
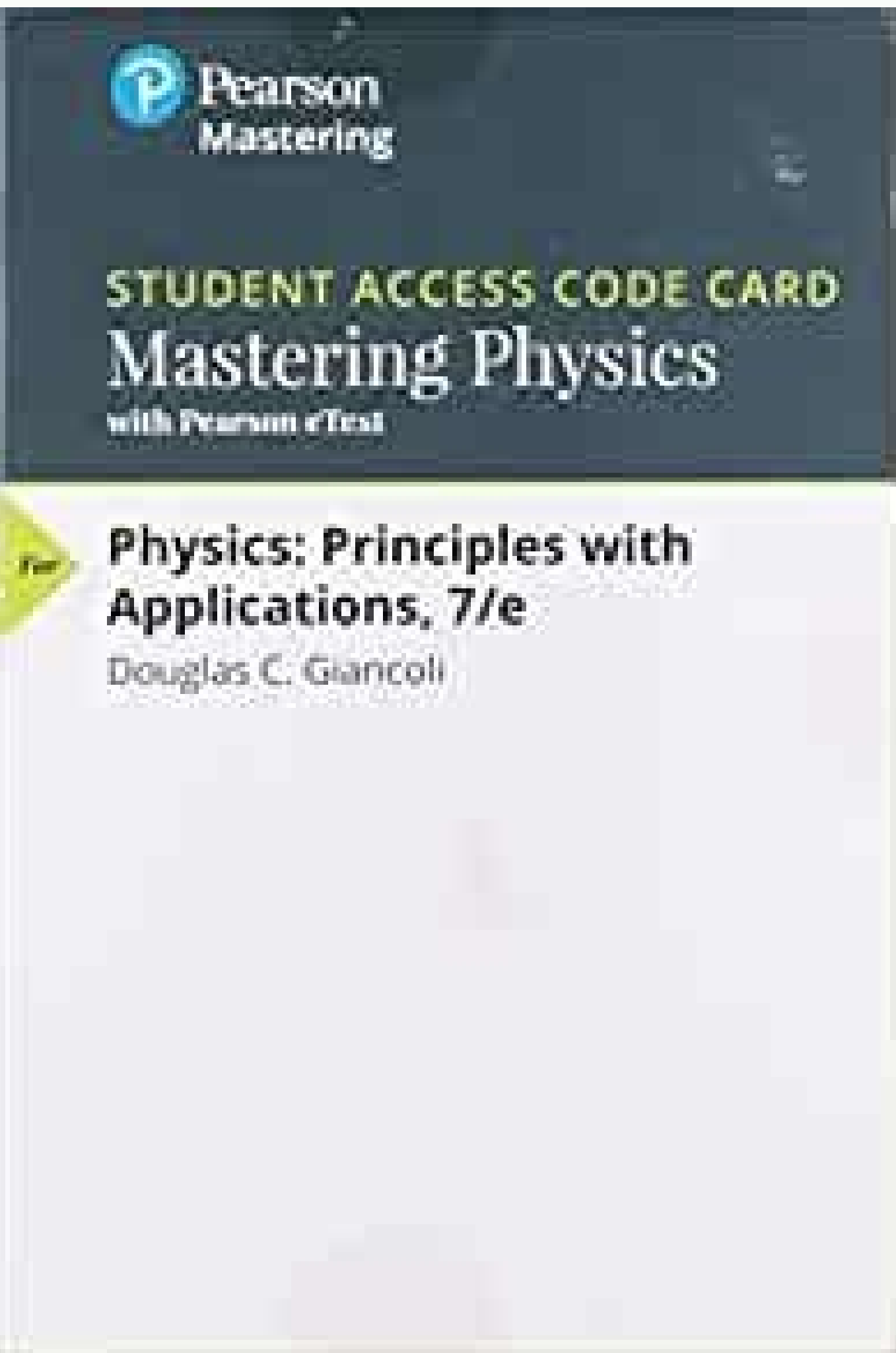
