

S M A R T H I N K I N G[®]

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WINNER

Online Tutoring



F A C U L T Y H A N D B O O K

Helping Students Use SMARTHINKING

When instructors provide information and guidance about the SMARTHINKING service, students listen and take advantage of it when the need arises. Consider the following ways of helping your students gain access to online tutoring.

- Mention SMARTHINKING in your syllabus when discussing the resources available to students who need assistance in your course. Include a reminder at exam time or when projects are due.
- Post a link to SMARTHINKING on your course web page, and include links to student support documents including the SMARTHINKING Student Flyer, Whiteboard Overview, and Student Handbook.
- Conduct orientation sessions for your classes to show them how to access SMARTHINKING, to discuss the ways in which the service can be used, and to review the ways in which use of this service can help them succeed. When possible, have students logon to the service and begin using it.
- Whenever assignments are soon to be due or tests are coming up, remind students that SMARTHINKING can help them prepare for an exam or can help them improve their writing.
- After a pre-test, review session, or a class exam, send students to SMARTHINKING to work with a tutor on concepts they do not understand or questions they miss. Correcting misunderstandings when they occur will help students get back on the path to successful course completion.
- Remind students that they have access to archives of each of their SMARTHINKING tutoring sessions. Archives can be used to review the content of a tutoring session or as the starting point for follow-up sessions with a tutor.

Integrating SMARTHINKING with Your Instruction

At SMARTHINKING, we have found that students are more likely to benefit from the academic services available to them if their instructors recommend and support those services. The suggestions below reflect the best practices of instructors who have integrated SMARTHINKING within their instructional programs.

Pre & Post Exam Review

- *Before you give a test*, have students complete a pretest or review sheet and work with a tutor on problems or concepts they do not understand.
- *After you give a test* have students review missed questions with a tutor to ensure that they are ready to proceed with new course content.

As an extra step to ensure that students follow through, have them submit a transcript of their tutoring session as a homework assignment.

Help at Each Step of the Writing Process:

- *As part of the pre-writing process*, have students use SMARTHINKING's Live Writing Center to clarify assignments, generate ideas, and develop plans for completing assignments.
- *Once a first draft has been completed*, have students submit it to SMARTHINKING for review and critique, and then use the e-structors' feedback as the basis for their essay revisions.
- *Have students brush up on their editing skills* by reviewing concepts in the *SMARTHINKING Writer's Handbook* and working with a tutor in the Live Writing Center for further clarification.

As an extra step, have students include transcripts of their live sessions, and copies of their critiqued drafts when they submit their final essays to you.

SPECIAL FILE SHARING OPTION: Students using the live tutoring option for Writing, may share their work with their tutor by using a special file upload tool. When this tool is used, the tutor sends a request to the student through the Whiteboard, the student selects the appropriate file from his/her computer, and uploads it, making it viewable by the tutor. Use of this feature is initiated by the tutor. It will be particularly useful when students are reviewing paragraphs or other short pieces of writing With a SMARTHINKING tutor.

Paragraph Submission Option

SMARTHINKING's Paragraph Submission option allows students to submit a single paragraph for review through the submit a question option. E-structors provide feedback for one higher-order concern and one lower-order concern for this paragraph in a way that offers suggestions and models revisions that students can apply to entire essay drafts

When using this option, students should enter on the whiteboard a description of the assignment and the type of help they would like to receive.

Class Participation

- *Encourage students to Ask for Help* when they need it. Many students are reluctant to ask questions in class, and private one-to-one tutoring allows them to receive help when they need it.
- *Award Class Participation Credit* to students who obtain help through tutoring. Instructors may ask students to print copies of the tutoring sessions as part of their class portfolio.

Using the Paragraph Submission Option—Steps for Students

- Logon to your SMARTHINKING account.
- Select **Paragraph Submission** from the drop-down menu under **submit a question**.
- Enter the following information on the Whiteboard. You can copy and paste it from another document or type it directly into the Whiteboard:
- Describe your assignment. A word-for-word description of the assignment as provided by your instructor will work best here.
- Describe the type of help you need with your writing. Possible areas include the following:

Grammar and Mechanics	Introduction/Conclusion	Transitions
Word Choice	Main Idea/Thesis	Organization
Sentence Structure	Content Development	Use of Resources

- Use the **Paste Text** tool under the tools menu to paste your writing on the Whiteboard:
- Copy your writing to the clipboard within your word processor.
- Choose **Paste Text** from the tools menu within the Whiteboard.
- Place your cursor inside the text box that appears, and use CTRL V to paste the contents of the clipboard in this box.
- Click the **Paste** button to bring this text to the Whiteboard.
- Click **Submit Question** to send your writing to an e-structor for review. You will receive a response typically within 24 hours.

