



It is always a good idea to study for a period of several days or even weeks or months prior to taking a test as important as the THEA math test (hereafter referred to as THEA or the test). This handout assumes you have done that and that you are looking for the extra edge that some test-taking skills can provide. Although THEA is the specific target here, many of these tips apply to other academic tests as well.

As the test date approaches, there are four times when specific actions (or inactions) on your part can significantly affect your performance on THEA: a day or two before the test, the night before the test, the morning of the test, and during the test.

A Day Or Two Before The Test be sure you know exactly where the test will be held. This includes checking out the parking situation (if you must drive to get to the exam) and finding the exact room (if the test is held somewhere you've never been before). Be sure your personal schedule allows you to stay for the entire 5 hours of the test. You may think you can finish the test and get to work after 3 hours, but many students haven't passed because they rushed to finish early. Make this test your number one priority for the day.

Understand the format of the test; all questions are multiple-choice with four answer choices. Also be aware of the information given to you on the Definitions and Formulas sheet. It's true that you don't have to remember a lot of formulas, but it's better to know which formulas are provided.

Be certain you have a game plan to follow during the test – some suggestions are provided later in this handout. Don't wait until the exam is in front of you to decide, "Gee, I guess I'll do all the geometry problems last," etc. Hopefully, you have practiced your game plan by solving THEA-like math problems under test conditions.

The Night Before The Test, don't do anything unusual. Don't eat any foods you've never eaten before; don't drastically change your sleep pattern; don't party in a way that will leave you unable to perform your best work the next morning, and *don't study any new material*. If you haven't studied a topic before now, looking at it the night before the test risks raising your anxiety level about it. It's better to just review general concepts and stay optimistic.

Gather *everything* you'll need for the next morning so there won't be a rush to get it together in the last few minutes before you leave to take the test. That means packing up your admission ticket, picture ID, sharpened pencils, and eraser *before* going to bed. Be sure you choose some comfortable clothes you can wear in layers. You'll be sitting in them a long time and, regardless of the outside temperature, you won't know whether the exam room will be warm or chilly. So being able to bulk up or take off a few layers is the best way to dress.

The Morning Of The Test is no time to be running late. Allow enough time to eat something nutritious for breakfast (avoid a heavy dose of caffeine, sugar, or anything else that will give you a short-lived, artificial high), and arrive at the test early. People have been turned away for arriving late.

During The Test listen carefully to the instructions read to you, but don't misunderstand the part about not needing to take all 3 sections. Not attempting a section is the same as failing it, so you might as well attempt all 3 sections. The only way you can skip a section and not have it count as a failure is if you have previously taken THEA and passed that section.

TAKING THE TEST

Follow your game plan; here are some suggestions:

- A. Immediately write down in the margin of the test booklet anything you are trying to remember for the test (Don't be afraid to write in the test booklet; it's there for your use). Then, read each problem and decide if it is easy, medium, or hard. If it is easy, do it immediately. That gets you warmed up, puts points on the paper, and increases your confidence. If it is medium, mark it with a check mark or with an "M". If it is hard, mark it with two check marks or with an "H."

If any thoughts come to you while you are reading through all the problems, immediately jot them down in the margin of the test booklet. Those thoughts can be valuable starting points for solving the problems.

After you have read all the problems, labeled them, and done all the easy ones, go back and do all the medium problems. Some of them will look easy now that you are warmed up. Finally, go back and do all the hard problems; even some of these will look easier now! When you're deciding on the best answer, cross out the obviously incorrect answer choices. Don't get stuck on any one problem; you can always circle that question number and come back to it later.

- B.** Be sure you mark an answer for every problem – there is **no penalty** for wrong answers. Spot-check your answer sheet every once in awhile to be sure you are answering each problem in the proper blank on the answer sheet.
- C.** As you work on each problem, be sure to read all the answer choices carefully and to answer only the question that is asked. Watch out for precise wording, as in the following example:

Congruent figures are figures that must have

- A. the same size but not necessarily the same shape
- B. the same shape but not necessarily the same size
- C. the same size and the same shape
- D. corresponding sides that are proportional but not necessarily equal

The word **must** means you need to find an answer that is **always** true for congruent figures and not one that may be true or is usually true. Answers A, B, and D start off with statements that are true for congruent figures. Then, each has a "but not necessarily" phrase that needs to be true for figures to be congruent. Answers B and D would be correct if the problem asked about **similar** figures. Answer C is correct.

