

SAT Preparation/  
Practice– Math  
[No Calculator /  
w-Calculator]

December VC Session  
Fall 2020

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## GENERAL IDEAS – SAT MATH

- ◆ Quick Facts:
  - ◆ Most math questions will be multiple choice, but some—called grid-ins—ask you to come up with the answer rather than select the answer.
  - ◆ The Math Test is divided into two portions: Math Test–Calculator and Math Test–No Calculator.
  - ◆ Some parts of the test include several questions about a single scenario.
  
- ◆ The Math Test will focus in depth on the three areas of math:
  - ◆ ALGEBRA: which focuses on the mastery of linear equations and systems.
  - ◆ PROBLEM SOLVING / DATA ANALYSIS: which is about being quantitatively literate.
  - ◆ ADVANCED MATH: which features questions that require the manipulation of complex equations.
  - ◆ ADDITIONAL MATH TOPICS (small number of questions) from geometry and trigonometry most relevant to college and career readiness.

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# SAT MATH – NO CALCULATOR PROBLEMS

## ◆ Solving Simultaneous Equations #11

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$$b = 2.35 + 0.25x$$

$$c = 1.75 + 0.40x$$

In the equations above,  $b$  and  $c$  represent the price per pound, in dollars, of beef and chicken, respectively,  $x$  weeks after July 1 during last summer. What was the price per pound of beef when it was equal to the price per pound of chicken?

- A) \$2.60
- B) \$2.85
- C) \$2.95
- D) \$3.35

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# SAT MATH – NO CALCULATOR PROBLEMS

## ◆ Solving Simultaneous Equations #11 Answer Explanation

- ◆ Set each equation equal to each other:  $2.35 + 0.25x = 1.75 + 0.40x$
- ◆ Solve for  $x \rightarrow 0.60 = 0.15x$ , and so  $x = 0.60 / 0.15 = 4$ .
- ◆ To find the price of the beef (use the equation:  $b = 2.35 + 0.25x$ )
  - ◆ Substitute 4 in the equation  $\rightarrow b = 3.35$  dollar/pound
- ◆ Choice D is correct. The other choices A, B, and C are incorrect as the result will be from substituting other values in the equation.
- ◆ **NOTE:** Many of you put B, where you had to put 1 in the equation not 4.

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# SAT MATH – NO CALCULATOR PROBLEMS

## ◆ Graphs of Linear Equation #12

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A line in the  $xy$ -plane passes through the origin and has a slope of  $\frac{1}{7}$ . Which of the following points lies on the line?

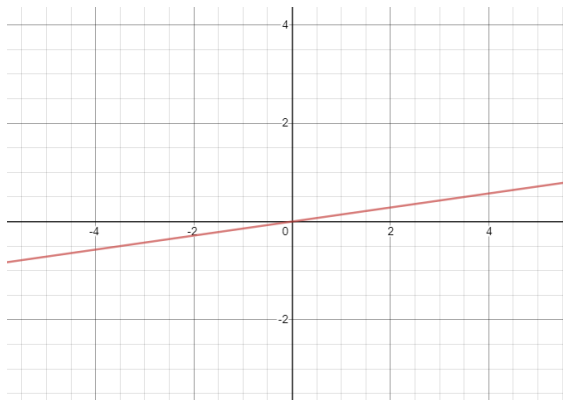
- A) (0, 7)
- B) (1, 7)
- C) (7, 7)
- D) (14, 2)

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# SAT MATH – NO CALCULATOR PROBLEMS

## ◆ Solving Graphs of Linear Equations #12 Answer Explanation

*How it looks*



- Equation of line is  $y = mx$ , So  $\rightarrow y = \frac{1}{7}x$  or  $x = 7y$
- We need to find a point with coordinates  $(a, b)$  will lie on the line if and only if  $a = 7b$
- For our choices, only answer D works, where:  $a=14, b=2$ , so  $\rightarrow 14 = 7(2)$

◆ **NOTE:** Many of you put B, but the ordered pairs with the y does not have a x that works.

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# SAT MATH – NO CALCULATOR PROBLEMS

## ◆ Solving Simultaneous Equations #14

14

If  $3x - y = 12$ , what is the value of  $\frac{8^x}{2^y}$  ?

- A)  $2^{12}$
- B)  $4^4$
- C)  $8^2$
- D) The value cannot be determined from the information given.

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# SAT MATH – NO CALCULATOR PROBLEMS

## ◆ Solving Simultaneous Equations #14 Answer Explanation

- ◆ How to approach – is to express  $8^x/2^y$  in the same base. We can see that 8 is a power of 2 or  $2^3$ , we can use to make same base  $\rightarrow 2^{3x}/2^y$ .
- ◆ Since same base, we can combine as such  $2^{3x-y}$ , we can see this is exactly what was given  $3x-2y=12$ . So,  $2^{3x-2y} = 12$
- ◆ Thus, our answer is A.

◆ **NOTE:** Many of you put D, incorrect, since the value of  $8^x/2^y$  can be determined.

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# SAT MATH – NO CALCULATOR PROBLEMS

## ◆ Equations with Radical Expressions #20

**20**

If  $a = 5\sqrt{2}$  and  $2a = \sqrt{2x}$ , what is the value of  $x$  ?

