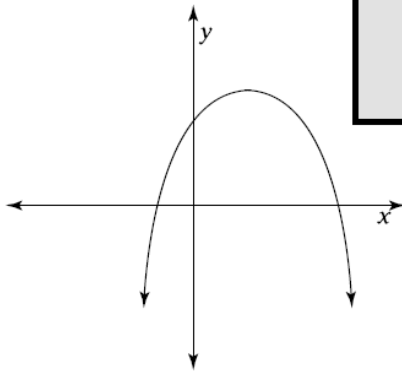


6) Which of the following is equivalent to  $\frac{\tan x \csc x}{\sin x \sec x}$  ?

- a) 1
- b)  $\sin x$
- c)  $\cos x$
- d)  $\cot x$
- e)  $\csc x$

7) The graph shows a parabola describing th  
Which of the following CANNOT be true



- c)  $b < c$
- d)  $c < b$
- e)  $a < c$

8)  $(2x - 1)^2 =$

- a)  $4x^2 - 1$
- b)  $4x^2 + 1$
- c)  $4x^2 - 4x + 1$
- d)  $4x^2 - 2x + 1$
- e)  $4x^2 + 2x - 1$

9) Find the domain of the function  $g(x) = \frac{4-x}{\sqrt{x^2-16}}$

- a)  $-4 \leq x \leq 4$
- b)  $-4 < x < 4$
- c)  $-4 > x > 4$
- d)  $x \leq -4$  or  $x \geq 4$
- e)  $x < -4$  or  $x > 4$

10) In the geometric sequence  $t_n$   $t_1 = 2$

$$t_2 = 3$$

- a) 5
- b) 6

# ACT/SAT Math STRATEGIES

100 Multiple Choice Questions  
(and, solutions)  
to improve time management  
and problem solving skills

by Lance Friedman

A solid Standardized Test performance will require

- **Knowledge of the subjects** – for example, if you don't know trigonometry, it is difficult to answer a trig ratio question.
- **Time management** – do easy questions first; know when to skip or abandon a question.
- **Attention to detail** – picking out key parts of questions, and minimizing simple mistakes!

This packet contains 100 multiple choice math questions designed to review subjects and to improve problem solving skills. Included are detailed solutions, showing steps and suggesting strategies and tips to improve time management. (The following page shows four examples)

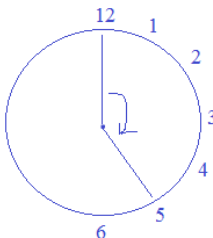
**“10 questions in 10 minutes”**

The 100 questions are divided into 10 batches: Spend 10 minutes or less per batch to improve speed and accuracy. Then, look at the answers and see how you did!

Example: What is the degree measure of the angle formed by the hands of a clock that reads exactly 5 o'clock?

- a) 30
- b) 70
- c) 120
- d) 150**
- e) 210

Strategy: draw a picture...  
 Eliminate: We can eliminate 30, 70, and 210  
 (The angle is obviously not acute. And, it's obviously not greater than 180...)



Solve:  
 the entire clock is 360 degrees;  
 12 to 6 is 180 degrees  
 Each hour is 30 degrees (180/6)  
 therefore, at 5:00, it's 150 degrees

Example: What positive number, when divided by its reciprocal, is  $\frac{9}{25}$  ?

- a) 3/25
- b) 3/5**
- c) 5/3
- d) 9/5
- e) 25/9

Strategy: try each number... and, perhaps identify a pattern?  
 $3/25$  divided by  $25/3$  --->  $3/25 \times 3/25$  (it's the number times itself)  
 so, we're looking for  $3/5$ , because  $3/5 \times 3/5 = 9/25$

Example: The data in the table was produced by an exercise scientist, showing the number of trips to the gym each week. Group X were 100 people who worked evenings, and Group Y consisted of 100 people who worked during the day. If a person from Group X is chosen at random, what is the probability they work out at least once per week?

	None	1 - 4	5 - 7	Total
Group X	15	29	56	100
Group Y	8	37	55	100
Total	23	66	111	200

- a) 15/100
- b) 29/100
- c) 85/100**
- d) 66/200
- e) 177/200

Strategy: This is a time-consuming question. And, there are no clear answers.  
 Skip 'til later...

Careful: attention to detail  
 "work out AT LEAST once per week"

In Group X  
 probability =  $\frac{\text{work out AT LEAST once}}{\text{Total from group X}} = \frac{29 + 56}{100} = 85/100$

Example: What is the diameter of the circle  $x^2 + y^2 + 6x - 8y = 144$

- a) 12
- b) 13
- c) 26**
- d) 144
- e) 288

Strategy: Put the equation into standard form (by completing the square)