- D.** THEA will supply all the "correct wrong-answers" among the answer choices. For example:

John has \$4.45 in dimes and quarters. He has a total of 22 coins. How many dimes does he have?

- A. 15 B. 70 C. 7 D. 12

Notice how answer A is the correct number of *quarters* John has, and answer B is the correct *cash value* of the dimes John has. Neither is the answer to the question asked. Answer D is the correct number of dimes if John has 25 coins (don't confuse 25¢ coins – quarters – with having 25 coins). Answer C is correct.

- E.** Of course, if the answer choices do not include "none of the above", you can try to work backwards by checking each one in the problem statement to see which one works. A variation of this method is to substitute simple numbers for the unknowns in the problem statement and in the answer choices. Here's an example:

$$\frac{3}{x} + \frac{5}{y} = \quad \text{A. } \frac{8}{x+y} \quad \text{B. } \frac{5x+3y}{x+y} \quad \text{C. } \frac{5x+3y}{xy} \quad \text{D. } \frac{3x+5y}{xy}$$

Let x equal any multiple of 3, and let y equal any multiple of 5, and evaluate the problem statement as a number. Using x = 3, and y = 5, the problem statement's value is 2. Now, use those same values for x and y in each answer choice and see which choice has a value of 2. Answer C is correct.

- F.** If you begin to feel anxious during the test, take a few moments to settle down by closing your eyes, imagining something pleasant, and breathing deeply. Time is not really a factor during THEA. The few moments spent relaxing are well worth it, even if you have to do it several times during the test. Every once in a while during your test, sit up very straight, tilt your head back a bit, and focus your eyes on something distant for several seconds. This will help ward off eye strain from too many hours of close work. Do whatever it takes to remove tension: flex your fingers, shake your hands, roll your shoulders, etc.

You need to be comfortable enough physically for total mental focus on the test, not on yourself and certainly not on others. Don't let what others are doing, what you did or didn't do to prepare for THEA, or what you don't know interfere with demonstrating what you do know.

- G.** If you finish early, check your answers for accuracy and for proper placement on the answer sheet. Be sure you indicate an answer choice for every problem.

MATH TIPS

Here are examples of a few test-taking skills you could use if you don't know how to solve the problem otherwise. It is *always* better to actually do the problem if you can. But, as a last resort, you may be able to use these techniques to eliminate some answer choices and improve your chances of guessing the correct answer. These techniques can sometimes be used to check your answer even if you do know how to solve the problem.

- A.** Often you can get part of an answer and use that part to eliminate one or more of the answer choices:

What is the slope and y-intercept of the line that has the equation $4y - 3x = 6$?

- A. slope = $\frac{3}{4}$; y-intercept = $\frac{3}{2}$
B. slope = $\frac{4}{3}$; y-intercept = -2
C. slope = $\frac{3}{4}$; y-intercept = 6
D. slope = $\frac{4}{3}$; y-intercept = $\frac{3}{2}$

If you know enough to determine that the y-intercept is the value of y when x is zero (i.e. $\frac{3}{2}$), you can eliminate choices B, and C. The correct answer is A.

- B.** Occasionally, you can use the units of the answer to determine which answer choices are possible:

What is the volume of a sphere of diameter 12 inches?

- A. $144\pi \text{ in}^2$
B. $288\pi \text{ in}^3$
C. $36\pi \text{ in}^2$
D. $2304\pi \text{ in}^3$

Volume is measured in cubic units, so A and C can be eliminated. The correct answer is B.

- C.** Because the test-makers are trying to determine if you really know your stuff, they often make two or more answer choices similar. If you have absolutely no idea what the answer is, choose one of the similar looking answer choices - the correct answer is often one of those. If the answer choices are made up of several pieces, and each different piece occurs in all but one answer choice, eliminate the answer choices that don't contain each of the similar pieces:

$$6x^2 + 3x - 18 =$$

A. $2(2x - 3)(x + 2)$
B. $3(2x - 3)(x - 2)$
C. $3(x - 3)(x + 2)$
D. $3(2x - 3)(x + 2)$

All answer choices have a 3 in them, except A. So eliminate A. All answer choices have a $(2x - 3)$ in them, except C. So eliminate C. All answer choices have a $(x + 2)$ in them, except B. So eliminate B. That leaves D, which is the correct answer.