Special Applications

- *Help students build **Quantitative Literacy** by writing about mathematics.* Assign students to write narratives describing solutions to open-ended problems and work with a SMARTHINKING tutor in a live or asynchronous session to review the accuracy and clarity of the content of their work.
- *Encourage students to **Show Their Work**:* when completing homework assignments, and have them work with a SMARTHINKING e-structor to review the processes and solutions underlying this work. This strategy helps students understand specific concepts and develop effective problem-solving methods.
- *Assign **Creative Exercises** designed to promote deep understanding of course concepts and topics, and have them work with a tutor to verify the accuracy of the content they produce.* These could include
 - Writing and answering new examination questions or questions that parallel those included in homework assignments or as exams.
 - Writing short (e.g. 300 words) explanations of concepts discussed in class without using numbers or jargon
 - Creating mnemonics for concepts that may be difficult to remember.

Topics Supported by SMARTHINKING

Mathematics and Statistics

Basic Math Skills, Algebra, Geometry, Trigonometry, Calculus I & II (Single Variable Calculus), Statistics

Basic Math: Operations on Whole Numbers, Addition and Subtraction Using Fractional Notation, Addition and Subtraction Using Decimal Notation, Multiplication and Division Using Fractional Notation, Multiplication and Division Using Decimal Notation, Ratio and Proportion, Percent Notation, The Real Number System, Dimensional analysis, Number systems other than base 10, Order of Operations, Exponents, Set Operations, Venn diagrams, Logic; Truth tables, Conditionals and Bi-conditionals.

Algebra: Linear equations; Applications, Absolute value - Inequalities; Linear, Absolute value, Non linear - Functions / Graphs; Function notation, Linear, Polynomials, Translations / Shifting / reflecting graphs, Composition, Inverse functions - Roots of polynomials; Quadratic, Factoring, Complete square, Quadratic formula, Complex Numbers, Higher Degree, Factoring special cases, Synthetic division - Exponentials and Logs; Graphs, Properties, Solving equations - Systems of linear equations; 2 equations 2 unknowns, Matrix algebra, Gaussian elimination, Inverses, Determinates - Conics - Mathematics of finance; Simple/compound interest, Annuities, Amortization - Linear programming; Geometric approach, simplex method.

Geometry: Basic Definitions; Points, Lines, Rays, Angles, Triangles - Angles, Types, Measurements - Congruent Triangles - Planes and Parallel Lines - Circles, Polygons, Quadrilaterals - Coordinate Geometry, Midpoint, Slope, Distance Formula - Theorems, Postulates, and Proofs.

Trigonometry: Trigonometric functions; Angles and their measure, Right triangle trigonometry, Functions of any angle, Applications - Graphs of trigonometric functions; Inverse trig functions - Analytic Trigonometry, Solving equations, Verifying identities, Formulas -Law of Sines, Law of Cosines - Complex numbers - Vectors - Analytic Geometry; Conics, Polar equations.

Calculus: Limits; definition, limit theorems, L'Hopital's Rule - Continuity; intermediate value theorem - Derivatives; chain rule, implicit differentiation - Applications of Derivatives; Analysis of Graphs, mean value theorem, max/min, related rates - Integrals; definition, definite integrals, fundamental theorem of calculus - Integration techniques; polynomials, exponential and logs, trigonometric, substitution, trig substitution, parts, partial fractions - Applications of Integrals; length of curves, work, volume, surface area - Parametric equations - Polar coordinates - Sequences and Series; Convergence test, Power series, Taylor series.

Statistics: Descriptive Statistics, Data Analysis (Graphic Representations, Measures of Central Tendency, Dispersion, Position, Regression and Correlation); Probability (Combinatorics, Random Variables, Probability Distributions for Discrete and Continuous Random Variables; Inferential Statistics (Sampling and Sampling Distributions, Central Limit Theorem, Confidence Intervals, Hypothesis Testing, Inference Concerning Correlation and Regression); Analysis of Variance (Categorical Data Analysis; Chi-square; Contingency Tables; Homogeneity tests; Decision Theory); Process and Quality Control (Control Charts)

Bi-lingual Math: Bi-lingual Math tutoring is available in all of the content areas described under Mathematics and Statistics.

Spanish

Spanish tutoring supports introductory to intermediate level subjects in Spanish. For introductory level students, we cover a topics of varying levels of difficulty-students receive help on basic grammar questions, such as number and gender agreement between nouns and adjectives, or higher level topics such as the subjunctive or preterit/imperfect, "if" clauses, and the passive voice. At more advanced levels, SMARTHINKING E-structor® Certified Tutors provide help on short stories, poems and cultural readings. For questions regarding grammatical structure, or for receiving help on short paragraphs or sentences, we encourage students to submit their questions or pre-schedule sessions with an E-structor® Certified Tutors. Students may submit longer writing pieces to the Spanish Essay Center where they may choose to receive tutor responses in English or Spanish. In their responses, tutors provide comments, suggestions and a road map for the student to follow in improving the essay, but tutors would not edit, proofread, or "fix" student papers.