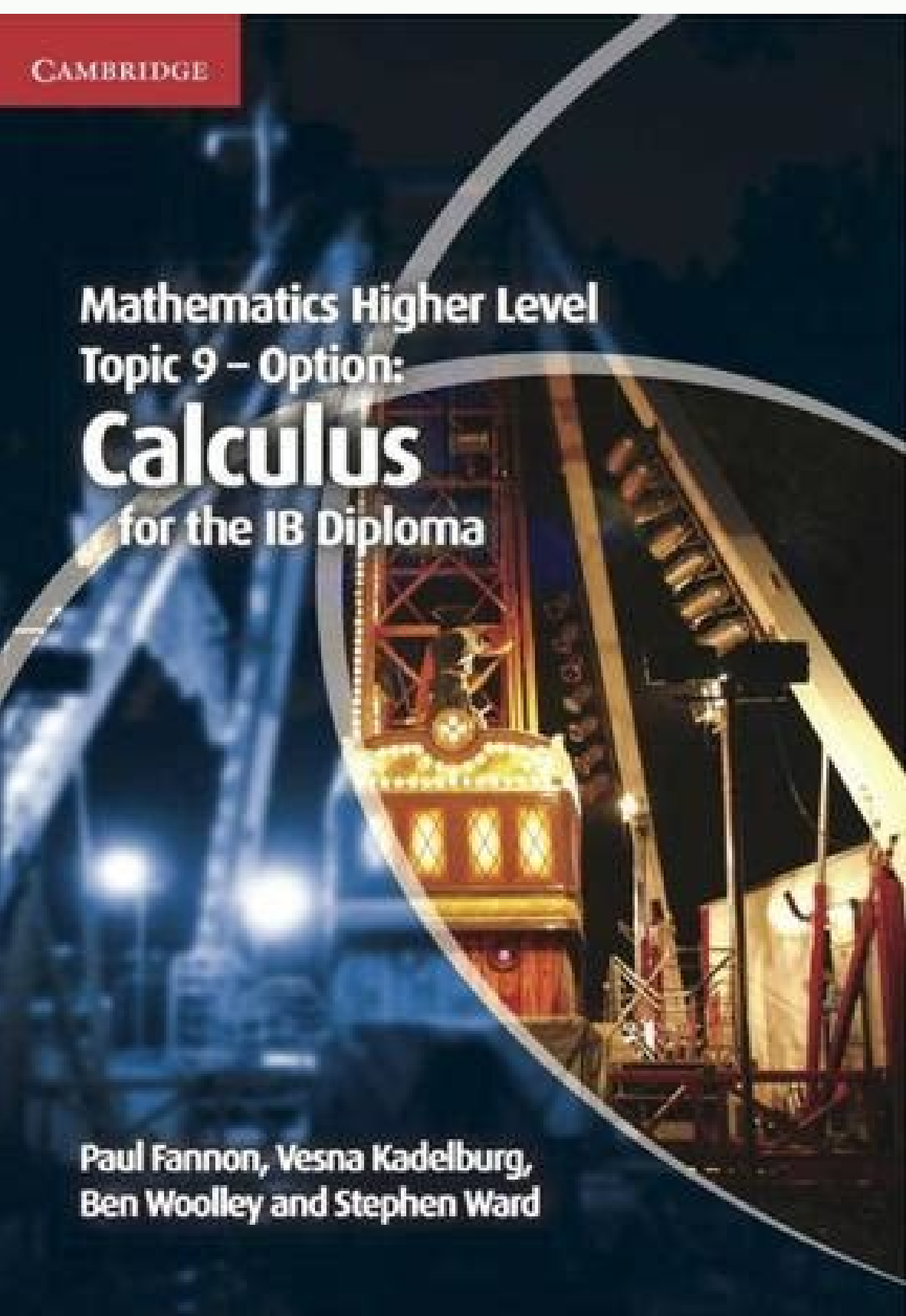


