 30 years? Round to the nearest penny.

□11.4.15. In 1997, 402 people moved into a city. Each year after that the number of people that move to the city increases by 5%. How many people move to the city over a 14-year period? Round to the nearest person.

□11.4.16. You are offered a job which pays $51,000 in the first year with a $1,600 raise each year after that. How much will you earn in total if you work at that job for 35 years?

□11.4.17. You are offered a job which pays $44,000 in the first year with a 3.9% raise each year after that. How much will you earn in total if you work at that job for 18 years? Round to the nearest penny.

11.4.18. When does an infinite geometric series converge? Answer in a complete sentence.

Determine whether the geometric series has a sum. If so, find the sum. If not, state the reason.

□11.4.19. $300 + 180 + 108 + \cdots$

□11.4.20. $5 - 10 + 20 - \cdots$

□11.4.21. Find the sum. $\sum_{k=1}^{\infty} \left(-\frac{1}{3}\right)^{k-1}$

□11.4.22. You deposit $250 at the beginning of each month into an account which earns a 3.3% APR compounded monthly. You do this for 5 years (for a total of 60 deposits). What is the value of the annuity at the end of the 5 years? Round to the nearest penny.

Answer Key

11.1.1. $-12, 6, -3, \frac{3}{2}$

11.1.2. $\frac{1}{4}, \frac{4}{7}, \frac{9}{10}, \frac{16}{13}$

11.1.3. $-3, 7, -1, 9, 1$

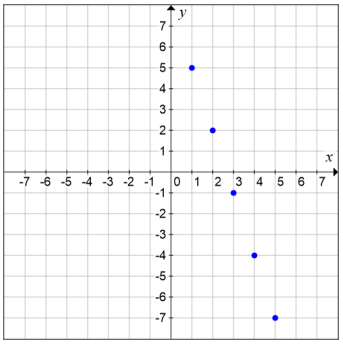
11.1.4. $24, -12, 6, -3, \frac{3}{2}$

11.1.5. 24

11.1.6. $\frac{1}{2450}$

11.1.7. $1, \frac{1}{2}, \frac{2}{3}, \frac{3}{2}, \frac{5}{24}$

11.1.8.



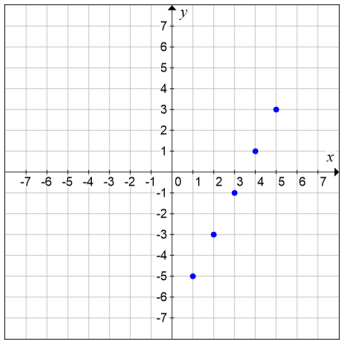
11.2.1. $d = 7$

11.2.2. $d = -\frac{3}{2}$

11.2.3. $-6, -15, -24, -33, -42$

11.2.4. 11.3, 15.7, 20.1, 24.5, 28.9

11.2.5.



11.2.6. 32

11.2.7. -168.4

11.2.8. $a_n = 11 - 9(n - 1)$

11.2.9. $a_n = 16.1 + 1.2(n - 1)$

11.2.10. $a_1 = 11, a_n = a_{n-1} - 9$

11.2.11. $a_1 = 16.1, a_n = a_{n-1} + 1.2$

11.2.12. 76 terms

11.2.13. 43 terms

11.2.14a. 37

11.2.14b. 8

11.2.14c. $a_n = 37 + 8(n - 1)$

11.2.15a. 21.8

11.2.15b. -3.2

11.2.15c. $a_n = 21.8 - 3.2(n - 1)$

11.2.16. $a_n = 23 - 6(n - 1)$

11.3.1. $\frac{4}{3}$

11.3.2. $r = -\frac{1}{4}$

11.3.3. $\frac{3}{25}, -\frac{3}{5}, 3, -15, 75$

11.3.4. 64

11.3.5. −2,302,911

11.3.6. $a_n = 25\left(\frac{2}{5}\right)^{n-1}$

11.3.7. $a_n = \left(\frac{1}{3}\right)(-3)^{n-1}$

11.3.8. $a_1 = 25,\ a_n = \frac{2}{5}a_{n-1}$

11.3.9. $a_1 = \frac{1}{3},\ a_n = -3a_{n-1}$

11.3.10a. 0.8

11.3.10b. 1,250

11.3.10c. $a_n = 1{,}250(0.8)^{n-1}$

11.3.11a. −5

11.3.11b. 6

11.3.11c. $a_n = 6(-5)^{n-1}$

11.3.12. 13 terms

11.3.13. 7 terms

11.3.14. $a_n = 3(-2)^{n-1}$

11.4.1. 30

11.4.2. 51

11.4.3. $\sum_{i=1}^{7} 37 - 5(i-1)$

11.4.4. $\sum_{i=1}^{22} 3 + 4(i-1)$

11.4.5. $\sum_{i=1}^{6} 2(-3)^{i-1}$

11.4.6. $\sum_{i=1}^{15} 3(2)^{i-1}$

11.4.7. 7,257

11.4.8. −3,264

11.4.9. −147

11.4.10. 976,562.4

11.4.11. 29,493

11.4.12. 97,656.2

11.4.13. −9,840

11.4.14. $111,025.56

11.4.15. 7,879 people

11.4.16. $2,737,000

11.4.17. $1,118,095.74

11.4.18. An infinite geometric series converges when $-1 < r < 1$.

11.4.19. 750

11.4.20. The series does not have a sum, because r is −2, which is less than −1.

11.4.21. 0.75

11.4.22. $16,328.97