Writing

The SMARTHINKING Online Writing Lab is designed to assist students with writing across the curriculum. SMARTHINKING writing tutors have advanced degrees in composition and rhetoric, literature, creative writing, and other relevant fields within the humanities. They are trained to respond to essays in a range of academic subjects (e.g. lab reports, business plans, and literary analyses) and at a range of academic levels (from "developmental" writers to graduate students). Specifically, SMARTHINKING E-structor® Certified Tutors review students' writing in the following general academic areas at the secondary through graduate levels, unless otherwise indicated: Composition; Literature; English for Speakers of Other Languages (ESOL); Creative Writing; AP English (high school); English Language Arts (high school); Writing-Intensive Courses Across the Curriculum (to include writing projects for classes in the humanities, sciences, and business, and to include thesis and dissertation projects in the humanities and business).

Science

Biology, Introductory Human Anatomy & Physiology, General Chemistry, and Physics

Biology: Chemistry of Life; Evolution; Cells; Molecules; Energy; DNA; Genetics; Biodiversity; Plant Form and Function; Physiology; Ecology. SMARTHINKING tutorial support aligns with the APTM Biology course*.

Introductory Human Anatomy & Physiology: cells, tissues, organs, and skeletal, muscular, circulatory, lymphatic, respiratory, nervous, endocrine, digestive, urinary and reproductive systems.

General Chemistry: Measurement; Atomic Structure; Chemical Formula & Equations; Chemical Reactions; Thermo Chemistry; Electron Configurations; Bonding; States of Matter; Solubility; Reaction Rates; Acids & Bases; Equilibria; brief introduction to Nuclear chemistry; simple organic nomenclature & introduction to functional groups. SMARTHINKING tutorial support aligns with the APTM Chemistry course*.

Physics: Kinematics; Forces and Newton's Laws of Motion; Work and Energy; Circular Motion; Momentum; Simple and Harmonic Motion; Fluids; Heat and Temperature; The Ideal Gas Law; Thermodynamics; Electric Forces and Electric Fields; Electric Circuits; Magnetic Forces and Fields; Optics; Special Relativity; Particles and Waves; Nuclear Physics and Radioactivity; Waves and Sound; Electromagnetic Waves. SMARTHINKING's tutorial support aligns with the APTM Physics B, APTM Physics C (Mechanics), APTM Physics C (Electricity & Magnetism)*

Business Studies

Accounting and Economics

Accounting: Topics covered in Principles Accounting I and Principles Accounting 2 classes including topics such as Financial Reporting and Accounting Cycle, Operating Activities, Investing and Financing Activities, Foundations of Management Accounting, Capital Investment Decisions, and Planning, Control, and Performance Evaluation. SMARTHINKING E-structor® Certified Tutors are also qualified to provide support to students taking intermediate Managerial and Financial Accounting, Cost Accounting, and Tax Accounting on a pre-arranged basis.

Economics: Topics covered in Principles Microeconomics and Principles Macroeconomics classes including topics such as Basic Price Theory, the Theory of the Firm, Public Economics, Analysis of the Market Structure, Resource Allocation and Welfare Analysis, National Income Analysis, Monetary System and the Federal Reserve, Business Cycles and Growth and International Trade. SMARTHINKING E-structor® Certified Tutors are also qualified to provide support to students taking Intermediate Microeconomics and Macroeconomics, Money and Banking, International Trade and Finance, Mathematical Economics and Industrial Organization on a pre-arranged basis.

Advanced Subjects Suite

Organic Chemistry, Introductory Finance, Mathematics Beyond Calculus II, and Advanced Statistics

Organic Chemistry: Atomic orbital hybridization, covalent bonding, electronegativity, resonance, Lewis acid-base theory. Functional groups and nomenclature. Structure, properties, and reactions of alkanes, alkenes, alkynes, cycloalkanes. Aromaticity, properties and reactions of aromatic hydrocarbons. Structure, properties and reactions of alkyl halides, alcohols, ethers, epoxides, aldehydes, ketones, amines, carboxylic acids and carboxylic acid derivatives. Common reaction mechanisms: free radical chain mechanism, electrophilic addition, nucleophilic substitution, elimination, electrophilic substitution, nucleophilic acyl addition. Stereochemistry: E/Z-isomers, R/S-isomers, Fischer projections, enantiomers, diastereomers, optical activity. Topics supported will be of interest to students preparing for MCAT™ Organic Chemistry.

Introductory Finance: Role and objective of financial management; review of the four basic financial statements; analysis of financial statements and financial performance; the financial environment: markets, institutions, interest rates, and taxes; risk and rates of return; time value of money; bonds and their valuation; stocks and their valuation; cost of capital; capital budgeting, including cash flow estimation, decision criteria, and risk analysis; capital structure and leverage; distributions to shareholders: dividends and share repurchases/treasury stock; managing current assets/working capital; financing current assets/managing current liabilities; financial planning, budgeting, and forecasting.