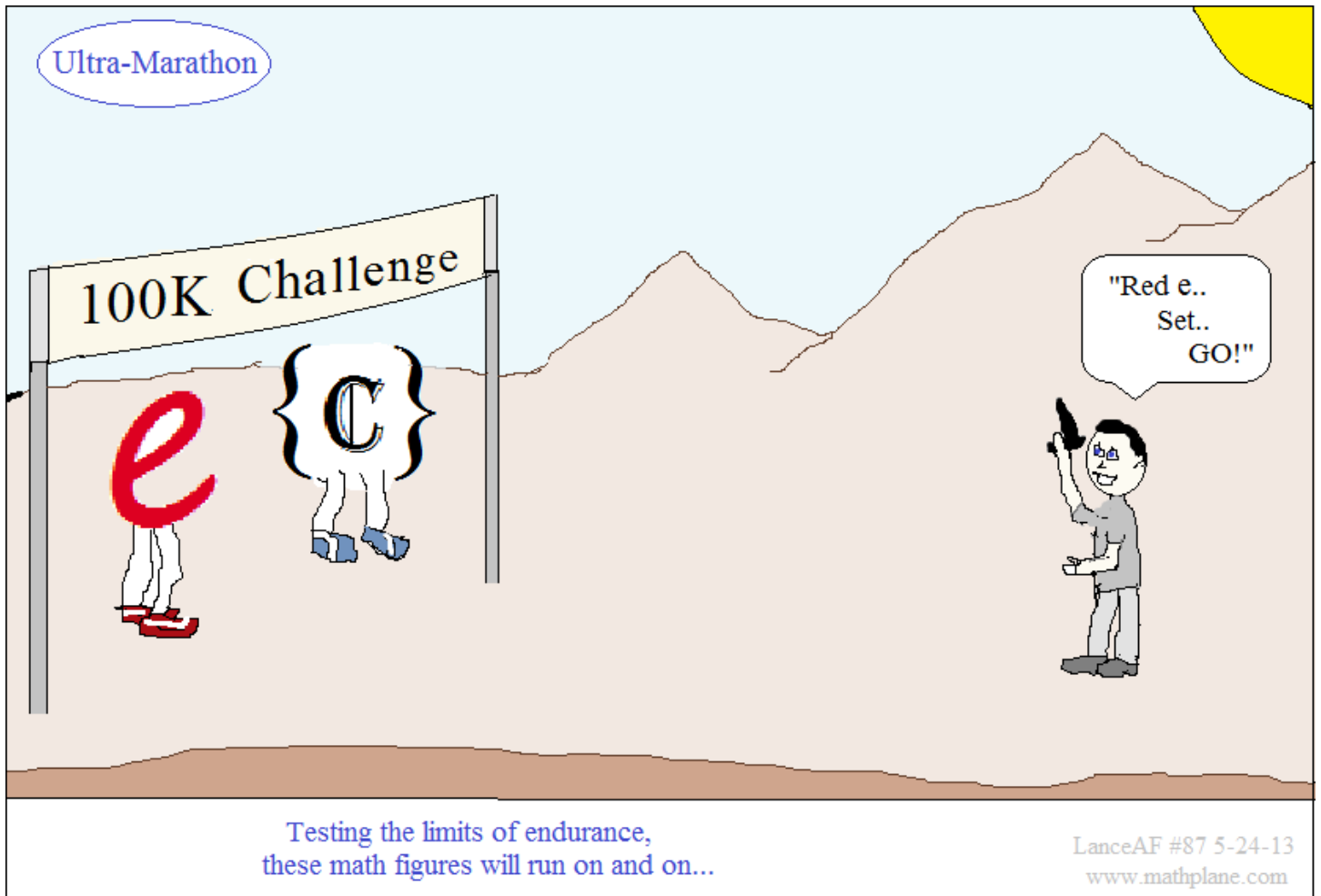
Careful! We're seeking the "diameter", not the radius...

$$x^2 + 6x + 9 + y^2 - 8y + 16 = 144 + 9 + 16$$

$$(x + 3)^2 + (y - 4)^2 = 169 \quad \text{center: } (-3, 4)$$

$$(x - h)^2 + (y - k)^2 = r^2 \quad \text{radius: } 13$$

therefore, the diameter is 26



*Strategy: "Pace yourself."*

10 Questions in 10 Minutes

"10 questions in 10 minutes"

1) Which is the largest number?

- a)  $\overline{.6}$
- b)  $.6$
- c)  $.66$
- d)  $.666$
- e)  $.6666$

2)  $x^2 - y^2 = 36$

$x - y = 4$

What is y?

- a) 2
- b) 2.5
- c) 6
- d) 6.5
- e) 9

3) What is the probability that a number selected at random from the set  $\{2, 5, 10, 11, 14, 19, 25\}$  will be even *and* divisible by 5?

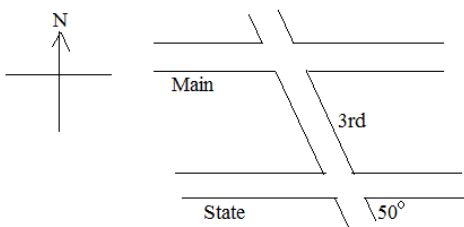
- a)  $1/7$
- b)  $3/7$
- c)  $4/7$
- d) 1
- e) 0

4) Matt has the following long distance plan:  $.10$  per minute on weekdays 7pm - 7am, Saturdays, and holidays;  $.05$  per minute on Sundays;  $.25$  per minute all other times. If the table represents his long distance calls, what was the total cost?

