Before You Choose This UExcel Exam

Uses for the Examination

• Excelsior College, the test developer, recommends granting three (3) semester hours of lower-level undergraduate credit to students who receive a letter grade of C or higher on this examination. The examination may be used to help fulfill the quantitative requirement for all Excelsior College degree programs that do not specify a higher level of math.

• Other colleges and universities also recognize this exam as a basis for granting credit or advanced standing.

• Individual institutions set their own policies for the amount of credit awarded and the minimum acceptable score.

Exam-takers enrolled in an Excelsior College degree program should ask their academic advisor where this exam fits within their degree program.

Exam-takers not enrolled in an Excelsior College degree program should check with the institution from which they wish to receive credit to determine whether credit will be granted and/or to find out the minimum grade required for credit. Those who intend to enroll in an Excelsior College degree program should ask an admissions counselor where this exam fits within their intended degree program.

Examination Length and Scoring

The examination consists of approximately 60 questions, most of which are multiple choice; for samples of all the item types on this exam, see the sample items in the back of this guide. Some items are unscored, pretest items. The pretest items are embedded throughout the exam and are indistinguishable from the scored items. You will have two (2) hours to complete the examination. Your score will be reported as a letter grade.

UExcel Exam Resources

Excelsior College Bookstore

The Excelsior College Bookstore offers recommended textbooks and other resources to help you prepare for UExcel exams.

The bookstore is available online at (login required): www.excelsior.edu/bookstore

UExcel Practice Exams

The official UExcel practice exams are highly recommended as part of your study plan. Once you register for your UExcel exam, you are eligible to purchase the corresponding practice exam, which can be taken using any computer with a supported Web browser. Each practice exam includes two forms that you may take within a 180-day period.
Excelsior College Library

Enrolled Excelsior College students can access millions of authoritative resources online through the Excelsior College Library. Created through our partnership with the Sheridan Libraries of The Johns Hopkins University, the library provides access to journal articles, books, websites, databases, reference services, and many other resources. Special library pages relate to the nursing degree exams and other selected exams. To access it, visit www.excelsior.edu/library (login is required).

Our library provides:
- 24/7 availability
- The world’s most current authoritative resources
- Help and support from staff librarians

Online Tutoring

Excelsior College offers online tutoring through SMARTTHINKING™ to connect with tutors who have been trained in a variety of academic subjects. To access SMARTTHINKING, go to www.excelsior.edu/smarthinking. Once there, you may download a copy of the SMARTTHINKING Student Handbook as a PDF.

Preparing for UExcel Exams

Take Charge of Your Own Learning

At Excelsior College, independent, self-directed study supported by resources we help you find is not a new concept. We have always stressed to exam takers that they are acting as their own teacher, and that they should spend as much time studying for an exam as they would spend in a classroom and on homework for a corresponding college course in the same subject area.

Begin by studying the content outline contained in this content guide, at its most detailed level. You will see exactly which topics are covered, and where chapters on those topics can be found in the Recommended Resources. You will see exactly where you might need to augment your knowledge or change your approach.

The content outline, along with the Learning Outcomes for this exam and recommended textbooks, will serve as your primary resources.

How Long Will It Take Me to Study?

A UExcel exam enables you to show that you’ve learned material comparable to one or more 15-week college-level courses. As an independent learner, you should study and review as much as you would for a college course. For a 3-credit course in a subject they don’t know, most students would be expected to study nine hours per week for 15 weeks, for a total of 135 hours.

Study Tips

Become an active user of the resource materials. Aim for understanding rather than memorization. The more active you are when you study, the more likely you will be to retain, understand, and apply the information.