Mathematics Beyond Calculus II: Multivariable Calculus (i.e. Calculus III) - Vectors: dot product, cross product, lines, planes; Vector-Valued Functions: limits, derivatives, curves, tangents, curvature; Partial Derivatives: chain rule, directional derivatives, gradient, Lagrange multipliers; Multiple Integrals: surface area, polar & cylindrical coordinates, moments and center of gravity; Vector Calculus: vector fields, line integrals, Green's theorem, surface integrals, Stokes Theorem, Divergence Theorem.

Differential Equations (i.e. Introductory Differential Equations) - Solution of First-order ODE's: analytical, graphical and numerical methods; Linear ODE's; Undetermined Coefficients and Variation of Parameters; Sinusoidal and Exponential Signals: Oscillations, Damping, Resonance; Complex Numbers and Exponentials; Fourier Series, Periodic Solutions; Delta Functions, Convolution, and Laplace Transform Methods; Matrix and First-order Linear Systems: Eigenvalues and Eigenvectors; and Non-linear Autonomous Systems: Critical Point Analysis and Phase Plane Diagrams.

Linear Algebra (Sophomore Level) - Linear Equations: row reduction, vector and matrix equations, linear independence, linear transformations; Matrix Algebra: matrix operations, inverse, subspaces, dimension, rank; Determinants: properties of determinants, Cramer's rule; Vector Spaces: subspaces, null, column & kernel spaces, bases; Eigenvalues: eigenvalues & eigenvectors, characteristic equation, diagonalization, linear transformations, complex eigenvalues, discrete dynamical systems; Orthogonality: inner product, Gram-Schmidt process, least-squares, inner product spaces, Symmetric Matrices: quadratic forms; Optimization: Simplex method.

Discrete Mathematics - Logic and proofs: propositional logic & equivalences, proof methods, and strategies; Discrete structures: sets, set operations, functions, sequences, and series; Algorithms: integers, primes, gcd, matrices, induction, recursion; Counting: pigeonhole principle, permutations, combinations, linear recurrence relations, generating functions; Discrete probability: Baye's theorem, expected value, variance; Graphs: representation, isomorphism, connectivity, Euler & Hamiltonian paths, trees; Boolean Algebra: functions, logic gates, minimization of circuits.

Advanced Statistics: Basic Review: Box plots, histograms, bar charts, pie charts, counting principles; descriptive statistics, mean, median, mode, five-number summary, standard deviation, range, IQR, Probability distributions.

Estimation Theory: Estimates by method of moments, their properties; Maximum likelihood estimates & their properties, Fisher information, Rao-Cramer inequality, efficient estimates; Bayes estimates, prior and posterior distributions, conjugate priors; Sufficient and jointly sufficient statistics, Neyman-Fisher factorization criterion, Rao-Blackwell theorem; Estimates for parameters of normal distribution, their properties; Chi-square, Fisher and Student distributions; Sampling distributions; Confidence intervals (For sampling distribution and for parameters of normal distribution).

Hypotheses Testing: Testing simple hypotheses, Bayes decision rules, types of error, most powerful tests, likelihood ratio tests, randomized tests; Composite hypotheses, power function, monotone likelihood ratio and uniformly most powerful tests; t-tests and F-tests; Goodness-of-fit tests, chi-square tests, tests of independence and homogeneity, Kolmogorov-Smirnov test, Effect Sizes; Two independent samples, paired sample t-tests; Test for equality of variance.

Regression and Classification: Simple linear regression, least-squares fit, statistical inference in simple linear regression, confidence intervals, prediction intervals; Classification problem, boosting algorithm; Multiple linear regression; Correlation; Normal probability plots and other assumption checking techniques; Effect Sizes; Logistic regression; Correlation and regression techniques for quantitative and qualitative data analysis; nominal scales, interactions; other related multivariate methods.

ANOVA: Basic One-Way, repeated measures, mixed model, factorial, randomized block ANOVA, ANCOVA; Effect Sizes; Preplanned comparisons; Post-hoc analysis/comparisons: Bonferroni, Tukey, LSD, Dunnett's.

Non-parametric Statistics: Kruskal Wallis; Sign Test; Wilcoxin Signed-Rank; Wilcoxin Rank Sum Test; Other tests. *AP™ is a registered trademark of the College Board, which was not involved in the production of, and does not endorse, SMARTHINKING services.

Sample Essay Return

SMARTHINKING's E-structor Response Form (Your marked-up essay is below this form.)

HOW THIS WORKS: Your e-structor has written overview comments about your essay in the form below. Your e-structor has also embedded comments [in bold and in brackets] throughout your essay. Thank you for choosing SMARTHINKING's OWL; best wishes with revising your paper!

***Strengths of the essay:** Hi Irina. Welcome to SMARTHINKING! I'm Melanie, and I'll be reading your essay today. You'll find my comments in bold and [brackets] in the form below and in the body of your essay. This really is a very funny story. Your sister is right; it could happen to anyone. You've done a good job of letting us know not only what happened at the restaurant, but also how this experience affected you in a larger sense. We learn both that you are the sort of person who can laugh at a misunderstanding and that you are the sort of person who took that potentially embarrassing experience and used it to help yourself gain more confidence in talking to Americans. Good for you! The most interesting stories, like yours, include a message or idea larger than just the events in the story.