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FUNCTIONS

A. A function is a relation in which each element of the domain (x value - independent variable) is paired with only one element of the range (y value - dependent variable).

B. A relation can be tested to see if it is a function by the vertical line test. Draw a vertical line through any graph, and if it hits an x-value more than once, it is not a function. (1-4)

C. Linear functions take the form: $f(x) = mx + b$, or $y = mx + b$ where $m =$ the slope, and $b =$ the y-intercept.
 Example 1: $f(x) = 4x - 1$, the slope is 4 (rise over run), and the y-intercept is -1.

D. The distance between two points on a line can be found using the distance formula, $d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$.

E. The mid-point of a line segment can be found using the mid-point formula, $\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$.

F. The standard form of a linear function is $f(x) = Ax + By + C$. The slope is $m = -A/B$, and the y-intercept is $-C/B$.

G. The zeros of a function are found by setting y to 0, and solving for x .

Example 1: $f(x) = 4x - 1$ (5)
 Example 2: $f(x) = 4$, this function has no zeros, and is a horizontal line through 4 on the y-axis. (6)
 Example 3: $f(x) = x + 4$, this is not a function, because there is a vertical line through 4 on the x-axis, giving an infinite set of values for y . (7)

H. Polynomial functions take the form: $f(x) = ax^n + bx^{n-1} + \dots + cx + d$.

- When the highest power of the function is an odd integer, there is at least one real zero.
- When the highest power is an even integer, there may be no real zeros.
- Both types can have imaginary roots of the form $a + bi$.
- The highest power of a polynomial with one variable is called its degree.

Example 1: $f(x) = 2x^3 + x^2 + x + 8$, has a degree of 4, there are four roots (real and imaginary) to this polynomial.
 Example 2: $f(x) = 2x^2 + x^2 - 2x + 3$, this function has one real zero at $x = -1.17$, and 2 non-real roots. (8)
 Example 3: $f(x) = x^2 + 1$, this function has 2 non-real roots. (9)

I. Quadratic functions take the form: $f(x) = ax^2 + bx + c$.

- The graph of a quadratic function is called a parabola. (10)
- Some parabolas are quadratic equations, but not quadratic functions. (11)
- Quadratic functions or equations can have one real solution, two real solutions, or no real solutions. (12-14)
- The vertex of a parabola is called its critical point.
- The quadratic equation $f(x) = -b \pm \sqrt{b^2 - 4ac}$ can be used to find the roots of all quadratic equations.
- The value under the square root symbol is called the discriminant. It tells us the type of roots of a quadratic equation.
 - $b^2 - 4ac > 0$, 2 distinct real roots.

FUNCTIONS cont.

$b^2 - 4ac = 0$, exactly one real root.
 $b^2 - 4ac < 0$, no real roots (2 distinct imaginary roots)

1) Example 1: $f(x) = x^2 - 4x + 1$ use
 $f(x) = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$
 $x = \frac{-(-4) \pm \sqrt{(-4)^2 - 4(1)(1)}}{2(1)}$, and
 $x = \frac{-(-4) \pm \sqrt{16 - 4}}{2} = \frac{4 \pm \sqrt{12}}{2}$, since the discriminant is > 0 , there are 2 real roots. (15)

2) Example 2: $f(x) = 2x^2 + 2x + 8$ using $b^2 - 4ac = -4$, since the discriminant is < 0 there are 2 imaginary roots. (16)

3) Example 3: $f(x) = x^2 + 2x + 1$ using $b^2 - 4ac = 0$, since the discriminant is $= 0$ there is 1 real root. (17)

J. Rational functions take the form: $f(x) = \frac{p(x)}{q(x)}$.

- The parent function is $f(x) = \frac{1}{x}$.
- The graph of these functions consists of 2 parts, 1 in quadrant 1, and 1 in quadrant 3.
- The branches of rational functions approach lines called asymptotes. (18)
- Example 1: $f(x) = \frac{2}{x-3}$ (19)
- Example 2: $f(x) = \frac{1}{x}$ (20)
- Example 3: $f(x) = \frac{1}{x-2} + 3$ (21)