- a) 4.70
- b) 5.50
- c) 6.20
- d) 7.40
- e) 8.25

Tuesday	5:00 pm	10 minutes
Wednesday	10:30am	8 minutes
Thanksgiving holiday	12:15pm	14 minutes
Saturday	4:00pm	9 minutes
Sunday	10:00am	12 minutes

5) Below is a map of Mathtown, showing the downtown cross streets...  
If Main and State run parallel East-West, what would the angle formed at the southeast corner of Main and 3rd avenue be?



- a) 40
- b) 50
- c) 130
- d) 140
- e) 150

- 6) A box contains a bunch of colored marbles.  
1/10 of the marbles are blue, 1/2 of the marbles are red,  
1/4 of the marbles are green, and the remaining 30 are clear white.

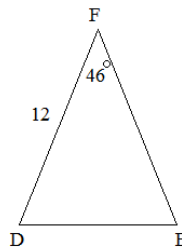
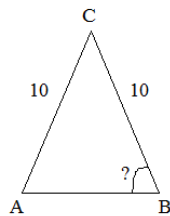
What is the number of green marbles in the box?

- a) 25
- b) 50
- c) 70
- d) 100
- e) 200

- 7) The triangles are similar. What the measure of angle B?

$$\triangle ABC \sim \triangle DEF$$

- a) 44
- b) 46
- c) 60
- d) 67
- e) 72



- 8) Jerry has math test scores of 88, 78, 74, and 92..  
What does he need on his 5th test to raise his average 2 points?

- a) 80
- b) 83
- c) 85
- d) 91
- e) 93

- 9) A hiker leaves camp and travels 10 miles due North. Then, he turns and goes 6 miles due East.  
If the hiker walks directly back to camp, how far must he travel?

- a) 4 miles
- b) 8 miles
- c) 11.7 miles
- d) 13.3 miles
- e) 16 miles

- 10) Jeremy is standing atop a vertical cliff. His friend Dani is on the ground, 130 feet from the bottom of the cliff.  
If the angle of depression from Jeremy to Dani is 35 degrees, what is the height of the cliff?

- a) 75
- b) 91
- c) 106
- d) 159
- e) 186

"10 questions in 10 minutes"

SOLUTIONS

1) Which is the largest number?

- a)  $\overline{.6}$
- b) .6
- c) .66
- d) .666
- e) .6666

Strategy: write out the digits....

$$\begin{aligned} \overline{.6} &= .666666 \quad \leftarrow \\ .6 &= .600000 \\ .66 &= .660000 \\ .666 &= .666000 \\ .6666 &= .666600 \end{aligned}$$

2)  $x^2 - y^2 = 36$   
 $x - y = 4$

What is y?

- a) 2
- b) 2.5
- c) 6
- d) 6.5
- e) 9

Strategy 1: Recognize that this question is emphasizing "factoring" (and the systems)

$$\begin{aligned} (x + y)(x - y) &= 36 \\ (x + y)(4) &= 36 \\ (x + y) &= 9 \\ x - y &= 4 \\ x + y &= 9 \\ \hline 2x &= 13 \\ x &= 6.5 \quad \text{so, } y = 2.5 \end{aligned}$$

Strategy 2: Simply plug in the 5 choices...

- a) 2 If y is 2, then x must be 6 (false)
- b) 2.5 If y is 2.5, then x must be 6.5  
 $42.25 - 6.25 = 36$  (true)
- c) 6 If y is 6, then x must be 10 (false)

3) What is the probability that a number selected at random from the set {2, 5, 10, 11, 14, 19, 25} will be even and divisible by 5?

- a) 1/7
- b) 3/7
- c) 4/7
- d) 1
- e) 0

Careful: attention to detail...

Strategy: write a formula; use lists..

$$\text{probability} = \frac{\text{"successes"}}{\text{"possibilities"}} = \frac{1}{7}$$

there are 7 elements in the set; there is only one term that is even and a multiple of 5: 10

4) Matt has the following long distance plan: .10 per minute on weekdays 7pm - 7am, Saturdays, and holidays; .05 per minute on Sundays; .25 per minute all other times. If the table represents his long distance calls, what was the total cost?

- a) 4.70
- b) 5.50
- c) 6.20
- d) 7.40
- e) 8.25

total: \$7.40

Tuesday	5:00 pm	10 minutes
Wednesday	10:30am	8 minutes
Thanksgiving holiday	12:15pm	14 minutes
Saturday	4:00pm	9 minutes
Sunday	10:00am	12 minutes

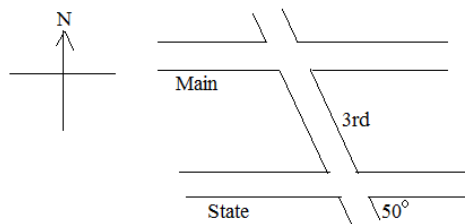
note: weekdays between 7pm and 7am are .10 per minute.. but, weekdays between 7am and 7pm are .25 per minute!

Strategy: I would SKIP this problem, and return to it later...

- a) it's time consuming
- b) lots of details (so, it's easy to make a simple mistake)
- c) the multiple choices all seem reasonable (so, it'll be tougher to catch any mistakes)

When solving, use a list to keep track of calculations...