***Irina has requested that you respond to the Introduction/Conclusion:** As I mention above, you do a good job of telling us why this story matters. You give us that information through your introduction and conclusion. Your introduction lets us know what your experience of English was before the super salad and that you learned something from the experience. The conclusion lets us know what you learned.

***Irina has requested that you respond to the Organization:** You have also done a good job of organizing your essay. You give us necessary background information in the introduction. Then, you move through the events in chronological (time based) order in the body of the essay. Then, your conclusion tells us what you learned from the events. That sort of organization is quite clear. There are a couple of small places where I wasn't sure about the order of information. I have included notes about those in the body of your essay.

Transitions: You use dialogue well in your essay. There are some rules for presenting dialogue that you will want to pay attention to.

- Each time you switch speakers, start a new paragraph.
- Use commas to join dialogue to clauses like "she said" and "I replied."
- Commas and periods always go inside of quotation marks.

So, let's look at some sample dialogue:

- *Joe walked into the room. As he threw himself into a chair, he said, "Man, I had a rough day."*
- *"Oh?" replied Mary, continuing to stare at the television.*
- *"Yeah, you wouldn't believe what my boss did. I think I'll quit this job."*
- *"Mhmm," said Mary. She'd heard it all before.*

Take a look at this dialogue. How might you use it as a model to help you restructure your dialogue?

Word Choice: Make sure that you proofread your essay carefully. There are a few places where you replace a word with one that is close to the same spelling: for example, "though" with "tough." Try reading your essay out loud slowly to listen for these kinds of errors. Keep an eye out for other grammatical issues as well.

Summary of Next Steps: Irina, You've done a very nice job of giving your essay a clear structure and of telling us both this specific funny story and how it affected you. Now, as you revise, pay attention to the following issues:

- Look at the places where I have asked some questions about organization.
- Restructure your dialogue so that it follows the normal rules for presenting dialogue.
- Proofread carefully for the grammar issues I mention and other ones.

Thanks for sending in your essay! It was a pleasure to get to read it.

Melanie

Please look for more comments in your essay below. Thank you for using our service, and we encourage you to submit future essays.

SOUP OR SALAD?

One year ago, when I moved from Germany to America, I had a really hard time to understand the American culture because I didn't speak English so well and I also had problems to understand people. [When we want to refer to a particular action in a noun-like way, we use the -ing form of the verb. So, I might say, "I love running," or "She likes talking to me." Here, you want "understanding."] I often avoided face to face conversation with people because I was scared of misunderstanding, and I never answered a phone. I thought that I would never learn how to speak to people and not to be afraid of misunderstanding. However, when my sister came to visit me last summer, I learned that speaking to people in English can be extremely funny.

Last summer, before my sister visited me, I thought that I would never learn how to speak English. On the day my sister arrived from Colorado in San Jose, California, we decided to go to a nice Italian restaurant in a nice area of Los Gatos. In the restaurant, I wanted to impress my sister, so I decided to order food for her and myself. I taught today is a day where I won't be scared to speak to people because my sister is with me. My sister could speak English very well, so I wasn't afraid of misunderstanding, and I knew she would help me out if I have some problems with speaking. [Here, you want a past tense. You might have "had some problems." "If I have" suggests that you are discussing something that might happen in the future.]

When a waitress came to our table, I was ready to order food and to have a little conversation in English. The waitress asked me if we would like to have a soup or salad for an appetizer. I understood super salad. So in my mind, I pictured a huge super salad with a lot of lettuce, tomatoes, onions, and a blue cheese dressing. This imagination made my mouth watering and my stomach started to make noises. ["Imagination" is our ability to think of things. "Image" is something that we might see in our minds or with our eyes.] So, I said to her: "Yes, we would like to have a super salad. The waitress looked at me very confused and asked me again: "So, would you like to have a soup or salad?" Now, I was very confused and I felt very stupid. So, I told her that we would like to have the super salad with some lettuce, tomatoes, and onions. "So, you want the salad", she said. "No, I don't really want salad, but you actually asked me if we would like to have the super salad": I replied. [Using a comma after a quotation is correct. A colon can introduce a quotation sometimes, but it can't follow one.] At this moment, my sister helped me out and I felt very embarrassed, but the waitress and my sister were laughing and having a good time.

At the end, even tough, I felt embarrassed, I thought that this misunderstanding is the funniest misunderstanding I ever had in America. My sister tried to make me feel better when she said that this could happen to anybody. I couldn't believe that I misunderstood something simple like soup or salad. I tried to forget this soup or salad moment but it was too funny to forget. On this day, we enjoyed our dinner together more then ever. [The first part of this paragraph sounds like you are stepping back and reflecting on the experience from a distance, but the last sentence sounds like you are still telling us what happened in the experience. Shifting from showing us the experience up close to reflecting on it from a distance and back to showing it up close can be confusing. Could you stay focused on the details of the experience until you are ready to completely shift to discussing it? How might you change the order or wording of your ideas so that they seem clearer?]