The following techniques are generally considered to be active learning:
- preview or survey each chapter
- highlight or underline text you believe is important
- write questions or comments in the margins
- practice re-stating content in your own words
- relate what you are reading to the chapter title, section headings, and other organizing elements of the textbook
- find ways to engage your eyes, your ears, and your muscles, as well as your brain, in your studies
- study with a partner or a small group (if you are an enrolled student, search for partners on MyExcelsior Community)
- prepare your review notes as flashcards or create recordings that you can use while commuting or exercising

When you feel confident that you understand a content area, review what you have learned. Take a second look at the material to evaluate your understanding. If you have a study partner, the two of you can review by explaining the content to each other or writing test questions for each other to answer. Review questions from textbook chapters may be helpful for partner or individual study, as well.

Using UExcel Practice Exams

We recommend taking the first form of the practice exam when you begin studying, to see how much you already know. After taking the first practice exam, check your performance on each question and find out
Preparing for This Exam

Prior Knowledge

A knowledge of arithmetic and elementary algebra is assumed.

Using the Content Outline

Each content area in the outline includes (1) the recommended minimum hours of study to devote to that content area and (2) the most important sections of the recommended resources for that area. These annotations are not intended to be comprehensive. You may need to refer to other chapters in the recommended textbooks. Chapter numbers and titles may differ in other editions.

This content outline contains examples of the types of information you should study. Although these examples are numerous, do not assume that everything on the exam will come from these examples. Conversely, do not expect that every detail you study will appear on the exam. Any exam is only a broad sample of all the questions that could be asked about the subject matter.

Using the Sample Questions and Rationales

Each content guide provides sample questions to illustrate those typically found on the exam. These questions are intended to give you an idea of the level of knowledge expected and the way questions are typically phrased. The sample questions do not sample the entire content of the exam and are not intended to serve as an entire practice test.

Recommended Resources for the UExcel Exam in Contemporary Mathematics

The resources and materials listed below were used by the examination development committee to verify all the questions on the exam. Excelsior College recommends you use these resources as the most appropriate information when ordering textbooks.
from the college’s bookstore (see page 1 of this content guide). You should allow ample time to obtain resources and to study sufficiently before taking the exam, so plan appropriately and systematically.

A word about textbook editions: Textbook editions listed in the UExcel content guides may not be the same as those listed in the bookstore. Textbook editions may not exactly match up in terms of table of contents and organization, depending upon the edition. However, our team of exam developers checks exam content against every new textbook edition to verify that all subject areas tested in the exam are still adequately available in the study materials. If needed, exam developers will list supplemental resources to ensure that all topics in the exam are still sufficiently covered. Public libraries may have the textbooks you need, or may be able to obtain them for you through interlibrary loan to reduce textbook costs. You may also consider financial aid, if you qualify, to further help defray the steep cost of textbooks. A section on OER has been included in this guide to help you locate additional resources to augment your study.

Textbook

Material on this exam has been drawn from chapters of two different textbooks to achieve the desired content coverage. This material is available in a single custom text (including an e-text format) from the Excelsior College Bookstore:


The custom text includes both the chapter content and material like worked solutions that would usually require the purchase of a supplementary workbook. If you choose not to purchase the custom text, you will need to access both of the following texts during your preparation for the exam:


Reducing Textbook Costs

Many students know it is less expensive to buy a used textbook, and buying a previous edition is also an option. The Excelsior College bookstore includes a buyback feature and a used book marketplace, as well as the ability to rent digital versions of textbooks for as long as students need them. Students are encouraged to explore these and the many other opportunities available online to help defray textbook costs.

A Word About Open Educational Resources

Open educational resources (OER) are educational materials available for study at no cost on the Web. Some OER are available for anyone to access any time. Others, such as Massive Open Online Courses (MOOCs), require sign-up and are only available during certain windows. Please note that some MOOC providers offer certificates of completion or other products or services for a fee. No MOOC or other OER is a complete substitute for the content guide and officially Recommended Resources listed here in this content guide. However, by definition, MOOCs are essentially free of charge and include access to a main body of learning materials that may help you in your learning.