K. Operations of functions:

- Sum: $(f + g)(x) = f(x) + g(x)$
- Difference: $(f - g)(x) = f(x) - g(x)$
- Product: $(fg)(x) = f(x)g(x)$
- Quotient: $\left(\frac{f}{g}\right)(x) = \frac{f(x)}{g(x)}$, $g(x) \neq 0$

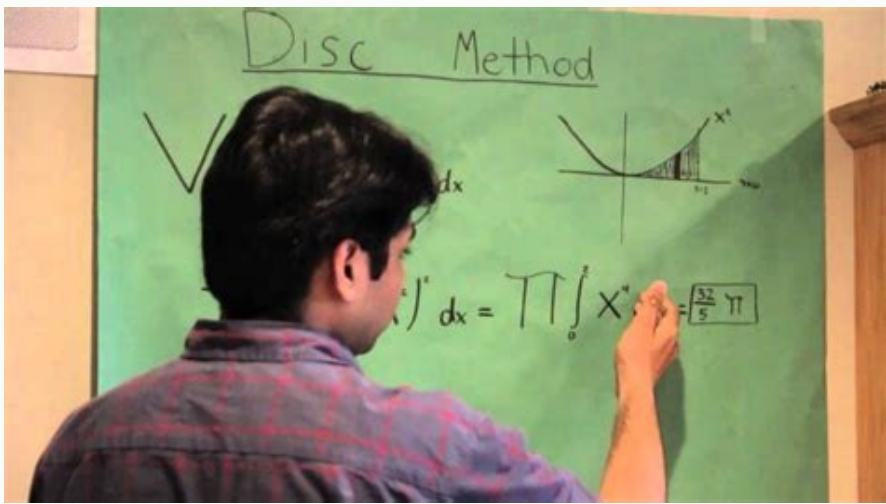
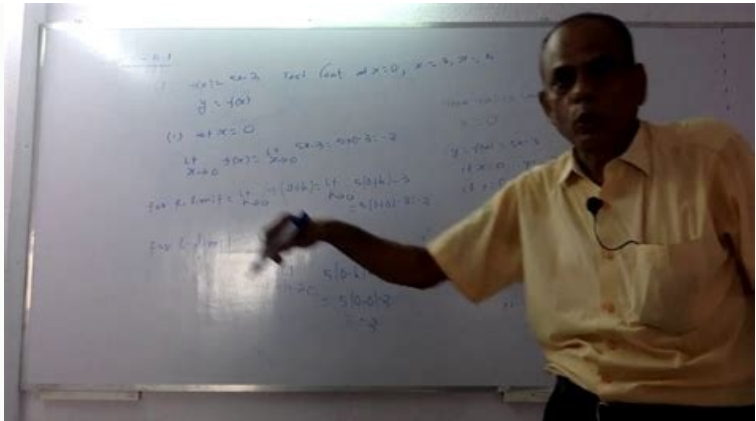
5. Example 1: Given $f(x) = x + 2$, $g(x) = \frac{1}{x-4}$
 a. Find the sum: $(f + g)(x) = x + 2 + \frac{1}{x-4} = \frac{(x+2)(x-4) + x + 2}{x-4} = \frac{x^2 - 2x - 8 + x + 2}{x-4} = \frac{x^2 - x - 6}{x-4}$, and $x \neq 4$.
 b. Find the difference: $(f - g)(x) = x + 2 - \frac{1}{x-4} = \frac{(x+2)(x-4) - 1}{x-4} = \frac{x^2 - 2x - 8 - 1}{x-4} = \frac{x^2 - 2x - 9}{x-4}$, and $x \neq 4$.

6. Example 2: Given $f(x) = x + 2$, $g(x) = \frac{1}{x-4}$
 a. Find the product: $(fg)(x) = (x+2)\left(\frac{1}{x-4}\right) = \frac{x+2}{x-4}$, and $x \neq 4$.
 b. Find the quotient: $\left(\frac{f}{g}\right)(x) = \frac{x+2}{\frac{1}{x-4}} = (x+2)(x-4) = x^2 - 2x - 8$, and $x \neq 4$.