This soup or salad misunderstanding in the restaurant showed me that I shouldn't be afraid of any conversation with people. I started to meet American people and I started to speak better English. I was glad that I had experienced a funny misunderstanding because it gave me an interest in going out and meeting American people. When I go out to eat with my husband and we order an appetizer, I often think about my funny soup or salad moment and it makes me laugh. [You do a good job in this conclusion of letting us know how the super salad moment has affected you. That's exactly the kind of information we want in a conclusion.]

Sample Math Interaction

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Actions Show Edit Tools Help

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Um my question is find the gcd and lcm im having trouble with step 2 & 3

Hi Jennifer, my name is Trey Can you give me an example of the type of problem you are working on? sure um find the lcm of 4 and 6

Okay, how would you start? i would break it down like $2*2$ for the 4 and $2*2*3$ for 6

Almost... the prime factorization for 6 is $2*3$ - what's your next step Jennifer? that is where i get stuck at i don't understand what to do then

Okay, we are looking for the LCM, least common multiple - let me ask you: is the LCM(4,6) larger or smaller than the original numbers

2 is used twice and 3 once - is that what you mean No :-) let me explain with an example:
 multiples of 5 are:
 $5*1 = 5$
 $5*2 = 10$
 $5*3 = 15$
 $5*4 = 20$

okay... so the multiple of 4 & 6 is two right?

2 is a common divisor of 4 & 6, we are looking for a number that is a multiple of both 4 & 6

Can you list the first few multiples of 4 & 6?

4: 4, 8, 12, 16, 20, 24, 28 good and for 6: 6, 12, 18, 24, 30, 36

let's noticed that both 12 and 24 appear in both lists, 12 and 24 are common multiples of 4 & 6. You want the Least Common Multiple so that's 12 correct!

okay but in the book, why do we have to break down the numbers to find that

We've found the LCM(4,6) = 12, but the method described in your book is more efficient when working large numbers

What is the prime factorization of 12, Jennifer? $2*2*3$ exactly

$$\begin{array}{r} 4 = 2*2 \\ 6 = 2*3 \\ \hline \text{lcm}(4,6) = 2*2*3 = 12 \end{array}$$

To find the LCM, we take the product of each prime number that appears in either factorization

Let's consider another example 8: $2*2*2$ Jennifer, can you write the prime factorizations for 8 & 12

12: $2*2*3$

good, and the LCM(8,12) will be $2^3*3 = 24$

Well done Jennifer, do you feel comfortable with finding the LCM?

i was getting confused by what the book was showing the gcd for 8 & 12 is 4 right? yes - can you tell me how you found that Jennifer?

2 is in both lists twice

Good, you seem to be ready to try a few on your own.

thank you Trey... Bye for now

Math Characters Greek Characters Language Characters Chemistry Characters

Submit Question Exit / Options

Done Internet

Sample Bi-Lingual Math Interaction

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Actions Show Edit Tools Help

Page: 1

Verdana

The diameter of a tree trunk varies directly with the age of the tree. A 45-year-old tree has a trunk diameter of 18 inches. What is the age of a tree that has a trunk diameter of 20 inches?

A 47 years
B 50 years
C 63 years
D 90 years

I could use some help
Hello Edwin, welcome to smarthinking.com.
My name is Hernan.
Hernan, ¿hablas español?
Si, hablo espanol. ¿Entiendes el enunciado del problema? "Diameter varies diretly with age"
No, no se a que se refiere
El enunciado dice: "El diametro del tronco es directamente proporcional a la edad del arbol".
¿Puedes escribir la ecuación?
creo que sería $d = ka$

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Yes, exactly. "k" stands for the "variation parameter". Can you find this parameter from the given data? yes

Ok. Can you solve for k from this expression?

$$18 = k \cdot 45$$

$$\frac{18}{45} = \frac{45k}{45}$$

Exactly. Very good.

$$\frac{18}{45} = k$$

Now, can you find the age of the tree with a 20 inch diameter?

I'll try $20 = \frac{2}{5}(a)$
 $a = 50$ Very good.

We can try to solve a slightly different example if you wish. ok!

Ok. Try to solve this problem: "x varies inversely with y"

En español: " x es inversamente proporcional a y" sería $x = k/y$

Can you write the equation asociated to this statement? Exactly. Very Good

What about the equation $y = \frac{kx}{z}$?

Can you translate this equation into a word statement?
y es directamente proporcional a x e inversamente proporcional a z
¿Bien, podrias traducirlo al inglés?
y varies directly with x and inversely with z
is this correct Hernan? Yes, this is correct.

Great. Thank you very much for your Help !
You are welcome!. Have a great day. Good bye.