5) Below is a map of Mathtown, showing the downtown cross streets...  
If Main and State run parallel East-West, what would the angle formed at the southeast corner of Main and 3rd avenue be?



- a) 40
- b) 50
- c) 130
- d) 140
- e) 150

Strategy: Identify the topic...

The question tests knowledge of parallel lines and transversal (corresponding, alt. interior angles, etc.) vertical,

Then, label a few angles and identify the Southeast corner...

- 6) A box contains a bunch of colored marbles.  
 1/10 of the marbles are blue, 1/2 of the marbles are red,  
 1/4 of the marbles are green, and the remaining 30 are clear white.

SOLUTIONS

What is the number of green marbles in the box?

Strategy: Set up an algebra equation

a) 25

b) 50

c) 70

d) 100

e) 200

$X =$  number of marbles

$$X = .1X + .5X + .25X + 30$$

$$X = (1/10)X + (1/2)X + (1/4)X + 30$$

$$.15X = 30$$

$$(3/20)X = 30$$

$$X = 200$$

Therefore, there are 50 green

- 7) The triangles are similar. What the measure of angle B?

$$\triangle ABC \sim \triangle DEF$$

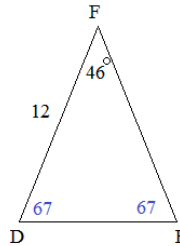
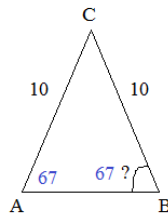
a) 44

b) 46

c) 60

d) 67

e) 72



Strategy: Recognize properties of similar triangles

Sides are proportional and corresponding angles are congruent (NOTE: the side measures are irrelevant in this question!)

Then, recognize properties of triangles angle sum is 180

- 8) Jerry has math test scores of 88, 78, 74, and 92..  
 What does he need on his 5th test to raise his average 2 points?

a) 80

b) 83

c) 85

d) 91

e) 93

Strategy: walk through the situation:

$$\text{Total points now: } 88 + 78 + 74 + 92 = 332$$

$$\text{Average: } 332/4 = 83$$

$$\text{Jerry wants to raise 2 points to 85.... } 85 \times 5 = 425...$$

He needs 93 points

- 9) A hiker leaves camp and travels 10 miles due North. Then, he turns and goes 6 miles due East.  
 If the hiker walks directly back to camp, how far must he travel?

a) 4 miles

b) 8 miles

c) 11.7 miles

d) 13.3 miles

e) 16 miles



Pythagorean Theorem

$$10^2 + 6^2 = d^2$$

$$136 = d^2$$

$$d = 11.66$$

Strategy: Draw a diagram.

Recognize the question is utilizing the Pythagorean Theorem...

- 10) Jeremy is standing atop a vertical cliff. His friend Dani is on the ground, 130 feet from the bottom of the cliff.  
 If the angle of depression from Jeremy to Dani is 35 degrees, what is the height of the cliff?

SOH CAH TOA

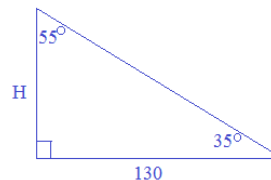
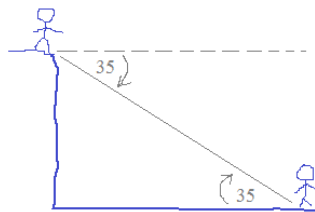
a) 75

b) 91

c) 106

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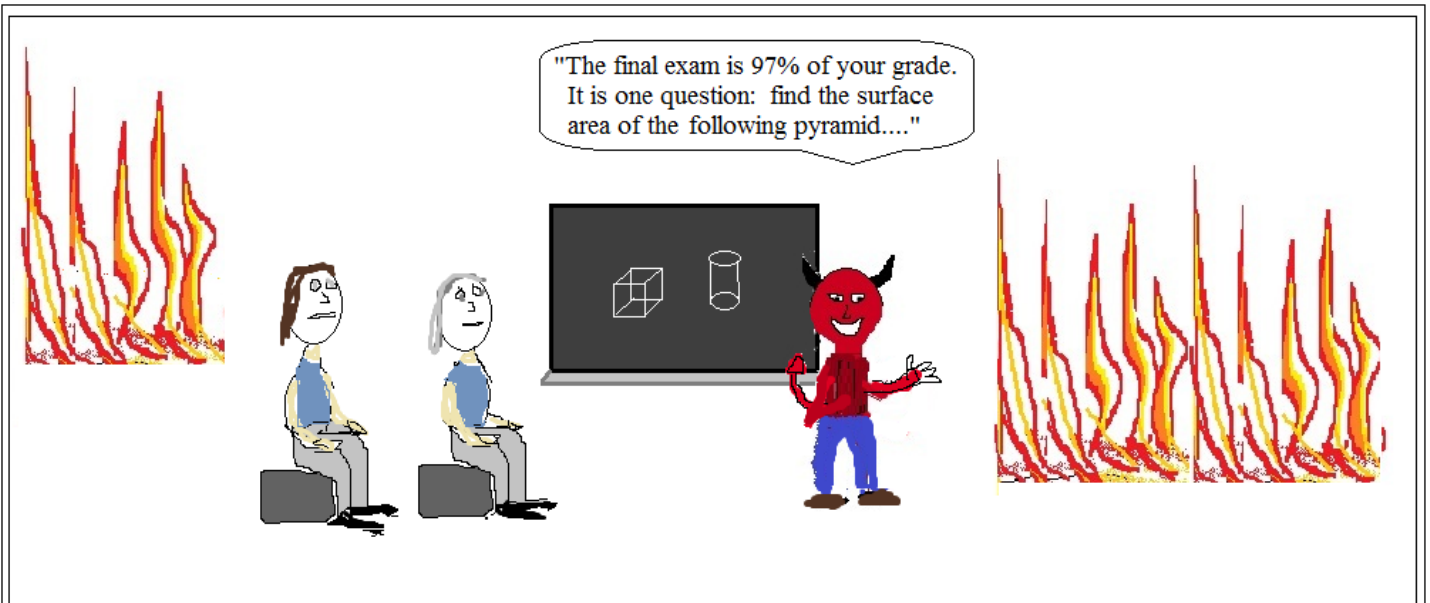


