**SAT Practice Problems GT Geometry Bernhard** Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1.A car averages 27 miles per gallon. If gas costs $4.04 per gallon, which of the following is closest to how much the gas would cost for this car to travel 2,727 typical miles?

[**A.**](http://www.actstudent.org/sampletest/math/math_01.html) $ 44.44

[**B.**](http://www.actstudent.org/sampletest/math/math_01.html) $109.08

[**C.**](http://www.actstudent.org/sampletest/math/math_01.html) $118.80

[**D.**](http://www.actstudent.org/sampletest/math/math_01.html) $408.04

[**E.**](http://www.actstudent.org/sampletest/math/math_01.html) $444.40

2. When *x* = 3 and *y* = 5, by how much does the value of 3*x*2 – 2*y* exceed the value of 2*x*2 – 3*y* ?

[**F.**](http://www.actstudent.org/sampletest/math/math_01.html)   4

[**G.**](http://www.actstudent.org/sampletest/math/math_01.html) 14

[**H.**](http://www.actstudent.org/sampletest/math/math_01.html) 16

[**J.**](http://www.actstudent.org/sampletest/math/math_01.html) 20

[**K.**](http://www.actstudent.org/sampletest/math/math_01.html) 50

3. What is the value of *x* when 2*x* + 3 = 3*x* – 4 ?

[**A.**](http://www.actstudent.org/sampletest/math/math_01.html)  –7

[**B.**](http://www.actstudent.org/sampletest/math/math_01.html) negative one fifth

[**C.**](http://www.actstudent.org/sampletest/math/math_01.html)   1

[**D.**](http://www.actstudent.org/sampletest/math/math_01.html) one fifth

[**E.**](http://www.actstudent.org/sampletest/math/math_01.html)   7

4. What is the greatest common factor of 42, 126, and 210 ?

[**F.**](http://www.actstudent.org/sampletest/math/math_01.html)   2

[**G.**](http://www.actstudent.org/sampletest/math/math_01.html)   6

[**H.**](http://www.actstudent.org/sampletest/math/math_01.html) 14

[**J.**](http://www.actstudent.org/sampletest/math/math_01.html) 21

[**K.**](http://www.actstudent.org/sampletest/math/math_01.html) 42

5. Sales for a business were 3 million dollars more the second year than the first, and sales for the third year were double the sales for the second year. If sales for the third year were 38 million dollars, what were sales, in millions of dollars, for the first year?

[**A.**](http://www.actstudent.org/sampletest/math/math_01.html) 16

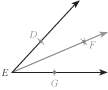
[**B.**](http://www.actstudent.org/sampletest/math/math_01.html) 17.5

[**C.**](http://www.actstudent.org/sampletest/math/math_01.html) 20.5

[**D.**](http://www.actstudent.org/sampletest/math/math_01.html) 22

[**E.**](http://www.actstudent.org/sampletest/math/math_01.html) 35

6. In the figure below, ray EFwas constructed starting from rays EDand EG. By using a compass, *D* and *G* were marked equidistant from *E* on rays EDand EG. The compass was then used to locate a point *F*, distinct from *E*, so that *F* is equidistant from *D* and *G*. For all constructions defined by the above steps, the measures of angle*DEF* and angle*GEF*:



[**F.**](http://www.actstudent.org/sampletest/math/math_01.html) are equal.

[**G.**](http://www.actstudent.org/sampletest/math/math_01.html) are NOT equal.

[**H.**](http://www.actstudent.org/sampletest/math/math_01.html) sum to 30°.

[**J.**](http://www.actstudent.org/sampletest/math/math_01.html) sum to 45°.

[**K.**](http://www.actstudent.org/sampletest/math/math_01.html) sum to 60°.