Being an independent learner preparing for credit by exam, you may not need any of the fee-based options that are offered elsewhere online. But if you are looking for a coherent academic course for self-study, lectures on specific topics, or audio or visual materials that fit your learning style better than print materials alone, a MOOC or other type of OER may be your answer. Keep in mind that none of these OER were designed by Excelsior, nor are they guaranteed to match the exam content outlines completely. They are simply another tool available in your study kit.

We highly encourage using the Recommended Resources. In the content outline, you will see that the topics in the exam are referenced to specific portions of recommended textbooks. Using OER alone will not ensure you’ve completely covered the content in the exam, or it may not cover some topics in sufficient-enough depth without the use of the formal, recommended textbooks.

If the OER course you choose does not include a textbook for reference and you do not have significant practical theory-based experience in the field of study, use a college textbook to ensure adequate preparation for the exam, and use the exam’s content outline as a guide.

Combined with comparable college textbooks, OER provides you with a variety of choices in knowledge sources and learning experiences, to enhance your understanding of the subject matter.
Choosing Open Educational Resources

Most sites for university-based OER can be searched through www.ocwconsortium.org and/or www.oercommons.org.

Sites that specialize in Web courses designed by college professors under contract with the website sponsor, rather than in Web versions of existing college courses, include:

www.education-portal.com
www.opencourselibrary.org (abbreviated as OCL)

We have included specific courses that cover material for one or more UExcel® exams from the sites in the listings above. It’s worth checking these sites frequently to see if new courses have been added that may be more appropriate or may cover an exam topic not currently listed.

In addition, sites like Khan Academy (www.khanacademy.com) and iTunes U feature relatively brief lessons on very specific topics rather than full courses. Full courses are also available on iTunes U (http://www.apple.com/education/ipad/itunes-u/). We have chosen a few courses and collections for this listing.

Other Online Resources

This section of the OER Guide is provided to allow learners to independently search for resources. Send an e-mail to OER@excelsior.edu if you have questions about a resource’s credibility.

Open Online Textbooks

Boundless open textbooks
https://www.boundless.com/open-textbooks/

BookBoon
http://bookboon.com/en/textbooks-ebooks

Flatworld Knowledge
http://catalog.flatworldknowledge.com/#our-catalog

College Readiness

Khan Academy
http://www.khanacademy.org/

Hippocampus
http://www.hippocampus.org/

Open Course Library
http://opencourselibrary.org/collg-110-college-success-course/

Study Aids

Education Portal
http://education-portal.com/

Khan Academy
http://www.khanacademy.org/

Annenberg Learner
http://www.learner.org/

OpenCourseWare
http://ocwconsortium.org/en/courses/search

OER Commons
http://www.oercommons.org/

Open Course Library
http://www.opencourselibrary.org/
General Description of the Examination

The UExcel Contemporary Mathematics examination is based on material typically taught in a one-semester, three-credit, lower-level course in applied mathematics. The content of the examination corresponds to course offerings such as Mathematics in Contemporary Society, Liberal Arts Math, or Math for Non-STEM (science, technology, engineering, and mathematics) Majors.

The examination measures the ability to apply mathematical knowledge and concepts to understand and analyze practical contemporary mathematical problems. Specifically, the exam covers graph theory, mathematical reasoning, statistics, and probability, and the application of mathematics to politics.

Those beginning to study for this exam should be familiar with arithmetic and elementary algebra.

Learning Outcomes

After you have successfully worked your way through the recommended study materials, you should be able to demonstrate the following learning outcomes:

1. Understand voting and apportionment using mathematical principles.
2. Demonstrate a basic understanding of statistical concepts.
3. Analyze data statistically.
4. Calculate simple probabilities.
5. Reason mathematically.
6. Explain and understand graphs, paths, and circuits.
Content Outline

The content outline describes the various areas of the test, similar to the way a syllabus outlines a course. To fully prepare requires self-direction and discipline. Study involves careful reading, reflection, and systematic review.