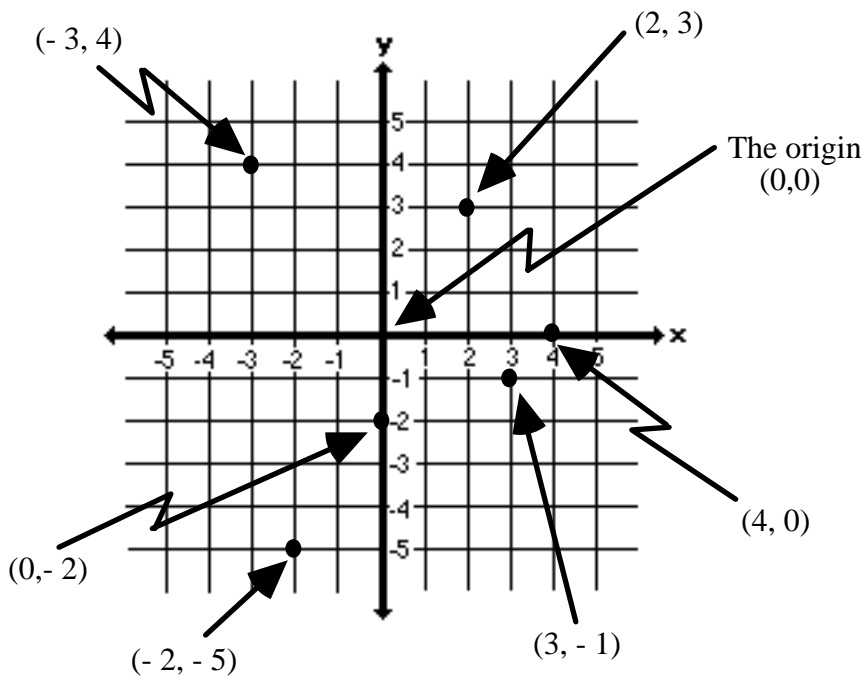
APPLICATION Try this strategy on the following problems in the Official TASP Test Study Guide: p. 629 #20, p. 642 #48

- D. Here are a few "Quick Algebra Graphing Tips":
Don't let those algebra graphs of lines and parabolas scare you! If you can plot a point, you can often solve the problem. Before looking at how to solve the problems, it might be helpful to review plotting points.

PLOTTING POINTS

Each point can be represented by an ordered pair, (x, y) . The first number tells you how to move in relation to the x-axis and the second number tells you how to move in relation to the y-axis. You always begin your movement from what is known as the origin $(0,0)$, the place where the x- and y-axis cross.

- For the x value - if it is negative move left, positive move right.
- For the y value - if it is negative move down, positive move up.



So the point $(-3, 4)$ would tell you to begin at the origin, move 3 units to the left, and then move 4 units up.

For the point $(4, 0)$ you begin at the origin, go 4 units to the right, and 0 units up or down.

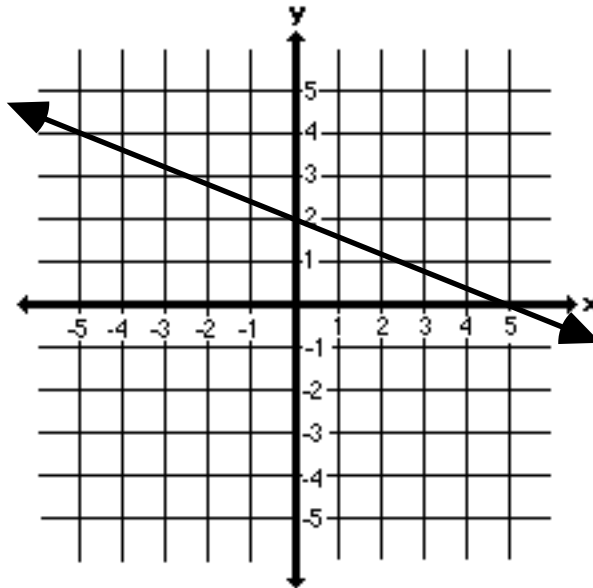
For the point $(0, -2)$ you begin at the origin, go 0 units left or right, and 2 units down.

For the point $(3, -1)$ you begin at the origin, go 3 units to the right, and 1 unit down.