7. Abandoned mines frequently fill with water. Before an abandoned mine can be reopened, the water must be pumped out. The size of pump required depends on the depth of the mine. If pumping out a mine that is *D* feet deep requires a pump that pumps a minimum of D squared over 25+ 4*D* – 250 gallons per minute, pumping out a mine that is 150 feet deep would require a pump that pumps a minimum of how many gallons per minute?

[**A.**](http://www.actstudent.org/sampletest/math/math_01.html)   362

[**B.**](http://www.actstudent.org/sampletest/math/math_01.html)   500

[**C.**](http://www.actstudent.org/sampletest/math/math_01.html)   800

[**D.**](http://www.actstudent.org/sampletest/math/math_01.html) 1,250

[**E.**](http://www.actstudent.org/sampletest/math/math_01.html) 1,750

8. The length, in inches, of a box is 3 inches less than twice its width, in inches. Which of the following gives the length, *l* inches, in terms of the width, *w* inches, of the box?

[**F.**](http://www.actstudent.org/sampletest/math/math_01.html) *l* = one half*w* + 3

[**G.**](http://www.actstudent.org/sampletest/math/math_01.html) *l* =  *w* + 3

[**H.**](http://www.actstudent.org/sampletest/math/math_01.html) *l* =  *w* – 3

[**J.**](http://www.actstudent.org/sampletest/math/math_01.html) *l* = 2*w* + 3

[**K.**](http://www.actstudent.org/sampletest/math/math_01.html) *l* = 2*w* – 3

9. In quadrilateral *PQRS* below, sides *PS* and *QR* are parallel for what value of *x* ?



[**A.**](http://www.actstudent.org/sampletest/math/math_01.html) 158

[**B.**](http://www.actstudent.org/sampletest/math/math_01.html) 132

[**C.**](http://www.actstudent.org/sampletest/math/math_01.html) 120

[**D.**](http://www.actstudent.org/sampletest/math/math_01.html) 110

[**E.**](http://www.actstudent.org/sampletest/math/math_01.html)   70

10. How many irrational numbers are there between 1 and 6 ?

[**F.**](http://www.actstudent.org/sampletest/math/math_01.html)   1

[**G.**](http://www.actstudent.org/sampletest/math/math_01.html)   3

[**H.**](http://www.actstudent.org/sampletest/math/math_01.html)   4

[**J.**](http://www.actstudent.org/sampletest/math/math_01.html) 10

[**K.**](http://www.actstudent.org/sampletest/math/math_01.html) Infinitely many

11. A typical high school student consumes 67.5 pounds of sugar per year. As part of a new nutrition plan, each member of a track team plans to lower the sugar he or she consumes by at least 20% for the coming year. Assuming each track member had consumed sugar at the level of a typical high school student and will adhere to this plan for the coming year, what is the maximum number of pounds of sugar to be consumed by each track team member in the coming year?

[**A.**](http://www.actstudent.org/sampletest/math/math_01.html) 14

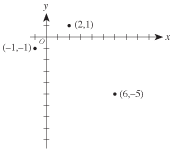
[**B.**](http://www.actstudent.org/sampletest/math/math_01.html) 44

[**C.**](http://www.actstudent.org/sampletest/math/math_01.html) 48

[**D.**](http://www.actstudent.org/sampletest/math/math_01.html) 54

[**E.**](http://www.actstudent.org/sampletest/math/math_01.html) 66

12. In the standard (*x*, *y*) coordinate plane below, 3 of the vertices of a rectangle are shown. Which of the following is the 4th vertex of the rectangle?



[**F.**](http://www.actstudent.org/sampletest/math/math_01.html) (3,–7)

[**G.**](http://www.actstudent.org/sampletest/math/math_01.html) (4,–8)

[**H.**](http://www.actstudent.org/sampletest/math/math_01.html) (5,–1)

[**J.**](http://www.actstudent.org/sampletest/math/math_01.html) (8,–3)

[**K.**](http://www.actstudent.org/sampletest/math/math_01.html) (9,–3)

**Incorrect**

Did you divide 2,727 by 27 correctly? Check your calculations.