$$\tan(35) = \frac{H}{130}$$

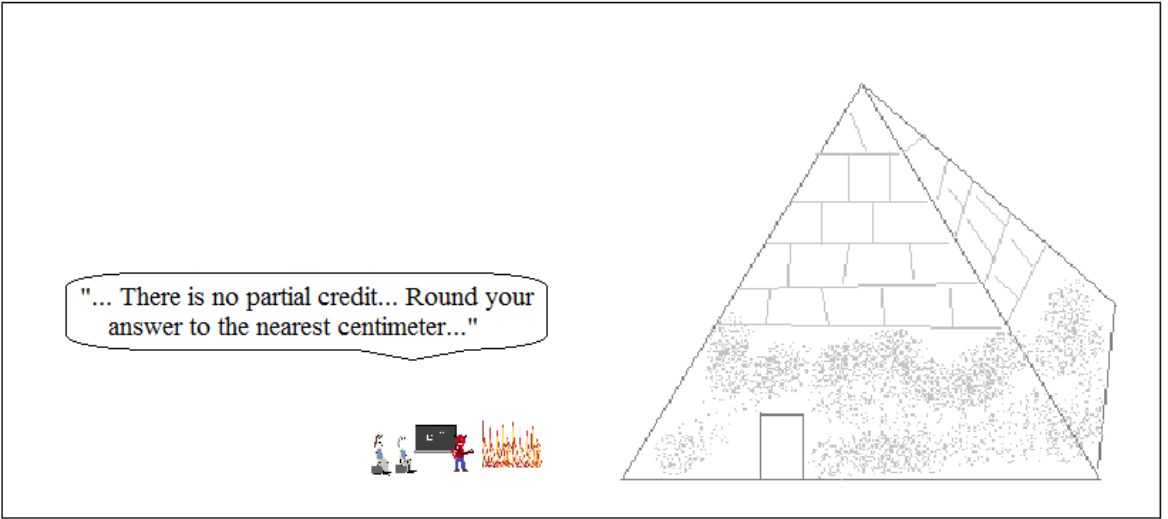
$$H = 91.03 \text{ feet}$$

Careful: recognize where the angle depression is!





*Math in  
Hell*



In its 1000 year history, no one ever  
passed Mr. Devlin's Geometry class.

LanceAF #39 7-1-12  
[www.mathplane.com](http://www.mathplane.com)

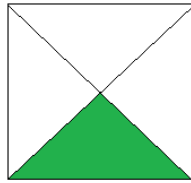
*Strategy: "Do the easy questions first."*

Save the tougher, more time consuming questions for the end.

- 1) Which of the following is the greatest common factor of 60 and 80
- a) 2
  - b) 10
  - c) 20
  - d) 120
  - e) 240

- 2) On the xy-coordinate plane, what is the length of a segment drawn from (2, 8) to (-7, 20)?
- a) 15
  - b) 17
  - c) 18
  - d) 20
  - e) 21

- 3) In the figure, if the perimeter of the square is 40 what is the area of the shaded region formed by the intersecting diagonals?



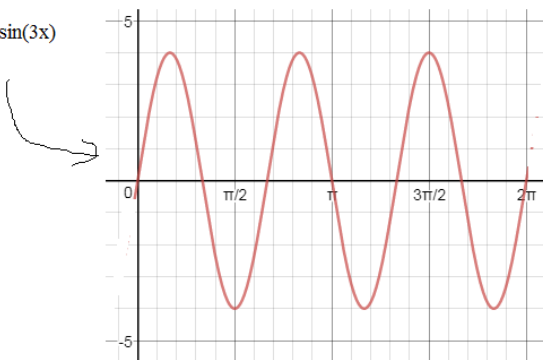
- a) 10
- b) 25
- c) 50
- d) 80
- e) 100

- 4) What is the slope of  $2x - 5y = 11$ ?