The major content areas on the Contemporary Mathematics examination, the percent of the examination, and the hours to devote to each content area are listed below.

<table>
<thead>
<tr>
<th>Content Area</th>
<th>Percent of the Examination</th>
<th>Hours of Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. Mathematical Reasoning</td>
<td>25%</td>
<td>34</td>
</tr>
<tr>
<td>II. Probability and Statistics</td>
<td>30%</td>
<td>41</td>
</tr>
<tr>
<td>III. Mathematics and Politics</td>
<td>20%</td>
<td>27</td>
</tr>
<tr>
<td>IV. Graph Theory</td>
<td>25%</td>
<td>34</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100%</strong></td>
<td></td>
</tr>
</tbody>
</table>

NOTE: Occasionally, examples will be listed for a content topic to help clarify that topic. However, the content of the examination is not limited to the specific examples given.

I. Mathematical Reasoning

25 PERCENT OF EXAM  | 34 HOURS OF STUDY

Custom Ch. 11 and 12, Problem Solving and Critical Thinking (Blitzer Ch. 1)

Custom Ch. 13 and 14, Logic (Blitzer Ch. 3)

A. Thinking critically
   1. Inductive reasoning
   2. Deductive reasoning
   3. Connective reasoning

B. Problem solving
   1. Problem solving techniques
      a. Polya’s four steps

II. Probability and Statistics

30 PERCENT OF EXAM  | 41 HOURS OF STUDY

Custom Ch. 15 and 16, Counting Methods and Probability Theory (Blitzer Ch. 11)

Custom Ch. 9 and 10, Descriptive Statistics and Ch. 19 and 20, Statistics (Blitzer Ch. 12)

A. Statistics
   1. Sampling
      a. Random samples
   2. Frequency distributions
   3. Histograms
   4. Measures of central tendency
      a. Mean
      b. Median
      c. Mode
   5. Measures of dispersion
a. Range
b. Variance
c. Standard deviation
d. Percentiles
e. Quartiles
6. Normal distribution

B. Probability
1. Counting
2. Permutations
3. Combinations
4. Simple probability
   a. Sample space
   b. Events
5. Dependence and independence
6. Expected value

III. Mathematics and Politics

20 PERCENT OF EXAM | 27 HOURS OF STUDY

Custom Ch. 1 and 2, The Mathematics of Voting
(Tannenbaum Ch. 1)

Custom Ch. 3 and 4, The Mathematics of Apportionment
(Tannenbaum Ch. 4)

Custom Ch. 17 and 18, Voting and Apportionment
(Blitzer Ch. 14)

A. Voting
1. Preference ballots
2. Preference schedules
3. Plurality method
4. Borda count method
5. Plurality-with-elimination method
6. Pairwise comparison method
7. Flaws in all voting methods
   a. Majority criterion
   b. Condorcet criterion
   c. Monotonicity criterion
   d. Independent of irrelevant alternatives
8. Belinski and Young

B. Apportionment
1. The problem of apportionment
2. Hamilton’s method
3. Jefferson’s method
4. Adams’ method
5. Webster’s method
6. Huntington-Hill method
7. Paradoxes and flaws
   a. Alabama
   b. New states
   c. Population paradox
   d. Quota rule

IV. Graph Theory

25 PERCENT OF EXAM | 34 HOURS OF STUDY

Custom Ch. 5 and 6, The Mathematics of Getting Around
(Tannenbaum Ch. 5)

Custom Ch. 7 and 8, The Mathematics of Touring
(Tannenbaum Ch. 6)

Custom Ch. 21 and 22, Graph Theory (Blitzer Ch. 15)

A. Graphs, paths, and circuits
1. Definitions and graph theory
2. Modeling
   a. Delivering the mail
   b. Travelling salesman
   c. The seven bridges of Königsberg

B. Euler paths and Euler circuits
1. The degree of vertex
2. Euler’s theorem
3. Fleury’s algorithm

C. Hamilton paths and Hamilton circuits
1. Travelling salesman problem
2. Weighted graph
3. Methods of finding the most efficient circuit
a. Nearest neighbor
b. Brute force
c. Cheapest link
Sample Questions

The sample questions give you an idea of the level of knowledge expected in the exam and how questions are typically phrased. They are not representative of the entire content of the exam and are not intended to serve as a practice test.