For the point $(-2, -5)$ you begin at the origin, go 2 units to the left, and 5 units down.

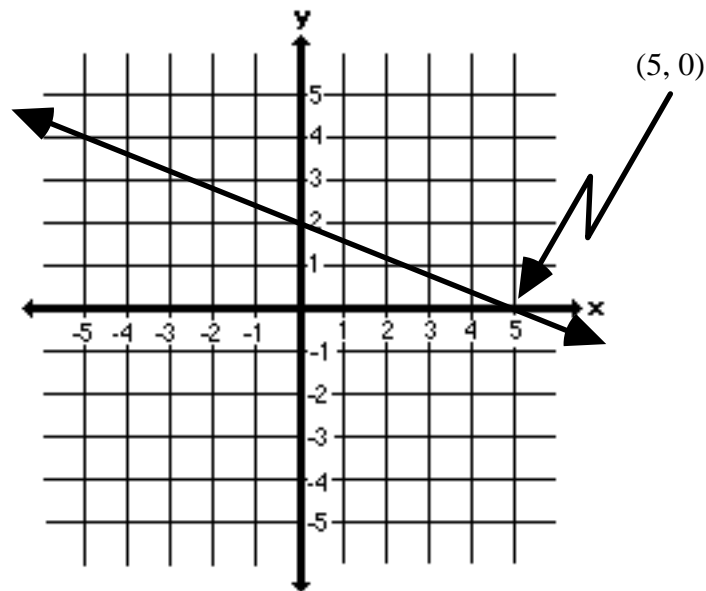
For the point $(2, 3)$ you begin at the origin, go 2 units to the right, and 3 units up.

Now on the THEA Test you might be asked, "Which equation is represented by the graph below?"



- A. $5x + 2y = 10$
- B. $y = -x + 2$
- C. $-x + 2 = y$
- D. $5y + 2x - 10 = 0$

It is always best to use a point on the x- or y-axis, if possible. This graph goes through the point (5, 0). You can plug these values into the answer choices and see which equation it satisfies.



Take the first equation, $5x + 2y = 10$, and plug a 5 in for x and a 0 in for y.

$$\begin{aligned} 5(5) + 2(0) &= 10 \\ 25 + 0 &= 10 \\ 25 &= 10 \text{ This is not true.} \end{aligned}$$

Try B.

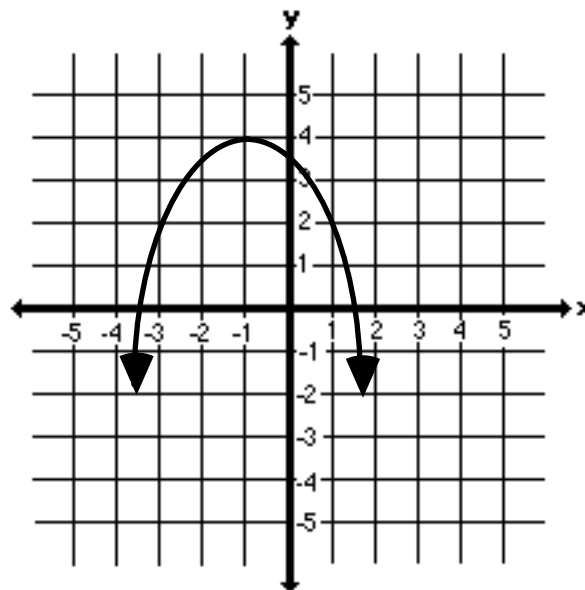
$$\begin{aligned} y &= -x + 2 \\ (0) &= -(5) + 2 \\ 0 &= -5 + 2 \\ 0 &= -3 \text{ This is not true.} \end{aligned}$$

Try C. $-x + 2 = y$
 $-(5) + 2 = (0)$
 $-5 + 2 = 0$
 $-3 = 0$ This is not true.

Try D. $5y + 2x - 10 = 0$
 $5(0) + 2(5) - 10 = 0$
 $0 + 10 - 10 = 0$
 $0 = 0$ This is true so D must be the answer.

Here is another example.

You might be asked, "Which equation is represented by the graph below?"

