

What students might read in high school math.

19. ★ **MULTIPLE CHOICE** What is a completely simplified expression for $\sqrt{108}$?

- (A) $2\sqrt{27}$ (B) $3\sqrt{12}$ (C) $6\sqrt{3}$ (D) $10\sqrt{8}$

ERROR ANALYSIS Describe and correct the error in simplifying the expression or solving the equation.

20.

$$\begin{aligned}\sqrt{96} &= \sqrt{4} \cdot \sqrt{24} \\ &= 2\sqrt{24}\end{aligned}$$

21.

$$\begin{aligned}5x^2 &= 405 \\ x^2 &= 81 \\ x &= 9\end{aligned}$$

EXAMPLES

3 and 4

on pp. 267–268
for Exs. 21–34

SOLVING QUADRATIC EQUATIONS Solve the equation.

22. $s^2 = 169$

23. $a^2 = 50$

24. $x^2 = 84$

25. $6z^2 = 150$

26. $4p^2 = 448$

(27.) $-3w^2 = -213$

28. $7r^2 - 10 = 25$

29. $\frac{x^2}{25} - 6 = -2$

30. $\frac{t^2}{20} + 8 = 15$

31. $4(x - 1)^2 = 8$

32. $7(x - 4)^2 - 18 = 10$

33. $2(x + 2)^2 - 5 = 8$

34. ★ **MULTIPLE CHOICE** What are the solutions of $3(x + 2)^2 + 4 = 13$?

- (A) $-5, 1$ (B) $-1, 5$ (C) $-2 \pm \sqrt{3}$ (D) $2 \pm \sqrt{3}$

35. ★ **SHORT RESPONSE** Describe two different methods for solving the equation $x^2 - 4 = 0$. Include the steps for each method.

36. ★ **OPEN-ENDED MATH** Write an equation of the form $x^2 = s$ that has (a) two real solutions, (b) exactly one real solution, and (c) no real solutions.

37. **CHALLENGE** Solve the equation $a(x + b)^2 = c$ in terms of a , b , and c .

PROBLEM SOLVING

EXAMPLE 5

on p. 269
for Exs. 38–39

38. **CLIFF DIVING** A cliff diver dives off a cliff 40 feet above water. Write an equation giving the diver's height h (in feet) above the water after t seconds. How long is the diver in the air?

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39. **ASTRONOMY** On any planet, the height h (in feet) of a falling object t seconds after it is dropped can be modeled by $h = -\frac{g}{2}t^2 + h_0$ where h_0 is the object's initial height (in feet) and g is the acceleration (in feet per second squared) due to the planet's gravity. For each planet in the table, find the time it takes for a rock dropped from a height of 150 feet to hit the surface.

Planet	Earth	Mars	Jupiter	Saturn	Pluto
g (ft/sec ²)	32	12	76	30	2

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What students might read in high school English.

Othello

by William Shakespeare

ACT I

SCENE I. Venice. A street.

Enter RODERIGO and IAGO

RODERIGO Tush! never tell me; I take it much unkindly
That thou, Iago, who hast had my purse
As if the strings were thine, shouldst know of this.

IAGO 'Sblood, but you will not hear me:
If ever I did dream of such a matter, Abhor me.

RODERIGO Thou told'st me thou didst hold him in thy hate.

IAGO Despise me, if I do not. Three great ones of the city,
In personal suit to make me his lieutenant,
Off-capp'd to him: and, by the faith of man,
I know my price, I am worth no worse a place:
But he; as loving his own pride and purposes,
Evades them, with a bombast circumstance
Horribly stuff'd with epithets of war;
And, in conclusion,
Nonsuits my mediators; for, 'Certes,' says he,
'I have already chose my officer.'
And what was he?
Forsooth, a great arithmetician,
One Michael Cassio, a Florentine,
A fellow almost damn'd in a fair wife;
That never set a squadron in the field,
Nor the division of a battle knows
More than a spinster; unless the bookish theoretic,
Wherein the toged consuls can propose
As masterly as he: mere prattle, without practise,
Is all his soldiership. But he, sir, had the election:
And I, of whom his eyes had seen the proof
At Rhodes, at Cyprus and on other grounds
Christian and heathen, must be be-lee'd and calm'd
By debtor and creditor: this counter-caster,
He, in good time, must his lieutenant be,
And I--God bless the mark!--his Moorship's ancient.

RODERIGO By heaven, I rather would have been his hangman.

What students might read in high school science.

On the actual Chemistry Test, the following type of question must be answered on a special section (labeled “Chemistry”) at the lower left-hand corner of your answer sheet. These questions will be numbered beginning with 101 and must be answered according to the following directions.

Sample Answer Grid

*Fill in circle CE (correct explanation) only if statement II is a correct explanation of the true statement I.