Rationales for the questions can be found on pages 13–15 of this guide. In that section, the correct answer is identified and each answer is explained. The number in parentheses at the beginning of each rationale refers to the corresponding section of the content outline. For any questions you answer incorrectly, return to that section of the content outline for further study. You will be provided with an erasable white board to use during your exam. During your exam, a basic 8-function calculator will also be available on your computer. A typical calculator is illustrated on page 16.

The calculator button is in the top left hand corner of the page as each question is presented.

1. What is the next number in this pattern?
   8, 15, 29, 57, 113
   1) 191
   2) 197
   3) 213
   4) 225

2. Let $p$ and $q$ represent the following simple statements:
   $p$: Dogs bark.
   $q$: Cats meow.

   Which corresponds to the symbolic statement $\neg p \lor q$?
   1) Dogs do not bark or cats meow.
   2) Dogs bark or cats do not meow.
   3) Dogs bark or cats meow.
   4) Dogs do not bark or cats do not meow.

3. In one game, a basketball team took 95 shots. The team made 12 of its 15 free-throw attempts (worth one point each), 30 out of 68 two-point shot attempts, and 5 out of 12 three-point shot attempts. Which piece of information is unnecessary in determining the number of points the team scored?
   (Select the 2 that apply.)
   1) the number of two-point shots made
   2) the number of shots taken
   3) the number of shots made
   4) the number of three-points shots made
   5) the number of free-throw attempts made

4. If the US population increases by one percentage point per year and the population is currently 310,000,000, what will the population be in two years?
   1) 312,000,000
   2) 312,231,000
   3) 316,200,000
   4) 316,231,000
5. What is the median of the following data set?
14, 26, 13, 11, 0, 0, 35, 39
1) 13.5
2) 17.2
3) 20
4) 23

6. Consider the following array of scores on a standardized test:
390 410 440 450 460 490
530 570 590 600 640 670
710
The 15th percentile is given by which score?
1) 400
2) 410
3) 420
4) 430

7. How many pairs of items can be created by choosing one item from a group of \( M \) items and one item from a group of \( N \) items?
1) \( M + N \)
2) \( M \times N \)
3) \( M^C_N \)
4) \( M^P_N \)

8. What is \( 200! / 198! \)?
1) 37,800
2) 39,600
3) 39,800
4) 40,200

9. What is the probability that, of two people selected at random, at least one was born on a Friday?
1) \( 1 ÷ 7 \)
2) \( 2 ÷ 7 \)
3) \( 11 ÷ 49 \)
4) \( 13 ÷ 49 \)

10. A basketball player makes 20% of her three-point shots and 40% of her two-point shots. Based on this information, what is the expected value of one shot?
1) 0.8 points
2) 1 point
3) 1.2 points
4) 1.4 points