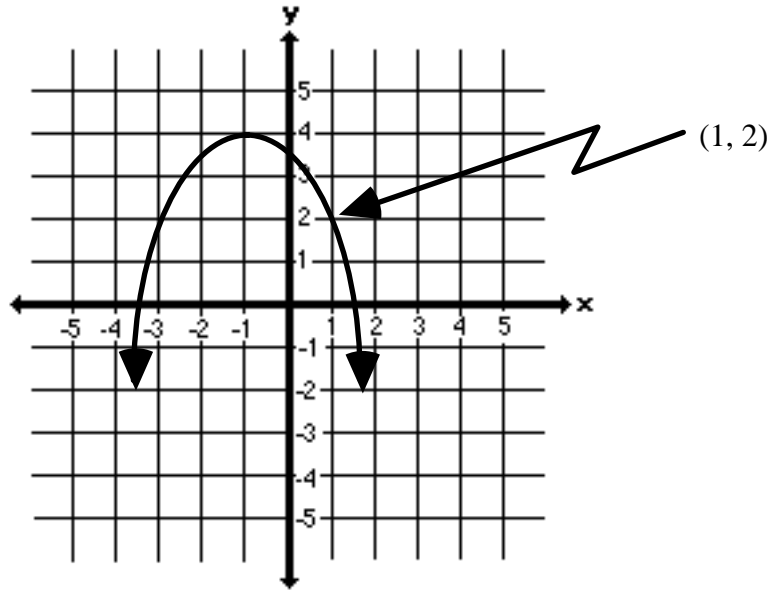


- A. $x^2 - 1 = y$
- B. $y = -x^2 + 4$
- C. $-x^2 + 7 = 2y + 2x$
- D. $x^2 - 2x + 4 = y$

The graph above is that of a parabola. To solve this, you don't have to know how to graph a parabola. You can use the fact that the graph goes through the point (1,2) and see which equation this point satisfies.

IMPORTANT NOTE:

When picking points it is best to pick one **ON** the x- or y-axis if there is a point that doesn't require a decimal or fraction. This graph did not have one so you are forced to look elsewhere.



Take the first equation, $x^2 - 1 = y$, and plug a 1 in for x and a 2 in for y .

$$\begin{aligned} (1)^2 - 1 &= (2) \\ 1 - 1 &= 2 \\ 0 &= 2 \quad \text{This is not true.} \end{aligned}$$

Try B. $y = -x^2 + 4$

$$\begin{aligned} (2) &= -(1)^2 + 4 \\ 2 &= -1 + 4 \\ 2 &= 3 \quad \text{This is not true.} \end{aligned}$$

Try C. $-x^2 + 7 = 2y + 2x$

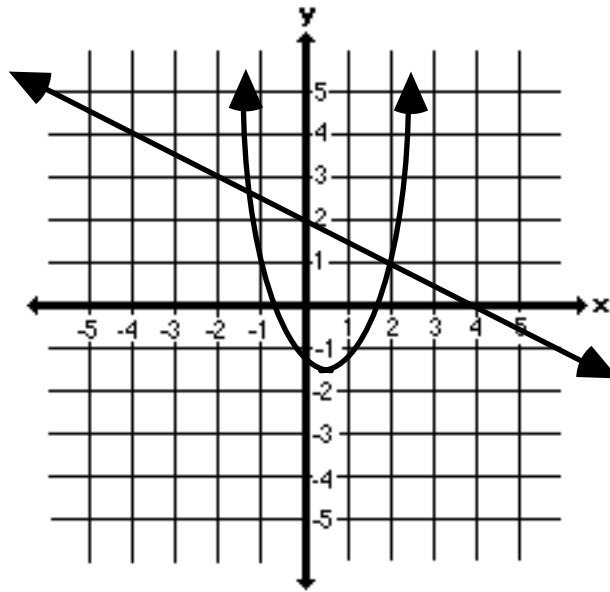
$$\begin{aligned} -(1)^2 + 7 &= 2(2) + 2(1) \\ -1 + 7 &= 4 + 2 \\ 6 &= 6 \quad \text{This is true so C must be the answer.} \end{aligned}$$

You may try D just to make sure. If the point also works for D, choose another point on the graph and find which equation, C or D, the point satisfies. This might happen since the designers of the test know you might be plugging in numbers to answer the questions.

Try D. $x^2 - 2x + 4 = y$

$$\begin{aligned} (1)^2 - 2(1) + 4 &= (2) \\ 1 - 2 + 4 &= 2 \\ 3 &= 2 \quad \text{This is not true so C must be the answer.} \end{aligned}$$

Even when the question gets more difficult you can still use this method. For example you might be asked, "Which system is represented by the graph below?"