	I	II	CE*
101	<input type="radio"/> T <input type="radio"/> F	<input type="radio"/> T <input type="radio"/> F	<input type="radio"/> CE

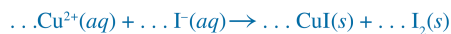
Directions: Each question below consists of two statements, I in the left-hand column and II in the right-hand column. For each question, determine whether statement I is true or false and whether statement II is true or false and fill in the corresponding T or F circles on your answer sheet. *Fill in circle CE only if statement II is a correct explanation of the true statement I.

I	BECAUSE	II
101. The rate at which sugar dissolves in water increases with stirring	BECAUSE	stirring exposes the surface of a solute crystal to a less concentrated layer of solution.
102. Diamond has a high melting point	BECAUSE	in a diamond crystal, the carbon atoms are held in place by ionic bonds.
103. Potassium has a lower first ionization energy than lithium has	BECAUSE	potassium has more protons in its nucleus than lithium has.
104. Zinc metal will reduce Cu^{2+} in solution	BECAUSE	zinc is a more active metal than copper is.
$\text{HC}_2\text{H}_3\text{O}_2 + \text{H}_2\text{O} \rightleftharpoons \text{C}_2\text{H}_3\text{O}_2^- + \text{H}_3\text{O}^+$		
105. If some acetic acid, $\text{HC}_2\text{H}_3\text{O}_2$, is added to the equilibrium mixture represented by the equation above, the concentration of H_3O^+ decreases	BECAUSE	the equilibrium constant of a reaction changes as the concentration of the reactants changes.

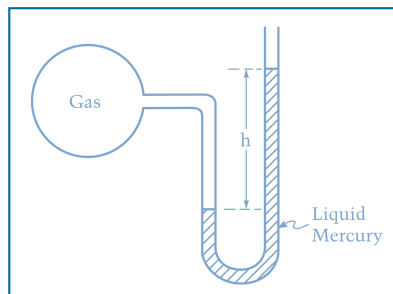
On the actual Chemistry Test, the remaining questions must be answered by returning to the section of your answer sheet you started for the Chemistry Test.

Directions: Each of the questions or incomplete statements below is followed by five suggested answers or completions. Select the one that is best in each case and then fill in the corresponding circle on the answer sheet.

11. The hydrogen ion concentration of a solution prepared by diluting 50. mL of 0.10 M $\text{HNO}_3(aq)$ with water to 500. mL of solution is
- (A) 0.0010 M (B) 0.0050 M (C) 0.010 M
(D) 0.050 M (E) 1.0 M



12. When the equation above is balanced and all coefficients are reduced to lowest whole-number terms, the coefficient for $\text{I}^{-}(aq)$ is
- (A) 1 (B) 2 (C) 3
(D) 4 (E) 5



13. The bulb of the open-end manometer shown above contains a gas. True statements about this system include which of the following?
- I. Only atmospheric pressure is exerted on the exposed mercury surface in the right side of the tube.
II. The gas pressure is greater than atmospheric pressure.
III. The difference in the height, h , of mercury levels is equal to the pressure of the gas.
- (A) II only
(B) III only
(C) I and II only
(D) I and III only
(E) I, II, and III

What students might read in high school history.

There Is To Be No War

Alfred Iverson of Georgia
Speaking before the U.S. Senate
December 4, 1860

We intend, Mr. President, to go out peaceably if we can, forcibly if we must; but I do not believe, with the Senator from New Hampshire, that there is going to be any war. If five or eight States go out, they will necessarily draw all the other Southern States after them. That is a consequence that nothing can prevent. If five or eight States go out of this Union, I should like to see the man that would propose a declaration of war against them, or attempt to force them into obedience to the Federal Government at the point of the bayonet or the sword.

Sir, there has been a good deal of vapping on this subject. A great many threats have been thrown out. I have heard them on this floor, and upon the floor of the other House of Congress; but I have also perceived this: they come from those who would be the very last men to attempt to put their threats into execution. Men talk sometimes about their eighteen million who are to whip us; and yet we have heard of cases in which just such men had suffered themselves to be switched in the face, and trembled like sheep-stealing dogs, expecting to be shot every minute.

But, sir, there is to be no war. The Northern States are controlled by sagacious men, like the distinguished Senator from New York [William H. Seward]. Where public opinion and action are thus controlled by men of common sense, who know well that they cannot succeed in a war against the Southern States, no such attempt at coercion will be made. If one State alone was to go out, unsustained by her surrounding sister States, possibly war might ensue, and there might be an attempt made to coerce her, and that would give rise to civil war; but, sir, South Carolina is not to go out alone. In my opinion, she will be sustained by all her Southern sisters. They may not all go out immediately; but they will, in the end, join South Carolina in this important movement; and we shall, in the next twelve months, have a confederacy of the Southern States, and a government inaugurated, and in successful operation, which, in my opinion, will be a government of the greatest prosperity and power that the world has ever seen.