×

**Incorrect**

You probably multiplied 27 and 4.04. However, this gives miles per gallon times cost per gallon, not the cost of gas for the trip. Start over and first find the number of gallons of gas needed to travel 2,727 typical miles.

×

**Incorrect**

You might have tried multiplying 27 by 4.4. Start over and first find the number of gallons of gas needed for 2,727 typical miles.

×

**Correct!**

This is the correct answer. If you divide 2,727 miles by 27 miles per gallon you will get the number of gallons: http://media.actstudent.org/images/a1_1d.gif= 101. Then, multiply the number of gallons by the cost per gallon: 101(4.04) = 408.04. This gives the cost of gas for this car to travel 2,727 typical miles.

×

**Incorrect**

You probably found the number of gallons of gas. However, at this point you need to multiply by 4.04, not 4.4.

×

**Incorrect**

Did you set up the expression (3*x*2 – 2*y*) – (2*x*2 – 3*y*) ? Make sure you follow through with the subtraction and change the sign on each term of 2*x*2 – 3*y*.

×

**Correct!**

14 is the correct answer. When you use *x* = 3 and *y* = 5 in the given expressions, 3*x*2 – 2*y* = 3(3)2 – 2(5) = 27 – 10 = 17 and 2*x*2 – 3*y* = 2(3)2 – 3(5) = 18 – 15 = 3. Then subtract 3 from 17 to get 14.

×

**Incorrect**

Did you think that 2*x*2 – 3*y* is the larger value? It is not. Since 3*x*2 – 2*y* is the larger value, you want to do the following subtraction: (3*x*2 – 2*y*) – (2*x*2 – 3*y*). Also, be sure that you distribute the negative sign through the parentheses, that is, change the sign on each term of the expression 2*x*2 – 3*y* before you add it to 3*x*2 – 2*y*.

×

**Incorrect**

If one term exceeds another by a certain value, you need to subtract the second term from the first. If you chose this response, you probably found the values of the expression correctly, but then added the terms together rather than subtracting them.

×

**Incorrect**

Check your order of operations when evaluating terms like 3(3)2 and 2(3)2. Remember that evaluating exponents is done before multiplication.

×

**Incorrect**

Did you remember that 2*x* – 3*x* = –*x* and –4 – 3 = –7 ?

×

**Incorrect**

Possibly you tried to add 2*x* and 3*x* ? You also probably tried to add 3 and –4. Think about what you need to do to combine terms in an equation when they are not on the same side of the equals sign.

×

**Incorrect**

Did you combine 3 and –4 by adding them together?

×

**Incorrect**

You need to subtract 2*x* and add 4 to each side of the equation.

×

**Correct!**

The correct response is E. You can solve this problem by first subtracting 2*x* from each side of the equation to get 3 = *x* – 4. Then add 4 to each side, so *x* = 7.

×

**Incorrect**

You found the second least common factor. The least common factor is 1.

×

**Incorrect**

This is a common factor, but not the greatest common factor.

×

**Incorrect**

This is a common factor, but not the greatest common factor.

×

**Incorrect**

This is a common factor, but not the greatest common factor.

×

**Correct!**

42 is the correct answer since it is the largest number that is a factor of all three numbers given. You can find the greatest common factor by writing out the prime factorization of all three numbers, and then taking each of the common prime factors to the lowest power that appears for that factor: 42 = 2 × 3 × 7; 126 = 2 × 32 × 7; and 210 = 2 × 3 × 5 × 7. So the greatest common factor is 2 × 3 × 7 = 42.

×

**Correct!**

This is the correct answer. If *x* = sales for the first year, then *x* + 3 = sales for the second year. Since sales for the third year were double the sales for the second year, sales for the third year = 2(*x* + 3). Sales for the third year were 38, so 2(*x* + 3) = 38. To solve this equation, you could first divide each side by 2 to get *x* + 3 = 19. Then, by subtracting 3 from both sides, *x* = 16.