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# SAT MATH – NO CALCULATOR PROBLEMS

## ◆ Equations with Radical Expressions #20 Answer Explanation

- ◆ Substitute  $a=5\sqrt{2}$ , you can plug it in the equation  $\rightarrow 10\sqrt{2} = \sqrt{2x}$
- ◆ Square both sides, to get rid of radicals  $\rightarrow 200=2x$ , or  $x = 100$
- ◆ Correct answer is 100.

◆ *NOTE: Most got this one right but ¼ problems are related to this topic.*

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# SAT MATH – WITH CALCULATOR PROBLEMS

## ◆ Evaluating Expressions #10

Questions 9 and 10 refer to the following information.

$$a = 1,052 + 1.08t$$

The speed of a sound wave in air depends on the air temperature. The formula above shows the relationship between  $a$ , the speed of a sound wave, in feet per second, and  $t$ , the air temperature, in degrees Fahrenheit ( $^{\circ}\text{F}$ ).

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At which of the following air temperatures will the speed of a sound wave be closest to 1,000 feet per second?

- A)  $-46^{\circ}\text{F}$
- B)  $-48^{\circ}\text{F}$
- C)  $-49^{\circ}\text{F}$
- D)  $-50^{\circ}\text{F}$

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# SAT MATH – WITH CALCULATOR PROBLEMS

## ◆ Evaluating Expressions #10 Answer Explanation

- ◆ The air temperature at which the speed of a sound wave is closest to 1,000 feet per second and can be found by substituting 1000 for  $a$ , and solving for  $t$ .
- ◆ You get  $a = 1,052 + 1.08t$ , yielding  $t = -52/1.08 \sim -48.15$ . From the choices given, it is closest to  $-48.15$  F.

◆ **NOTE:** Most, put C – not the best choice as errors may arise by putting in 1000 for  $a$  or solving for  $t$  in the equations  $a=1,052+1.08t$ .

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# SAT MATH – WITH CALCULATOR PROBLEMS

## ◆ Simple Inequalities #11

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Which of the following numbers is NOT a solution of the inequality  $3x - 5 \geq 4x - 3$  ?

- A) -1
- B) -2
- C) -3
- D) -5

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# SAT MATH – WITH CALCULATOR PROBLEMS

## ◆ Simple Inequalities #11 Answer Explanation

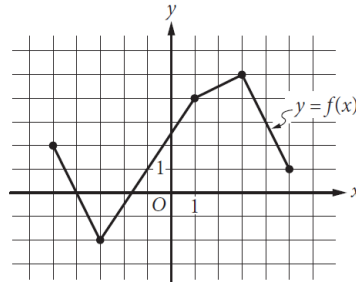
- ◆ Subtracting  $3x$  and adding  $3$  to both sides of  $3x - 5 \geq 4x - 3 \rightarrow -2 \geq x$ .
- ◆ Therefore,  $x$  is a solution to  $3x - 5 \geq 4x - 3$  --- if and only if  $x$  is less than or equal to  $-2$  but not a solution if it was greater.
- ◆ For the choice given, only  $-1$  is greater than  $-2$ .
  
- ◆ *NOTE: Most put B but is incorrect because each is a value of  $x$  that is less than or equal to  $-2$  and, therefore, could be a solution to the inequality.*

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# SAT MATH – WITH CALCULATOR PROBLEMS

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## ◆ Domain & Range #17



The complete graph of the function  $f$  is shown in the  $xy$ -plane above. For what value of  $x$  is the value of  $f(x)$  at its minimum?

- A)  $-5$
- B)  $-3$
- C)  $-2$
- D)  $3$

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# SAT MATH – WITH CALCULATOR PROBLEMS

## ◆ Domain & Range #17 Answer Explanation

- ◆ *The minimum value of the function corresponds to the  $y$ -coordinate of the point on the graph that has the smallest  $y$ -coordinate on the graph.*
- ◆ *Since the smallest  $y$ -coordinate belongs to the point with coordinates  $(-3, -2)$ , the minimum value of the graph is  $f(-3) = -2$ .*
- ◆ *Therefore, the minimum value of  $f(x)$  is at  $x = -3$ .*
  
- ◆ *NOTE: Most put 'C' for this one – but it is the minimum value of  $f$ , not the value of  $x$  that corresponds to the minimum of  $f$ .*

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## SAT MATH – WITH CALCULATOR PROBLEMS

### ◆ Percent #26

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Katarina is a botanist studying the production of pears by two types of pear trees. She noticed that Type A trees produced 20 percent more pears than Type B trees did. Based on Katarina's observation, if the Type A trees produced 144 pears, how many pears did the Type B trees produce?

- A) 115
- B) 120
- C) 124
- D) 173

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## SAT MATH – WITH CALCULATOR PROBLEMS

### ◆ Percent #26 Answer Explanation

- ◆ Start by – letting  $x$  represent the number of pears produced by the Type B trees.
- ◆ Type A trees produce 20 percent more pears than Type B trees, or  $x$ , which can be represented as  $x + 0.20x = 1.20x$  pears.
- ◆ Since Type A produce 144 pears, it follows that  $1.20x = 144$ .
- ◆ Thus  $x = 144 / 1.20 = 120$ . Therefore, the Type B trees produced 120 pears.
- ◆ **NOTE:** Most put A – but is incorrect because while 144 is reduced by approximately 20 percent, increasing 115 by 230 % gives 138, not 144.

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