Math Characters Greek Characters Language Characters Chemistry Characters

Submit Question Exit / Options

Done Internet

Sample Economics Interaction

Actions Show Edit Tools Help

Page: 1

Use a graph to show the impact on the price of German cars sold in US if the US imposes import quotas on German cars.

Hello and welcome. My name is Dr. Randy R.

We like to analyze many of our issues with demand and supply. As you think about the demand and supply of German cars, which is affected do you think by this quota?

I think that the supply will have to go up, forcing the price to lower???

What is an import quota? A set number of cars that have to be imported.

When a country does this do you think they are worried about too much of the product coming into the country or too little?

hm... for me, I worked at a sales position where we had quotas, it was hard for me to meet my quota daily, so that's why I though they would have to increase supply??!?......

Interesting experience. I can see the confusion. In the case of foreign products the idea is usually to keep some of the foreign products out of the country to protect domestic businesses.

So the objective is to reduce the number of German cars coming in. I agree with you that this will affect supply but can you now see the idea is to reduce the number of German cars entering this country?

..... yes. so, if the number of cars is reduced, does that mean that supply will be lower and prices will go up?

Exactly. So when you graph this you will illustrate the market for German cars which is nothing more than the demand for and the supply of German cars.

so when I do a graph.. it will look like this:

okay, now I get it! thank you very much, I just needed help with the graphing!

This is why we are here. You are very welcome. Take care.

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Sample Paragraph Submission

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Hi, Kelly! I'm Jincy, and I'll try to help you today.

I need help this paragraph it is a narrative paragraph I need help with grammar or punctuations or what can i do to improve it.

Meeting the person behind the computer (title)

Late one spring night I decided to meet Joey. I spent a year talking to him online before we met. We decided we were going to meet at Ham's. The food was not that great, but it helped calm the butterflies in my stomach. We spent alot of time discussing our conversations we shared online and what we thought of one another. I found myself wondering why did I wait so long to meet this wonderful person. As the night was coming to an end, we said our goodbyes and decided we wouls see one another the folling week.

There are some typos here (wouls; folling) but on the whole your grammar and sentence structure are pretty good, Kelly. So let's focus on the content of this narrative paragraph.

I like your first sentence, because it really captures our attention. How, we wonder, can a person "decide to meet" another person. Then we learn that you and Joey had already "met", online. You tell us that you'd been talking for a year. Could you tell us a little more than this? Okay, you'd been chatting for a year, but what was it about Joey (online) that made you want to meet him? A sentence about that would be helpful, and would bridge the gap to your next sentence (about deciding where to meet). And what sort of place is Ham's? Remember, your readers don't necessarily know about this place.

Finally, you should tell us in a little more detail about the conversation you had at Ham's. You say that afterward you wondered why it had taken you so long to meet Joey, and that he seemed "wonderful." But you don't actually show us how successful the conversation was, and you should. What did you talk about? What overall impression did he make on you? What sort of guy was he? ("Wonderful" covers a lot of ground, Kelly!)

The more detailed you make this, the more effective it should be.

I hope this has been helpful, Kelly.

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Sample Physics Interaction

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Below, the particles have charges $q_1 = -q_2 = 182 \text{ nC}$ and $q_3 = -q_4 = 200 \text{ nC}$, and a distance $a = 4.7 \text{ cm}$.

is it square with side a?
yea

can you similarly show other forces on q_3 ?
good job!

What are the a) x _____ N and b) y _____ N components of the net electrostatic force on particle 3?

hello Lindsey, welcome to smarthinking.. Archana here :)

hello....

any work so far? ok.. just a minute..
not sure how to work it... ok

the net force of $q_3 = F_{13} + F_{23} + F_{43}$ i.e. sum of all forces. ok?

now, q_1 and q_3 are both positive charges.. so what will be direction of force on q_3 due to q_1 ?
negative means?

can you show that in the diagram?

do you remember the formula to calculate force? Use up and down arrow key on ket board to write suffixes.

$$F = k \frac{q_1 q_2}{r^2}$$

can you calculate F_{13} and F_{43} ?

$$F_{13} = \frac{-9 \times 10^9 (182 \times 10^{-9}) (200 \times 10^{-9})}{(.047 \text{ m})^2}$$

we need not consider direction here, just magnitude. ok?
right? yes.. except that negative sign..
ok

so $F_{13} = .1483 \text{ N}$ ✓?

similarly, what do you get for F_{43} ? good :)
.1630 N ✓

now, how to calculate F_{23} ? can i take F_{13} and multiply by sin 45degrees? nope..

is r same as a for charges 2 and 3 ? nope... so first we need to find r here ok?

lets continue with this on next page.. ok?

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Sample Organic Chemistry Interaction

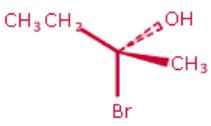
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Page: 1

My name is Karen. Can you help me please?
This is from my homework.
Identify whether the configuration at the chiral carbon is R or S.