L. Composition of functions: $(fg)(x) = f(g(x))$
 Example: Given $f(x) = x + 2$, $g(x) = \frac{1}{x-4} + 2$.
 Find $(fg)(x) = f\left(\frac{1}{x-4} + 2\right) = \frac{1}{x-4} + 2 + 2 = \frac{1}{x-4} + 4$, and $x \neq 4$.

M. Inverse functions: $(f^{-1})(x) = f^{-1}(x)$
 Example: Given $f(x) = 2x - 4$, $g(x) = \frac{1}{2}x + 2$.
 $(fg)(x) = f\left(\frac{1}{2}x + 2\right) = 2\left(\frac{1}{2}x + 2\right) - 4 = x$, and $(gf)(x) = g(2x - 4) = \frac{1}{2}(2x - 4) + 2 = x$.

More Inside!



24 o Class notes Sep. Enough said; it's important. 3. I have opened answers to previous LON CAPA problem sets. This is the skill you need on the exam; reading a problem then thinking about how to solve it. It has been like 6 years since I've taken it in high school and forget everything. How bad is it? Lon Capa tips? Does every class have the departmental final? Evgeni Trofimov course webpage What's new o Sep. o LON CAPA There are no written assignments in the course. The required texts for the course are the 3rd ed Chemistry: An Atoms First Approach by Zumdahls and Decoste along with the Student Solutions Manual that accompanies the 3rd ed text. 29 o Class notes Sep. I have also posted an info sheet for the midterm (see below). Raw and scaled exam 3 scores are in the gradebook (link on the right). The equations page and periodic table for the final is here. It is a great learning experience, but you will also appreciate a corrected exam to study from for the final exam. 26 o 1st old midterm with solutions o 2nd old midterm with solutions o 3rd old midterm with solutions o Some info about midterm o Class notes Sep. In addition, study the PowerPoint slides, notes, assigned homework problems, quizzes, old hour exams, and the Zumdahl text. Conscientious students have done enough problems by now, so you should just review your worked out solutions to the homework, quiz, and hour exam problems. Only read the Zumdahl text to clear up misunderstandings. Cover to cover reading of the text will be a big waste of time, better spent on homework, hour exams, and the class notes. 4. If you have special exam accommodations, register to take the exam through the Testing Accommodations Center at DRES. Either is fine. 6. How is it? Would you recommend going to the Math Assistance Center? Anything else? Thank you. Page 2 Posted by 9 years ago 15 comments Announcements 1. Cengage Unlimited eTextbooks for \$69.99. To study for the final, correcting your mistakes on the exams you took this semester is the first place to start. Learn from the mistakes you made previously and don't make them again. Instructor's Information Email: kaveth A1 pitt.edu Office: Thackeray #424 Office hours: Tuesdays and Thursdays 11:00PM-12:00PM or by appointment. 29: I have posted some old midterms with solutions as practice material for upcoming midterm. For other grade mistakes, please contact me. If you took a conflict exam or if you took the exam at the TAC center, your exam is in 1026 Chem Annex for you to pick up. If you believe you qualify for a conflict exam, email Tom Hummel (thummel) for approval. 17 o Class notes Sep. 18: Posted past few lecture notes. The publishing company of the text (Cengage) has two different electronic versions you can purchase. The 70 point Lon Capa grade is determined from the percentage of the 153 total Lon Capa homework points you did throughout the semester. Inna Sysoeva's course webpage Prof. 5 o Class notes Sep. This 500 point score includes the three 100 point scaled exams, the 100 point scaled quiz grade, the 70 point Lon Capa Homework grade, and the 30 point text homework grade. 16: Some LON CAPA advice: When doing calculations to get the answer for a LON CAPA problem, keep all the digits (several decimals) and enter the final answer to LON CAPA with several decimals. 8. Use the direct link if you receive the Shibboleth error message when you try to access the videos. 27 o Class notes Oct. You can print these 2 pages out for use on the final. If you don't want to print off these pages, you will be able to access them on the final via a link. They are at 11 am and 1 pm on Tuesdays and Thursdays. 10 o Class notes Sep. 22 o Class notes Sep. Our Learning Management System is called Lon Capa. 8 o Class notes Oct. We started with applications of double integral (mass, center of mass, ...). 