- A. $x^2 - 1 = y$ and $y = -x + 3$
- B. $2y + x - 4 = 0$ and $x^2 - x = 1 + y$
- C. $2y - 1 = x$ and $x^2 - x + 1 = y$
- D. $x^2 - x = y$ and $y = x + 2$

For a problem like this you might observe that both graphs go through the point (2, 1), so plug these values into both equations for each of the answers choices.

Start with A.

$x^2 - 1 = y$	and	$y = -x + 3$
$(2)^2 - 1 = (1)$	and	$(1) = -(2) + 3$
$4 - 1 = 1$	and	$1 = 1$
$3 = 1$	and	$1 = 1$

Both of these cases must be true for this to be the answer. This is not the answer.

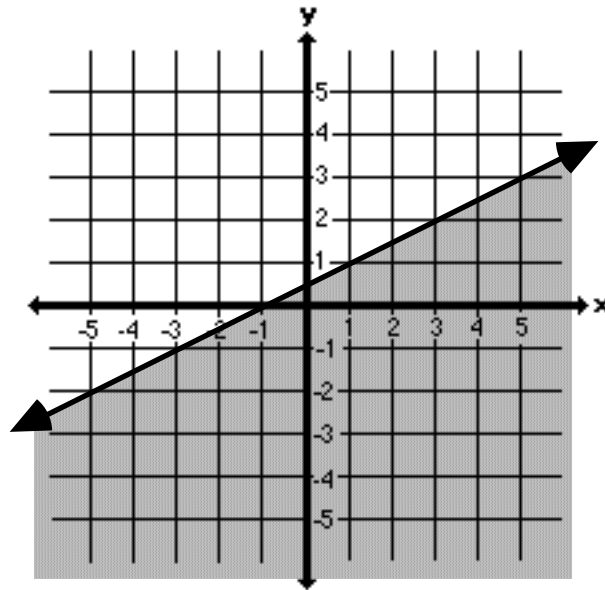
Now try B.

$2y + x - 4 = 0$	and	$x^2 - x = 1 + y$
$2(1) + (2) - 4 = 0$	and	$(2)^2 - (2) = 1 + (1)$
$2 + 2 - 4 = 0$	and	$4 - 2 = 1 + 1$
$4 - 4 = 0$	and	$2 = 2$
$0 = 0$	and	$2 = 2$

These are both true so this would be the answer.

You can even take the graphs one at a time. Notice that the line goes through (-2, 3) and the parabola goes through (-1, 1). If you take them one at a time you must remember that the equation of a line has just x's and y's but no x²'s and a parabola has x²'s. You will have to be careful into which equation you put which point.

For an inequality you can also use this method. The THEA Test may ask, "Which equation is represented by the graph below?"



- A. $y < x - 1$
- B. $x - 1 \leq y$
- C. $2x > 1 - y$
- D. $1 + x \geq 2y$

Any time you have a graph with shading like the one above, ANY point within the shaded region must satisfy the inequality. One additional thing to note is the line itself. If the line is solid then you are looking for \geq or \leq in the answer. If the line is dotted then you are looking for $>$ or $<$ in the answer. The equal sign part tells us whether or not the line is solid or dotted. For this problem, since the line is solid, we need only check B and D for the correct answer since they contain the \leq and \geq symbols. The point (4,1) is within the shaded region so we can try it.

B. $x - 1 \leq y$
 $(4) - 1 \leq (1)$
 $4 - 1 \leq 1$
 $3 \leq 1$ This is not true.

D. $1 + x \geq 2y$
 $1 + (4) \geq 2(1)$
 $5 \geq 2$ This is true so this is the answer.

NOTE: If more than one of the equations works, try picking a point **ON** the line. When you do this, for the correct answer, the result on the left hand side of the equation and the right hand side of the equation will be equal (i.e., $5 \leq 5$). This will tell you which of the two is the answer.

APPLICATION Try this strategy on the following problems in the Official TASP Test Study Guide: p. 624 #9, p. 627 #16, p. 631 #27, p. 632 #28

These guessing techniques don't always produce a correct answer. Use them only if you don't already know how to work the problem.

GOOD LUCK!!