- a) 2/5
- b) -2/5
- c) 2
- d) -2
- e) 5/2

- 5) Determine the period of the function:

$y = 4\sin(3x)$

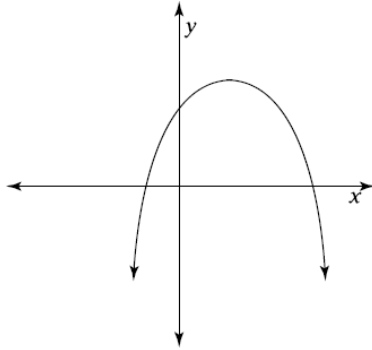


- a) 3
- b) 4
- c)  $\frac{\pi}{4}$
- d)  $\frac{2\pi}{3}$
- e)  $2\pi$

6) Which of the following is equivalent to  $\frac{\tan x \csc x}{\sin x \sec x}$  ?

- a) 1
- b)  $\sin x$
- c)  $\cos x$
- d)  $\cot x$
- e)  $\csc x$

7) The graph shows a parabola describing the equation  $ax^2 + bx + c$   
Which of the following CANNOT be true?



- a)  $a < b$
- b)  $b < a$
- c)  $b < c$
- d)  $c < b$
- e)  $a < c$

8)  $(2x - 1)^2 =$

- a)  $4x^2 - 1$
- b)  $4x^2 + 1$
- c)  $4x^2 - 4x + 1$
- d)  $4x^2 - 2x + 1$
- e)  $4x^2 + 2x - 1$

9) Find the domain of the function  $g(x) = \frac{4-x}{\sqrt{x^2-16}}$

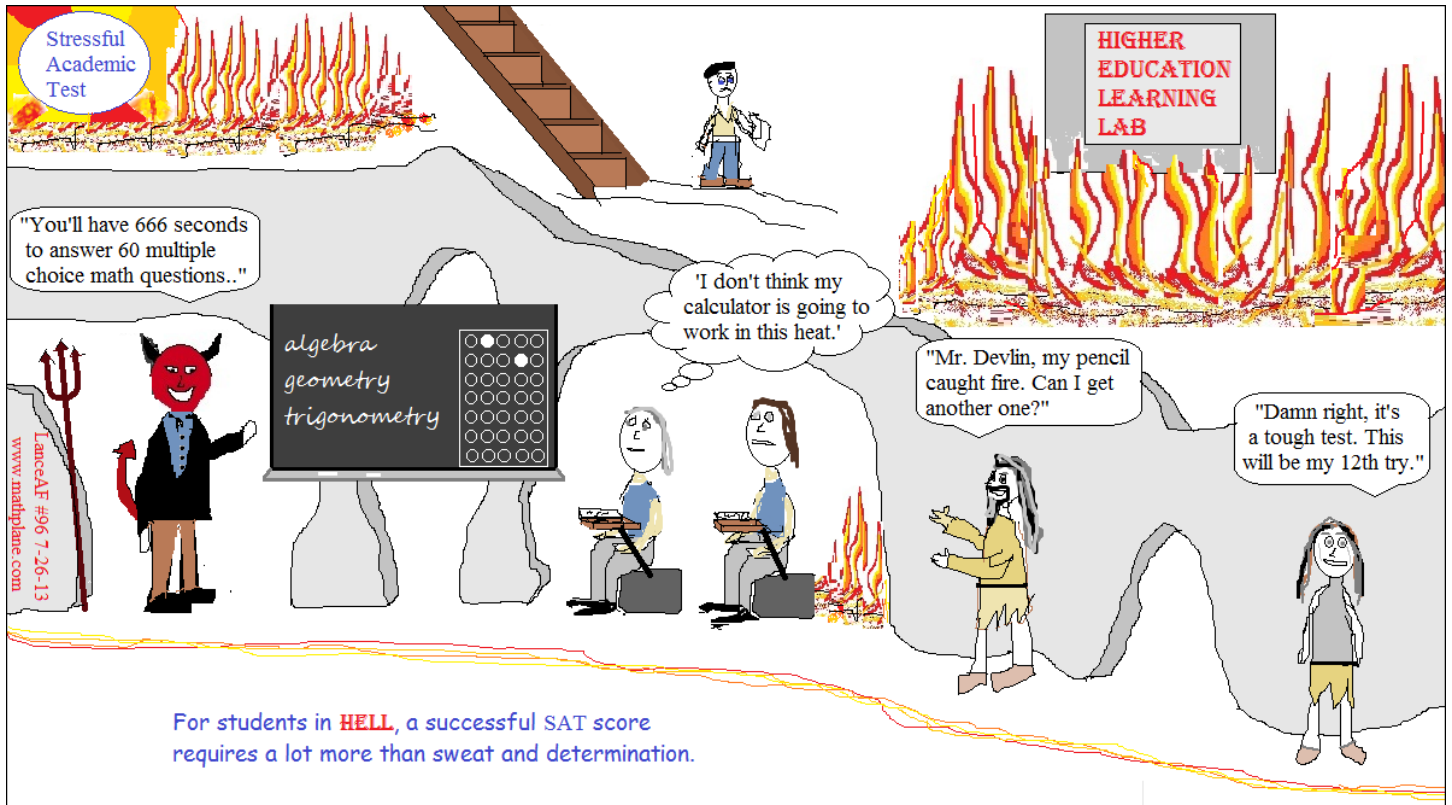
- a)  $-4 \leq x \leq 4$
- b)  $-4 < x < 4$
- c)  $-4 > x > 4$
- d)  $x \leq -4$  or  $x \geq 4$
- e)  $x < -4$  or  $x > 4$

10) In the geometric sequence  $t_n$   $t_1 = 2$

$$t_2 = 3$$

$$t_5 =$$

- a) 5
- b) 6
- c) 10.125
- d) 13
- e) cannot be determined



Successful test performance will involve *knowledge, speed and accuracy*. The best preparation is practice!