1: - Breakdown of topics is roughly 30% midterm 1 material, 30% midterm 2, and 40% post-midterms ("roughly" since midterms vary a bit in what they cover) - The classification of quadric surfaces will not be specifically tested (ie, the table on p 578), though quadric surfaces may well appear as bounds of integration etc. o Math Assistance Center o Good source of old exams, quizzes and practice problems with or without answers: Prof. 19 o Class notes Nov. 12 o Class notes Nov. 21 o First link for old final exams o Second link for old final exams o Class notes Nov. If none of your other U of I classes require Cengage texts, then this is your best option. Where you purchase the materials is up to you. Also all videos have a direct link to view them in case Lon Capa is not cooperating. o Oct. 5 o Midterm 2 solutions Course information o Text: James Stewart, Essential Calculus, Early Transcendentals, 2nd Edition o Time of lectures: MWF 2PM-2:50PM o Location of lectures: Langley Hall A224 o Last day of classes: December 5 o First midterm: October 6 o Second midterm: November 7 (midterms are during the class time) o There will be weekly quizzes during the recitations on Thursdays. o Sep. 2: MT1 solutions posted. LON CAPA doesn't like rounding up the numbers! Sometimes this could be the problem if LON CAPA does not accept your answer. Actually I do not recommend you purchase the shrink wrapped version of the text because it does not include the Student Solutions Manual. If you are receiving "Shibboleth Error" messages when viewing videos or when accessing other Lon Capa materials, here is troubleshooting guide for these type of error messages (. 24 o Class notes Dec. Here is a link to purchase one of the two options listed above. Therefore, don't worry about redox material for the final. 3 o Class notes Sep. We will skip lecture/assignment 25 on oxidation-reduction reactions this semester. o Nov. If you did 90% of the 153 homework points, then your Lon Capa grade is 90% of 70 or 63 points, etc. Our Chem 102C/102D course will not use any Cengage homework platforms; all of our online homework is accessed through Lon Capa. Search for ISBNs listed above in item A when searching for your ebooks on your Cengage account. All of your etextbooks are included in this package for all U of I courses requiring Cengage textbooks plus you have access to the Cengage homework platforms. Also, understanding is the key for all problems. For the statement problems, understand why the true statements are true and why the false statements are false. For the calculation problems, talk yourself through the strategy necessary to solve the problem. Cengage Unlimited for \$119.99. 5 o Class notes Nov. The online final exam for chem 102D students is 1:30-4:30 pm, May 10. o Dec. This error sheet lists your raw score out of 25 questions. So work on this skill when you are studying. 7. Of course you will need a computer to access Lon Capa along with your phone fully charged and plugged into an outlet while the exam is going on so your TA can proctor you. These solutions are here for you to check your work if you get stuck. 27 o Class notes Aug. They are: a. 22 o Class notes Oct. - Minor topics not appearing are Kepler's laws of planetary motion and the midpoint rule for double integrals. 3 o Class notes Nov. Then you must catch up on the missed video lectures and the missed text assignments. The lecture videos and PowerPoint slides are on Lon Capa. Click on the link to familiarize yourself the contents of Lon Capa. 15 o Class notes Oct. 4: Solutions to MT2 posted. 19 o Class notes Sep. This is not correct. My office hours will be held through Zoom. 25 o Class notes Aug. The Illini Union Bookstore incorrectly indicates that you are required to purchase the shrink wrapped hard copy of the text for \$206.70. 3. You can drop by anytime, I am usually in. 13 o Class notes Oct. Note that you have detailed solutions to the odd numbered assigned text problems through the required Students Solutions Manual text (see item 6 below). To help you with this, I have posted detailed solutions to the exams you took this spring semester. Online material o Class notes Aug. If you added the course late, first read the Course Policy (link on the left) to learn about the course details. You do your homework in LON-CAPA. 1 o Class notes Oct. 20 o Class notes Oct. 17: I opened PS7 in LON CAPA. 9: The final exam is this coming Friday Dec 12 from 2-3:50 at 1500 Posvar Hall. 17 o Class notes