11. Four people are voting for the type of beverage to be served at a picnic. The choices are cola, ginger ale, and iced tea. Which could be among the valid preference ballots for this vote?
(Select the 2 that apply.)
1) Ballot Ballot Ballot Ballot
   1st Cola 1st Cola 1st Ginger ale 1st Iced tea
   2nd Iced tea 2nd Ginger ale 2nd Cola 2nd Ginger ale
   3rd Ginger ale 3rd Iced tea 3rd Iced tea 3rd Ginger ale
2) Ballot Ballot Ballot Ballot
   1st Iced tea 1st Cola 1st Cola 1st Iced tea
   2nd Ginger ale 2nd Ginger ale 2nd Ginger ale 2nd Ginger ale
   3rd Cola 3rd Iced tea 3rd Iced tea 3rd Ginger ale
3) Ballot Ballot Ballot Ballot
   1st Iced tea 1st Cola 1st Cola 1st Iced tea
   2nd Ginger ale 2nd Ginger ale 2nd Ginger ale 2nd Ginger ale
   3rd Cola 3rd Iced tea 3rd Iced tea 3rd Ginger ale
4) Ballot Ballot Ballot Ballot
   2nd Cola 3rd Cola 3rd Cola 2nd Cola
   1st Iced tea 2nd Iced tea 2nd Iced tea 2nd Iced tea
   3rd Ginger ale 1st Ginger ale 3rd Ginger ale 3rd Ginger ale
5) Ballot Ballot Ballot Ballot
   1st Cola 2nd Cola 1st Cola 2nd Cola
   3rd Ginger ale 3rd Iced tea 2nd Iced tea 1st Iced tea
   2nd Iced tea 1st Ginger ale 1st Ginger ale 3rd Ginger ale

12. The members of a class are holding an election to choose among four choices for a field trip. Their preference schedule is shown below:

<table>
<thead>
<tr>
<th>Number of votes</th>
<th>9</th>
<th>8</th>
<th>6</th>
<th>3</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st choice</td>
<td>Zoo</td>
<td>Museum</td>
<td>Museum</td>
<td>Farm</td>
<td>Farm</td>
</tr>
<tr>
<td>2nd choice</td>
<td>Park</td>
<td>Park</td>
<td>Park</td>
<td>Zoo</td>
<td>Museum</td>
</tr>
<tr>
<td>3rd choice</td>
<td>Farm</td>
<td>Zoo</td>
<td>Farm</td>
<td>Park</td>
<td>Park</td>
</tr>
<tr>
<td>4th choice</td>
<td>Museum</td>
<td>Farm</td>
<td>Zoo</td>
<td>Museum</td>
<td>Zoo</td>
</tr>
</tbody>
</table>

Using the Borda count method, which is the winning choice?
1) farm
2) museum
3) park
4) zoo
13. If a candidate wins an election and in a recount, one of the losing candidates withdraws, then the original winner should still win the election. This describes which voting criterion?

1) majority
2) Condorcet
3) monotonicity
4) independence-of-irrelevant-alternatives

14. Which method of apportionment might produce the Alabama paradox?

1) Adams’s
2) Hamilton’s
3) Jefferson’s
4) Webster’s

15. Which vertices have a degree of 3?

(Select the 3 that apply.)

1) A
2) B
3) C
4) E
5) G

16. Which graph has at least one Euler circuit?

1) 

17. What is the total weight of the Hamilton circuit D, B, E, C, A, D?

1) 313
2) 334
3) 344
4) 356

18. The chart below shows the distances between four cities, A, B, C, and D:

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>*</td>
<td>12</td>
<td>3</td>
<td>8</td>
</tr>
<tr>
<td>B</td>
<td>12</td>
<td>*</td>
<td>10</td>
<td>6</td>
</tr>
<tr>
<td>C</td>
<td>3</td>
<td>10</td>
<td>*</td>
<td>7</td>
</tr>
<tr>
<td>D</td>
<td>8</td>
<td>6</td>
<td>7</td>
<td>*</td>
</tr>
</tbody>
</table>

Using the nearest neighbor method starting at A, what is the total distance for the Hamilton circuit obtained?

1) 24
2) 27
3) 28
4) 37
**SECTION FOUR**

**Rationales**

1. (IA1)
   1) See 4).
   2) See 4).
   3) See 4).
   *4) To determine the next number in the sequence, take the previous number, double it, and subtract one. Therefore $113 \times 2 - 1 = 225$.

2. (IA3)
   *1) This is correct for $\neg p \lor q$.
   2) This would be $p \lor \neg q$.
   3) This would be $\neg(p \lor q)$.
   4) This would be $\neg p \lor \neg q$.