×

**Incorrect**

If *x* = sales for the first year, then *x* + 3 = sales for the second year. Since sales for the third year were double the sales for the second year, sales for the third year = 2(*x* + 3). Sales for the third year were 38, so 2(*x* + 3) = 38. Remember that multiplying 2 and *x* + 3 is 2(*x* + 3), not 2*x* + 3.

×

**Incorrect**

If *x* = sales for the first year, then *x* + 3 = sales for the second year. Since sales for the third year were double the sales for the second year, sales for the third year = 2(*x* + 3). Sales for the third year were 38, so 2(*x* + 3) = 38. Remember that multiplying 2 and *x* + 3 is 2(*x* + 3), not 2*x* + 3. Also, if you have an equation such as *x* + 3 = 19, you would have to subtract 3 from both sides in order to solve for *x*.

×

**Incorrect**

If *x* = sales for the first year, then *x* + 3 = sales for the second year. Since sales for the third year were double the sales for the second year, sales for the third year = 2(*x* + 3). Sales for the third year were 38, so 2(*x* + 3) = 38. So 2*x* + 6 = 38. Did you remember to subtract 6, rather than add 6 when solving the equation?

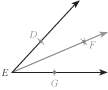
×

**Incorrect**

Perhaps you thought 38 is 3 more than the first-year sales. Try reading the problem again and start over.

×

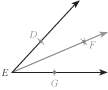
**Correct!**

×

The correct answer is F. If you draw line segments *DF* and *FG*, you can show triangle*DEF* is congruent totriangle*GEF* by SSS (side-side-side congruence). So, angle*DEF* is congruent toangle*GEF* because corresponding parts of congruent triangles are congruent.

×

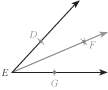
**Incorrect**

×

You may have looked at the diagram and thought the angle measures were different. Try drawing line segments *DF* and *FG* and look at the triangles that are formed.

×

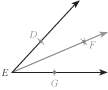
**Incorrect**

×

There are no special triangles stated. Draw in line segments *DF* and *FG*, and look at the triangles that are formed.

×

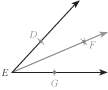
**Incorrect**

×

You may have assumed that angle*DEG* is a right angle. However, that was not stated, and you can not assume it is true. Try drawing line segments *DF* and *FG*, and look at the triangles that are formed.

×

**Incorrect**

×

You may have estimated from the picture and assumed that the measure of angle*DEG* is 60°. However, you cannot estimate angles. Try drawing line segments *DF* and *FG*, and look at the triangles that are formed.

×

**Incorrect**

D squared over 25means first square *D* and then divide by 25. *D*2 http://media.actstudent.org/images/notequal.gif2*D*.

×

**Incorrect**

4*D* – 250 http://media.actstudent.org/images/notequal.gif4(*D* – 250). Be careful about order of operations.

×

**Incorrect**

Did you drop the 4 in the middle term? Recheck your calculations.

×

**Correct!**

The correct answer is D. If you substitute *D* with 150 in the expression, you get http://media.actstudent.org/images/a1_7d1.gif+ 4(150) – 250 = http://media.actstudent.org/images/a1_7d2.gif+ 600 – 250 = 1,250.

×

**Incorrect**

If you substitute *D* with 150 in the expression, you get http://media.actstudent.org/images/a1_7d1.gif+ 4(150) – 250. Did you add 250 rather than subtract?

×

**Incorrect**

Twice the width is 2*w*, and 3 less than a number means to subtract 3 from the number.

×

**Incorrect**

Remember that *w* is multiplied by 2, and then 3 is subtracted from the result.

×

**Incorrect**

Did you forget to multiply *w* by 2 ?

×

**Incorrect**

Remember that 3 less than a number means to subtract 3 from the number.