1) When  $x = 4$  and  $y = -3$ , the value of  $2x^2 - 2y$  is

- a) 10
- b) 22
- c) 26
- d) 38
- e) 54

2) A car gets 30 miles per gallon. How much will it cost to fill the tank?

- a) \$177
- b) \$269
- c) \$299
- d) \$508
- e) \$538

3) Find the greatest common factor of 36, 84, and 132.

- a) 2
- b) 4

# 200 SAT/ACT Math Practice Questions (and, Solutions)

**\*\*\*NEED MORE PRACTICE?!?!\*\*\***

1) In a geometric sequence, the 2nd term is 12 and the 4th term is 3. The seventh term is

- a)  $-13/2$
- b) -6
- c)  $3/8$
- d)  $1/2$
- e)  $3/4$

2) A car gets 30 miles per gallon. How much will it cost to fill the tank?

- a) \$177
- b) \$269
- c) \$299
- d) \$508
- e) \$538

3) How many different 4-person committees can be selected from a 10-member club?

- a) 40
- b) 210

# 200 (MORE) SAT/ACT Math Practice Questions (and, Solutions)

# Taking the SAT LEVEL 2 MATH Subject Test?

- 1) A game has 2 spinners. Spinner #1 has a probability of landing red of  $\frac{2}{3}$ . And, spinner #2 has a probability of landing red of  $\frac{1}{5}$ .  
What is the probability spinner #1 lands red AND spinner #2 does NOT land red?

- a)  $\frac{2}{15}$
- b)  $\frac{8}{15}$
- c)  $\frac{13}{15}$
- d)  $\frac{1}{5}$
- e)  $\frac{3}{5}$

- 2) For some positive real number 'b',  $b - 1$ ,  $b + 4$ ,  $3b + 2$ . What is the

- a) 16
- b) 20
- c) 24
- d) 28
- e) 40

- 3) Which equation best models the following data in the table:

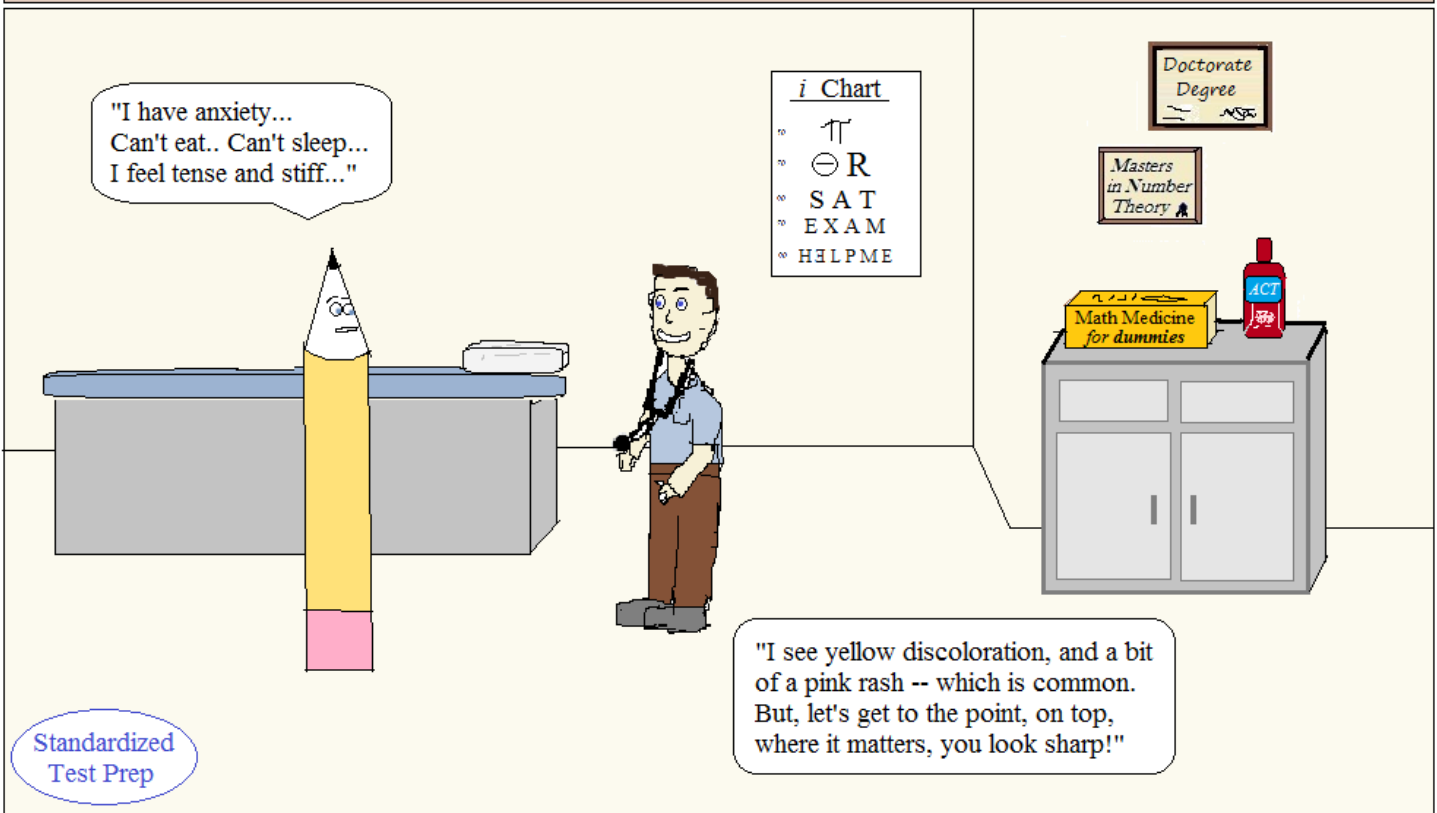
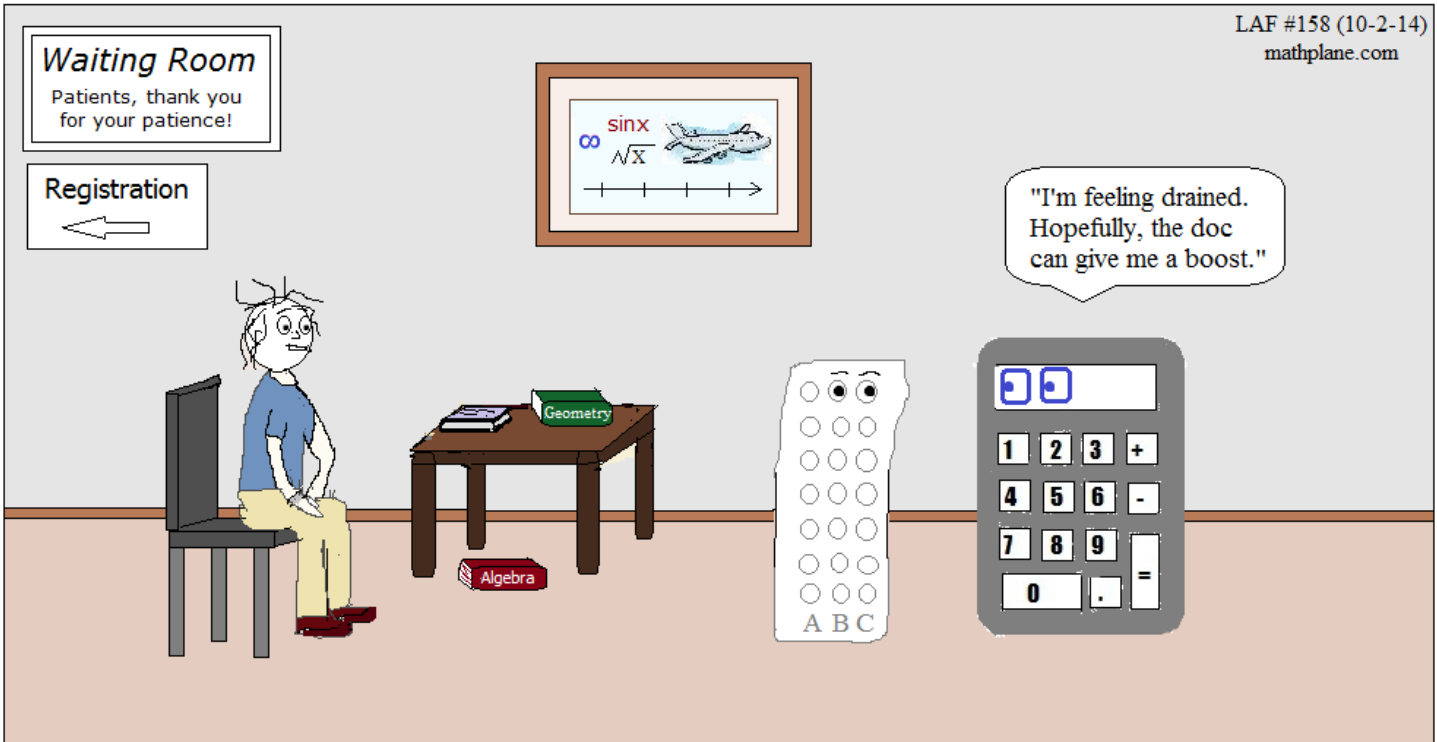
a)  $y = 1.2(4.4)^x$

b)  $y = 4.4(1.2)^x$

x	-6.7	-1.3	3.2	8.8
	1.20	2.47	7.80	21.80

## 150 SAT Subject Test Math Level 2 Practice Questions (and, Solutions)

All products are available for purchase at the mathplane sites; or, visit the mathplane stores at TeachersPayTeachers and TES. Thanks!



Strategy: "Don't stress!"

Focus on one question at a time. Don't worry. Do the best you can.

**GOOD LUCK!!!**