3. (IB1)
   1) This must be known in order to calculate the total number of points scored by the team.
   *2) It is not necessary to know the number of shots taken to calculate the number of points scored by the team.
   *3) It is not necessary to know the number of shots made, separate from knowing how much each shot was worth.
   4) See 1).
   5) See 1).

4. (IB3)
   1) This would be the population if it increased by one million per year.
   2) See 4).
   3) This would be the population if it increased by two percentage points every two years.
   *4) $310 \text{ million} \times 1.01 = 313.1 \text{ million}$ and $313.1 \text{ million} \times 1.01 = 316.231 \text{ million}$.

5. (IIA4b)
   *1) There are 8 data points. Arrange them in order.
   The median is the sum of the fourth and fifth values divided by 2 = 13.5.
   2) This is the mean ($138 \div 8 = 17.2$).
   3) This is an incorrect value.
   4) This is $138$ divided by 6 (using only the nonzero values).

6. (IIA5d)
   1) See 2).
   *2) There are 13 scores. Therefore, the locator for the 15th percentile is $(0.15) \times 13 = 1.95$. Because this is not a whole number, we round it up to 2. Thus, the 15th percentile is given by the second score, which is 410.
   3) See 2).
   4) See 2).

*correct answer
7. (IIB1)
   1) This would result from using the fundamental counting theorem as additive instead of multiplicative.
   2) \( M \times N \) is the correct answer according to the fundamental counting theorem.
   3) This would result from confusing the fundamental counting theorem with combinations.
   4) This would result from confusing the fundamental counting theorem with permutations.

8. (IIB2)
   1) \( 37,800 = 200 \times 189 \), which could be the result of a typo in computation.
   2) \( 39,600 = 200 \times 198 \), a mistake a person in a hurry might make by misreading the problem.
   3) \( \frac{200!}{199!} = \frac{200 \times 199 \times 198!}{198!} = 200 \times 199 = 39,800 \)
   4) \( 40,200 = 200 \times 201 \)

9. (IIB4)
   1) See 4).
   2) See 4).
   3) See 4).
   4) In the sample space of 49 combinations, there are 7 in which the first person was born on Friday plus seven more in which the second person was born on Friday, minus one if they were both born on Friday. Therefore, the probability is \( \frac{13}{49} \).

10. (IIB6)
   1) See 4).
   2) See 4).
   3) See 4).
   4) \( .20 \times 3 + .40 \times 2 = 1.4 \) points

11. (IIIA1)
   1) This is wrong because there are five ballots, not four.
   2) This is not a linear preference ballot because cola does not appear on the last ballot.
   3) This is a valid preference ballot for four voters and three choices.
   4) This is wrong because no beverage is in first place.
   5) See 3).

12. (IIIA4)
   1) The Farm comes in last with only 54 points.
   2) The Museum is the majority winner, but by the Borda count method, it comes in second place with 71 points.
   3) The Park is the winner by the Borda count method, with 77 points.
   4) The Zoo appears first, winning the most common ballot, but it has only 68 points.

13. (IIIA7d)
   1) See 4).
   2) See 4).
   3) See 4).
   4) This is a description of the independence-of-irrelevant-alternatives criterion because the elimination of a non-winning candidate should not logically affect the top vote getter.

14. (IIIB7a)
   1) See 2).
   2) There is a flaw in Hamilton’s math. When the number of seats is increased, each state’s standard quota goes up, but not by the same amount. As the remainders change, some states can move ahead of others in the priority order for the surplus seats. This can result in a state losing a seat it already had.
   3) See 2).
   4) See 2).

*correct answer
15. (IVB)
   1) Vertex A has degree 2.
   2) Vertex B has degree 2.
   *3) Vertex C has degree 3.
   *4) Vertex E has degree 3.
   *5) Vertex G has degree 3.

