

SAT Lesson Recaps

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SAT Math

Goal Score

Goal	16-Problem	18-Problem	20-Problem	%
500	8	9	10	50
550	6 10	7 11	8 12	61
600	12	13	14	72
650	13	15	16	81
700	14	17	18	90
750	16	18	20	100

~~21~~
18

Our first target is to get you around a 550. Use this chart to figure out the total number of questions you will be allowed to omit come test day.

Strategies covered.

Using the answer choices.

The first strategy we covered was using the answer choices to help us solve. Please remember that in order to use this strategy the problem must meet this construction:

The question is asking you for the value of a single variable and the all of the answer choices are numeric.

Reference problem number 7 on pg. 797 as seen below:

797

7. If a and b are positive integers and $a^2 - b^2 = 7$, what is the value of a ?

(A) 3
(B) 4
(C) 5
(D) 6
(E) 7

$a = 3$
 $a = 4$

$9 - b^2 = 7$
 $-9 - b^2 = -9$
 $-b^2 = -2$
 $b^2 = 2$
 $\times b = \sqrt{2}$

$4^2 - b^2 = 7$
 $16 - b^2 = 7$
 $-b^2 = -9$
 $b = 3$

when the problem asks for the value of a single variable, and the answer choices are all numeric, you can think about using the choices to help you solve.

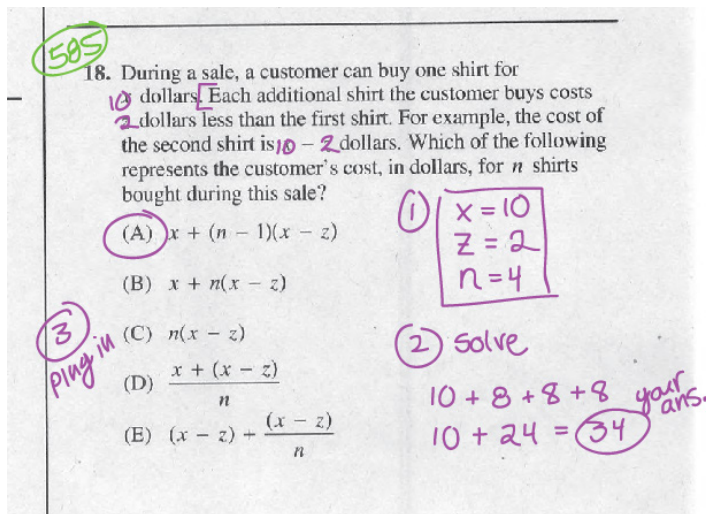
Using Your Own Values

We covered solving a question by **substituting in your own values** for the variables in the problem. Remember that the problem must have answer choices in expressional format written in the same variables as used in the text of the question

Here is the proper protocol:

- write down the values of your choosing
- reread the problem using the values you chose
- solve the problem on your own, circle your answer.
- substitute the values you chose for the variables back into the answer choices and evaluate each one
- circle the answer choice whose value matched that of your answer

Reference problem number 18 on pg. 585 as seen below:

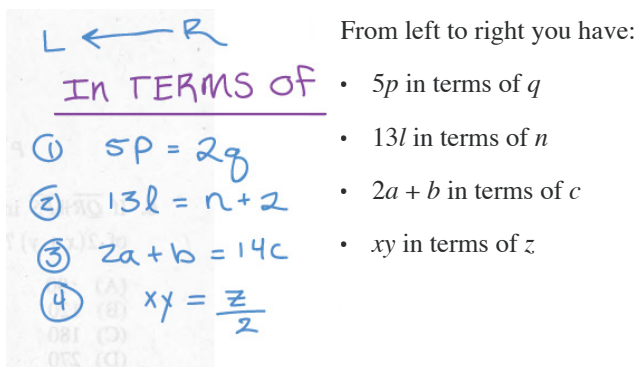


Keywords Used for Translation

Words you should remember for translating English statements into

- **Per** => Division
- **Of** => Multiplication (when in conjunction with a fraction)
- **Is** => Equals

Remember how to use the statement “in terms of”



Inequalities: The one big difference between equations and inequalities is that when you multiply or divide by a negative number, you must **reverse the sign**. Reference problem number 12 from Lesson 1.