Nov. This package includes all of the items mentioned in the previous plan plus you can get the various Cengage platforms for online homework. and the online final exam for Chem 102C students is 7-10 pm Friday, May 13. The only two acceptable reasons to take a conflict exam are if you another exam at the same time or if you have three final exams in a row. Instead, I recommend you purchase the electronic version of the text which gives you the text and the Solutions Manual but also gives you the option to rent a hard copy of the text for shipping and handling. They are available on Lon Capa and on our website under Exam Information. The Zoom links to my office hours are here. The final exam is worth 37.5% of your grade (300 of 800 total points). HomeMy Library You don't have any courses yet. You don't have any books yet. You don't have any Studylists yet. You haven't viewed any documents yet. Read documents to start getting recommendations. Discovery Links o Calculus webpage o Approximate schedule of the course and practice problems o Course information and guidelines o Differences between Ed.1 and Ed.2 of the text book. 17 o Class notes Oct. We had 24 lectures/assignments this semester, so there are 2-3 questions from each lecture/assignment. 8 o Class notes Sep. 14 o Class notes Nov. However, if you are required to purchase a Cengage homework platform for another course (perhaps Calculus on campus), then this option is your best choice. 15 o Class notes Sep. 24 o Class notes Oct. Please correct your exam mistakes now while the material is fresh in your mind. 1: I have posted links to several practice old final exams. During final exam week, I will be available 11 am Tuesday, May 10 and 1 pm Thursday, May 12. If there are any mistakes in the text homework grades, please contact your TA. The final is an excellent opportunity for you to improve your grade. Note that we do not use Compass or Canvas or Moodle in our course, so don't waste your time looking for course materials on Compass or Canvas or Moodle. I have also posted detailed solutions to all of the assigned even numbered text problems and Review questions on Lon Capa. 17: We finished with double integral in polar coordinates. 12 o Class notes Sep. In general, if you can do and understand the assigned text homework assignments, then you are in good shape with your catch-up work. The final will have ~60 multiple choice questions. The only items you are allowed at your work area when taking the final are the constants page/periodic table, a calculator, scratch paper, and something to write with. b. There is a link to Lon Capa on the right. 29 o Class notes Oct. The only remaining graded assignment in the course is the 300 point final exam. 3 o Class notes Dec. 1 o Class notes Dec. This package includes a 4 month subscription to the text (ISBN-13:9780357363454) and to the solutions manual (ISBN-13:9780357363591) with an option to rent a hard copy of the text for the price of shipping and handling. 2. The log-in is your Pitt username and (if you haven't changed your password previously) your password is your peoplesoft number. 3 o Class notes Oct. Angela Athana's course webpage Prof. If you did all 153 homework points during the semester, then you get 100% of 70, which is 70. For the 500 point total, apply the 90, 80, 70, 60% cut-offs to determine your grade going into the final. Your point total going into the final is also posted in the gradebook. And don't forget to have a good internet connection. 31 o Class notes Nov. But it also summarizes the problems you missed with your answer and the correct answer listed. Note that if you didn't fill in your UIN correctly, you will not have an error sheet. For the text homework grade, we collected text homework six times during the semester at 5 points each time collected; this comes to a total of 30 points. 10 o Class notes Nov. See below. Office phone: 412-624-8331 Hello, I've been procrastinating mathematics up until the last minute and finally am taking Calculus during my final part-time semester. 29 o Solution to MT1 o 1st old midterm 2 with solutions o 2nd old midterm 2 with solutions o 3rd old midterm 2 with solutions o Some info about midterm o Class notes Oct. 5. To help you correct your exams, an error sheet for each student is available at . The text homework assignments are in a link on the left called Course Policy and Assignments.