16. (IVB1)
   1) There is no Euler circuit.
   2) See 1).
   *3) A, B, C, A, D, E, A is an Euler circuit.
   4) See 1).

17. (IVC2)
   1) See 3).
   2) See 3).
   *3) DB = 72; BE = 90; EC = 72; CA = 55; AE = 50
   4) See 3).

18. (IVC3a)
   1) See 3).
   2) See 3).
   *3) For path A, C, D, B, A, the total weight is 
       \[ 3 + 7 + 6 + 12 = 28. \]
   4) See 3).
Registering for Your Exam

www.excelsior.edu/examregistration
Follow the instructions and pay by Visa, MasterCard, American Express, or Discover Card.

Examination Administration

Pearson Testing Centers serve as the administrator for all Excelsior College computer-delivered exams. The Disability Services office at Excelsior College is responsible for considering requests for reasonable accommodations (exceptions for individual students with documented disabilities). If you are requesting an accommodation due to a disability, download and complete a Request for Accommodation form that can be accessed by visiting the Excelsior College website at www.excelsior.edu/disability-services.

Computer-Delivered Testing

You will take the exam by computer, entering your answers using either the keyboard or the mouse. The system is designed to be as user-friendly as possible, even for those with little or no computer experience. On-screen instructions are similar to those you would see in a paper examination booklet.

Before taking your exam, we strongly encourage you to go on a virtual tour of the testing center. To access this tour, click the What to Expect in a Pearson VUE test center at the following link: home.pearsonvue.com/test-taker/security.aspx

You also will receive a small, erasable whiteboard if you need one. You may not take your own calculator, if the exam calls for it. One will be provided on the testing screen. See example below

On the Day of Your Exam

Important Reminders

On the day of your exam, remember to:

• dress comfortably: the computer will not mind that you’re wearing your favorite relaxation outfit

• arrive at the test site rested and prepared to concentrate for an extended period

• allow sufficient time to travel, park, and locate the test center

• be prepared for possible variations in temperature at the test center due to weather changes or energy conservation measures
• bring your ID, but otherwise, don’t weigh yourself down with belongings that will have to be kept in a locker during the test.

**Academic Honesty Nondisclosure Statement**

• All test takers must agree to the terms of the Excelsior College Academic Honesty Policy before taking an examination. The agreement will be presented on screen at the Pearson VUE Testing Center before the start of your exam.

• Once the test taker agrees to the terms of the Academic Honesty Nondisclosure Statement, the exam will begin.

If you choose not to accept the terms of the agreement

• your exam will be terminated

• you will be required to leave the testing center

• you will not be eligible for a refund. For more information, review the Student Policy Handbook at [www.excelsior.edu/studentpolicyhandbook](http://www.excelsior.edu/studentpolicyhandbook).

Student behavior is monitored during and after the exam. Electronic measures are used to monitor the security of test items and scan for illegal use of intellectual property. This monitoring includes surveillance of Internet chat rooms, websites, and other public forums.

**Information About UExcel Exams for Colleges and Universities**

A committee of teaching faculty and practicing professionals determines the learning outcomes to be tested on each exam. Excelsior College Center for Educational Measurement staff oversee the technical aspects of test construction in accordance with current professional standards. To promote fairness in testing, we take special care to ensure that the language used in the exams and related materials is consistent, professional, and user friendly. Editorial staff perform systematic quantitative and qualitative reviews to ensure accuracy, clarity, and compliance with conventions of bias-free language usage.

Excelsior College, the test developer, recommends granting three (3) semester hours of lower-level undergraduate credit to students who receive a letter grade of C or higher on this examination. The examination may be used to help fulfill the quantitative requirement for all Excelsior College degree programs that do not specify a higher level of math. Other colleges and universities also recognize this exam as a basis for granting credit or advanced standing. Individual institutions set their own policies for the amount of credit awarded and the minimum acceptable score.

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