12. If $-3 \leq 9 - 3x \leq 30$, then the expression for all values of x is:

- (A) $-12 \leq x \leq 21$
- (B) $-4 \leq x \leq 7$
- (C) $4 \geq x \geq -7$
- (D) $-21 \geq x \geq 7$
- (E) $23 \geq x \geq 0$

$$\frac{-12 \leq -3x \leq 21}{-3} \quad \frac{-12}{-3} \leq \frac{-3x}{-3} \leq \frac{21}{-3}$$

$$4 \geq x \geq -7$$

Translating Word Problems with Relationships

Remember that when you read a word problem that presents certain items that are all related to one another. The general rule will be that the first relationships that is defined will tell you what variable the rest of the item will be written in terms of. Do not forget to write down the initial variable defined simply, as itself. Refer to problem 18 from Lesson 1.

18. Gerald held a three-day bake sale to support his youth soccer league. On Saturday, he raised \$20 less than twice what he raised on Friday. On Sunday, he earned twice what he earned on Saturday. If the total amount that Gerald raised was \$220, how much did he raise on Sunday?

- (A) \$60
- (B) \$80
- (C) \$100
- (D) \$120
- (E) \$160

f: f
 Sa: 2f - 20
 Su: 2(2f - 20)

$$f + Sa + Su = 220$$

$$f + 2f - 20 + 4f - 40 = 220$$

$$7f - 60 = 220$$

System of Equations

When you are multiple equations with multiple variables on one side of the equal sign, think to use elimination. Alternatively when you have multiple equations with multiple variables, you can think to use substitution. Use whatever you are most comfortable using is the best method. Reference problem 22 from Lesson 1.

22. The cost of a movie ticket and large popcorn together is \$2.20. The cost of 2 movie tickets and a large popcorn together is \$3.60. What is the cost of a large popcorn?

- (A) \$0.50
- (B) \$0.60
- (C) \$0.80
- (D) \$0.95
- (E) \$1.40

$$m + p = 2.20 \quad 2m + p = 3.60$$

$$\begin{array}{r} 2m + p = 3.60 \\ - m + p = 2.20 \\ \hline m = 1.40 \\ p = .80 \end{array}$$

The Difference of 2 squares:

When you see the difference of two squares remember to factor it out. Dont forget all that we have covered up to then i.e. substitution / elimination.

24. If $x^2 - y^2 = 99$ and $x + y = 11$, what is the value of x ?

$$(x+y)(x-y) = 99$$

$$(11)(x-y) = 99$$

$$x-y = 9$$

$$x+y = 11$$

$$x-y = 9$$

$$2x = 20$$

$$x = 10$$

Alternatively. If you see two polynomials next to eachother, don't forget to foil it. See problem 26 from Lesson 1.

FOIL

26. If $(2x - 5)(2x + 5) = 15$, what is the value of $4x^2$?

(A) -40

(B) -20

(C) 20

(D) 40

(E) 60

$$4x^2 + 10x - 10x - 25 = 15$$

$$4x^2 - 25 = 15$$

$$4x^2 = 40$$

This is a good time to recap our **Rules of Exponents**. You must ALWAYS have the same base before working with exponents.

- $x^a \cdot x^b = x^{a+b}$
- $x^a / x^b = x^{a-b}$
- $(x^a)^b = x^{ab}$
- $x^{-n} = \frac{1}{x^n}$
- $x^{\frac{1}{2}} = \sqrt{x}$
- $x^{\frac{m}{n}} = \sqrt[n]{x^m}$
- $(xy)^n = x^n y^n$
- $x^0 = 1$

Functions:

- When we see function notation such as $f(x) = 2x + 7$, we are simply giving the function a name (f) so that we can refer to it, and indicating that the output of the function is dependent on the variable x .
- When we're told that $f(x) = y$, that simply means that (x,y) lies on the graph of $f(x)$. When we're asked for $f(3)$, plug in (3) for x to the initial equation and simplify. DON'T forget to substitute the parentheses!

x	$f(x)$
2	-1
3	0
4	2
5	-3
6	4
7	-5
8	6

$f(2) = -1$
 $g(x) = f(3x+1)$
 $g(2) = f(3(2)+1)$
 $g(2) = f(7)$

16. Several values of the function f are shown above. The function g is defined by $g(x) = f(3x + 1)$. What is the value of $g(2)$?