×

**Correct!**

You did the problem correctly. Twice a number means to multiply the number by 2, and 3 less than a number means to subtract 3 from the number. Combining these, you get *l* = 2*w* – 3.

×

**Incorrect**

×

Because *PS* is parallel to *QR*, the sum of the measures of angles angle*S* and angle*R* is 180°. So, 180° – 112° = 68°, and the measure of angle*R* is 68°. However, to find *x* you do not just add 90° to the measure of angle*R*. Think about the sum of the angles of a quadrilateral.

×

**Incorrect**

×

Remember that the sum of the measures of the angles in a quadrilateral is 360°.

×

**Incorrect**

×

Did you subtract correctly? Recheck your work.

×

**Correct!**

×

The correct answer is D. The question states that *PS* and *QR* are parallel. If you treat *PQ* as a transversal, then angle*P* and angle*Q* are interior angles on the same side of a transversal, so their measures add up to 180°. Since the measure of angle*P* is 70°, the measure of angle*Q* is 180° – 70° = 110°.

×

**Incorrect**

×

Angles angle*P* and angle*Q* are not corresponding angles on the same side of a transversal.

×

**Incorrect**

piis an irrational number between 1 and 6.

×

**Incorrect**

You chose the second most popular response; 2, 3, and 5 are all irrational numbers between 1 and 6. Are there more?

×

**Incorrect**

2, 3, 5, and 6 are all irrational numbers between 1 and 6.

×

**Incorrect**

Did you find all combinations of the whole numbers and 2, 3, and 5  
(2, 22, 32, etc.)? What about putting those numbers in fractions?

×

**Correct!**

This is the correct response. If you chose this answer, you know 1 and 6 are real numbers and that there are an infinite number of irrational numbers between any two real numbers.

×

**Incorrect**

You probably multiplied 67.5(0.20) and rounded your answer. However, this is the amount of sugar that will NOT be consumed.

×

**Incorrect**

You may have been approaching the problem correctly, but had a computation error, either when multiplying or subtracting. Recheck your calculations.

×

**Incorrect**

Remember that 20% does not mean 20 pounds.

×

**Correct!**

54 is the correct answer. For each member of the track team to consume 20% less sugar, the track member will consume 100% – 20% = 80% of the level of a typical high school student. 80% of 67.5 = 0.80(67.5) = 54.

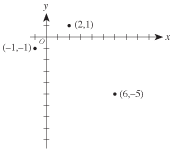
×

**Incorrect**

When converting 20% to a decimal you get 0.20 not 0.02.

×

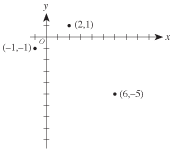
**Correct!**

×

The correct response is F. When moving from (2,1) to (–1,–1), you can go 3 units left and 2 units down. Since you want to form a rectangle, you will need to move in the same pattern from (6,–5) to the 4th vertex. Subtract 3 from the *x*-value, and subtract 2 from the *y*-value, and you will find the point needed: (6 – 3, –5 – 2) = (3,–7).

×

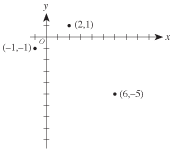
**Incorrect**

×

You might have mixed up the *x*'s and *y*'s. Did you recognize that moving left or right will affect the *x*-values, and moving up or down will affect the *y*-values?

×

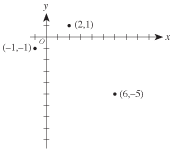
**Incorrect**

×

You need to go 3 units left and 2 units down from the point (6,–5). Remember, moving 3 units left will mean subtracting 3 from the *x*-value.

×

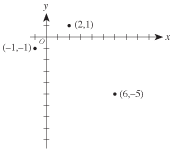
**Incorrect**

×

You need to start with the point (6,–5) and move 3 units left and 2 units down.

×

**Incorrect**

×

Moving 3 units left means subtracting 3 from the *x*-value. Moving 2 units down means you need to subtract 2 from the *y*-value.

×

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