Hello Karen, my name is Jason.
Welcome to smarthinking.
Hi Jason.



What have you done on this problem so far?

Well, I am a little confused because all the examples from class have an H, but this one doesn't. I don't know where to start. Usually I would make the H the #4 group to start.

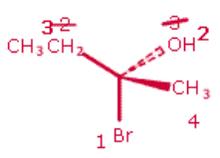
Do you know your priority rules for the different groups around the chiral center?

I know you use the mass or something like that.

Good. and where does hydrogen rank in the priority rules? lowest, it's lightest
What would be the next lowest ranking group in your molecule above?

Well, I think it would be CH₃. good!

if that is lowest priority, use it just as you would the hydrogen. and assign configuration.



Like that?

Are you saying that the ethyl carbons are a higher priority than the hydroxyl?

yes. that group has more mass...

lets look at this from the point of the stereocenter. what is the next atom immediately next to the stereocenter. which would be higher priority?

you mean compare the C and the O? yes. oh! the O is higher priority than C Great!

So the priority 3 group is the ethyl and the OH is priority 2 group correct.

OK. I fixed it. So what would the config be? R or S? I get it to be R.

Good job. thats it. Cool! Thanks Jason!

Do you have any other questions today Karen?

Well, I might, but I'm going to work on these some more on my own first.
I might be back later! Thanks again! bye...

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SMARTHINKING Hours of Service

	Summer Schedule June through August	Regular Schedule September through May
Basic Math Skills, Algebra, Geometry, Trigonometry, Calculus	Sun - Thurs: 9AM to 1AM ET Fri - Sat: 9AM to 6PM ET	24 hours a day, 7 days a week
Writing, General Chemistry, Physics	Sun - Thurs: 6PM to 1AM ET	Sun - Thurs: 9 AM to 2 AM ET Fri & Sat: 12 PM to 6PM ET
Accounting, Statistics, Bi-lingual Math	Sun - Thurs: 6PM to 1AM ET	Sun - Thurs: 12 PM to 2 AM ET Fri & Sat: 12 PM to 6PM ET
Economics	Sun - Thurs: 6PM to 1AM ET	Sun - Thurs: 3 PM to 1 AM ET Fri & Sat: 12 PM to 6PM ET
Intro Human A & P, Biology	Sun - Thurs: 9PM to 1AM ET	Sun - Thurs: 9PM to 1AM ET
Spanish	Available upon request via Prescheduled Sessions	Available via Submit Your Question, the Spanish Essay Center, Prescheduled Sessions
Advanced Subject Suite		
Organic Chemistry, Introductory Finance	Sun - Thurs: 9PM to 1AM ET	Sun - Thurs: 9PM to 1AM ET
Mathematics Beyond Calculus II, Advanced Statistics	Available upon request via Prescheduled Sessions	Available via Submit Your Question and Prescheduled Sessions

- **Live Sessions** are metered to the minute + five minutes for archiving.
- **Submit a Question** -- metered at 20 minutes per question; available 24 hours a day, 7 days a week.
- **Submit Your Writing** -- metered at 35 minutes per essay; available 24 hours a day, 7 days a week.
- **Essay Center - 1 Hour Review** -- where available, this option is metered at 60 minutes per essay plus 5 minutes for archiving, and is available 24 hours a day, 7 days a week.
- *Note: Summer schedule begins at 9 AM on the Tuesday after Memorial Day; regular hours resume at 9 AM on the Tuesday after Labor Day.*
- *Note: Drop-in tutoring will not be available during holiday closures..*

Basic Setup

Memory

Windows PC = 16MB

Apple Mac OS = 32MB

Connection Speed

56K modem recommended; 28.8K modem will also work without major problems.

Browsers

Windows PC users need:

Firefox 1.0.4 or higher
Internet Explorer 5.1 or higher
Netscape 6 or higher

Apple Mac OS users need:

Firefox 1.0.4 or higher
Internet Explorer 5.1 or higher
Safari 1.3 or higher

Attention Mac OS Users: Netscape browsers on the Apple Mac OS platform are not supported with the SMARTHINKING application.

Settings and Plug-Ins

- Pop-ups must be disabled for the SMARTHINKING site.
- JavaScript must be enabled to use this site.
- Session cookies must be enabled for your logged in session on our site to work properly.
- Java runtime must also be enabled if you will be using the screen capture tool in the SMARTHINKING whiteboard.
- ActiveX must be enabled if you will be using the screen capture tool in the SMARTHINKING whiteboard and are using Internet Explorer.
- Flash® Player must be installed: 8 or higher for Windows 98/NT/2000/XP or Apple Mac OS X; 7.0.19 or higher for Apple Mac OS 9

Please visit the Customer Support section of the SMARTHINKING website at <http://www.smarthinking.com> for the latest technical specifications for this service.

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or
- Email support@SMARTHINKING.com, and receive a response within 24-48 hours.