(A) -5
(B) -1
(C) 0
(D) 2
(E) 4

$g(2) = -5$

Direct and Inverse Relations / Proportions:

If x and y are **directly** proportional to one another, then $y = kx$, where k is a constant. As y gets larger, as does x .

If x is **inversely** proportional to y , then $y = \frac{k}{x}$, where k is a constant. As x gets larger, y gets smaller.

If two values are proportional besides x and y , you may replace them with x and y in the correct equation.

Sometimes, the exam will ask you to make two quantities proportional to one another. Rewrite an equality in one variable, and use the rules of exponents to manipulate until it is in the form the exam wants.

6. If $x \neq 0$ and x is inversely proportional to y , which of the following is directly proportional to $\frac{1}{x^2}$?

(A) $-\frac{1}{y^2}$
(B) $\frac{1}{y^2}$
(C) $\frac{1}{y}$
(D) y
(E) y^2

Direct: $a = kb$
 Inverse: $c = \frac{k}{d}$

$x = \frac{k}{y} \rightarrow \text{constant}$
 $\frac{1}{x^2} = \frac{y^2}{k^2}$
 $\frac{1}{x^2} = \frac{y^2}{k^2}$

Diagonals in Cubes

When asked to find the diagonal inside of a cube you must remember that you will have to do a series of two pythagorean theorem problems in order to solve. First step will be to find the length of the base, then once you know that dimension you can use that to set up your final pythagorean theorem equation and solve for the diagonal.

16. A cube with volume 8 cubic centimeters is inscribed in a sphere so that each vertex of the cube touches the sphere. What is the length of the diameter, in centimeters, of the sphere?

(A) 2
(B) $\sqrt{6}$ (approximately 2.45)
(C) 2.5
(D) $2\sqrt{3}$ (approximately 3.46)
(E) 4

must say that the side has to be the cube root of the area.
 $V = l \cdot w \cdot h$
 $V = 5 \cdot 5 \cdot 5$
 $V = 5^3$
 $8 = 5^3$
 $5 = 2$
 $(2\sqrt{2})^2 + 2^2 = d^2$
 $4 + 4 = d^2$
 $\sqrt{8} = d$
 $2\sqrt{2} = d$

Plugging a Coordinate into an Equation

Often times if you are presented with a problem that gives you an equation of a line or a parabola and you are given or can determine a point that lies on the function, you will likely have to substitute that point back into the given equation to solve.

generally given an equation and a point, the problem will require you to plug the point back into the equation.

$$y = ax^2$$

$$8 = a(4)^2$$

$$8 = \frac{16a}{16}$$

$$a = \frac{1}{2}$$

18. In the figure above, $PQRS$ is a square and points Q , R , and O lie on the graph of $y = ax^2$ where a is a constant. If the area of the square is 64, what is the value of a ?

$S^2 = 64$
 $S = 8$ must say that the side has to be the square root of the area.

Homework!

- 1) Finish Waves 1 and 2 on pg. 261 of *The SAT Manual*.
 - Limit yourself to 40 minutes.
 - Check your answers when you are finished.
 - Answers are found in the blue book directly after the closest section number 10.
 - Mark on page 261 any questions you have.
- 2) Take Lesson 1 Quiz on pg. 70 of *The SAT Manual*.
 - Limit yourself to 25 minutes.
 - Message me as soon as you are finished.
 - Due by Wednesday
- 3) Take Test 3 in Blue Book
 - Section 2 - Tomorrow pg 514 (1-20) - 25 minutes aim to get 13 correct 1-20 (easy - hard)
 - Section 5 - Friday pg 525 (1-18) - 25 minutes aim to get 11 correct 1-8 (easy - hard) 9-18 (easy - hard)
 - Section 8 - Sunday AM pg 543 (1-16) - 20 minutes aim to get 10 correct 1-16 (easy - hard)
- 4) Take May 2014 Test I sent you in LUA