The fifteen slave States, or even the five of them now moving, banded together in one government, and united as they are soon to be, would defy the world in arms, much less the Northern States of this confederacy. Fighting on our own soil, in defence of our own sacred rights and honor, we could not be conquered even by the combined forces of all the other States; and sagacious, sensible men in the Northern States would understand that too well to make the effort.

What students in high school might read outside of the classroom.

SECTION 4 – STUDENT FINANCES

- Answer the questions as of the date you will complete and sign your FAFSA.
- This section asks about your income. Refer to your IRS tax return when necessary.
- If you filed a foreign tax return, convert all figures to U.S. dollars, using the exchange rate. To view the daily exchange rates, go to www.federalreserve.gov/releases/h10/update.
- If you are married as of today, report your and your spouse's income, even if you were not married in 2006. Ignore references to spouse if you are single, divorced, separated or widowed.

<p>Have you completed a 2006 IRS income tax return or other income tax return? (Q32)</p>	<input type="checkbox"/> Already completed <input type="checkbox"/> Will file <input type="checkbox"/> Will not file
<p>What income tax return did you file or will you file for 2006? (Q33)</p>	<input type="checkbox"/> IRS 1040 <input type="checkbox"/> IRS 1040A or 1040EZ <input type="checkbox"/> A foreign tax return <input type="checkbox"/> A tax return with Puerto Rico, another U.S. territory or a freely associated state
<p>If you filed or will file a 1040, were you eligible to file a 1040A or 1040EZ? (Q34)</p> <p>In general, you are eligible to file a 1040A or 1040EZ if you make less than \$100,000, do not itemize deductions, do not receive income from your business or farm, and do not receive alimony. A person is not eligible to file a 1040A or 1040EZ if he or she makes \$100,000 or more, itemizes deductions, receives income from his or her own business or farm, is self-employed, receives alimony, or is required to file Schedule D for capital gains. If you filed a 1040 only to claim Hope or Lifetime Learning tax credits, and you would otherwise have been eligible for a 1040A or 1040EZ, you should answer "Yes."</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Don't know
<p>What was your (and your spouse's) adjusted gross income for 2006? (Q35)</p> <p>Adjusted gross income is on IRS Form 1040—line 37; 1040A—line 21; or 1040EZ—line 4.</p>	<input type="text" value="\$"/>
<p>What was your (and your spouse's) income tax for 2006? (Q36)</p> <p>Income tax amount is on IRS Form 1040—line 57; 1040A—line 35; or 1040EZ—line 11.</p>	<input type="text" value="\$"/>
<p>Enter your (and your spouse's) exemptions for 2006. (Q37)</p> <p>Exemptions are on IRS Form 1040—line 6d or 1040A—line 6d. On the 1040EZ, if a person checked either the "you" or "spouse" box on line 5, use EZ worksheet line F to determine the number of exemptions (\$3,300 equals one exemption). If a person didn't check either box on line 5, enter 01 if he or she is single, or 02 if he or she is married.</p>	<input type="text"/>
<p>How much did you (and your spouse) earn from working (wages, salaries, tips, combat pay, etc.) in 2006? (Q38, 39)</p> <p>Answer this question whether or not you filed a tax return. This information may be on your W-2 forms or on IRS Form 1040—lines 7+12+18+Box 14 of IRS Schedule K-1 (Form 1065); 1040A—line 7; or 1040EZ—line 1.</p>	<p>Student <input type="text" value="\$"/></p> <p>Spouse <input type="text" value="\$"/></p>

- If you answered "YES" to ANY question in Section 2, answer the following questions.
- If you answer "NO" to all the questions in Section 2, skip these questions and go to "Student FAFSA Worksheets A, B and C."

<p>How many people are in your household? (Q90)</p> <p>Include in your household: (1) yourself (and your spouse, if you are married), (2) your children, if you will provide more than half of their support from July 1, 2007, through June 30, 2008, and (3) other people if they now live with you, you provide more than half of their support, and you will continue to provide more than half of their support from July 1, 2007, through June 30, 2008.</p>	<input type="text"/>
<p>How many people in the question above will be college students in 2007-2008? (Q91)</p> <p>Always count yourself. Include others only if they will attend college at least half time in 2007-2008 in a program that leads to a college degree or certificate.</p>	<input type="text"/>
<p>In 2006, did you (or your spouse) or anyone in your household (from Q90) receive benefits from any of the federal benefit programs listed? (Q92-96)</p> <p>Mark all the programs that apply.</p> <p>The federal benefit programs are listed in the answer column. Report benefits received for all of your household members. Use the instructions in Q90 to identify who is included in your household.</p>	<input type="checkbox"/> Supplemental Security Income <input type="checkbox"/> Food Stamps <input type="checkbox"/> Free or Reduced Price School Lunch <input type="checkbox"/> Temporary Assistance for Needy Families (TANF) <input type="checkbox"/> Special Supplemental Nutrition Program for Women, Infants, and Children (WIC)