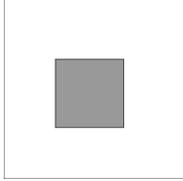
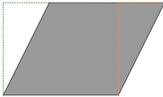
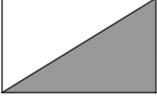
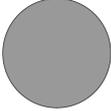
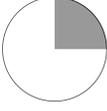
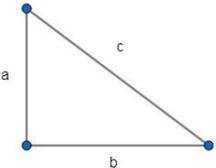
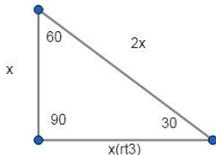
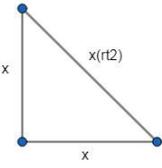


Most students are familiar with all the basic geometry by middle school. The SAT test will cover this knowledge of basic geometry and also challenge test takers with compositions of shapes that are constructed from two or more polygons.

Area Compositions

Square	Rectangle	Parallelogram	Triangle
			
$Area = (side)^2$	$Area = bh$	$Area = bh$	$Area = \frac{1}{2}bh$
$25 = (5)^2$	$15 = 5 * 3$	$21 = 7 * 3$	$12 = \frac{1}{2}(6 * 4)$

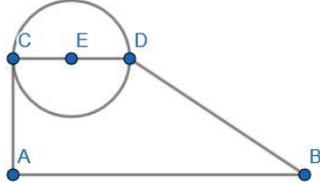
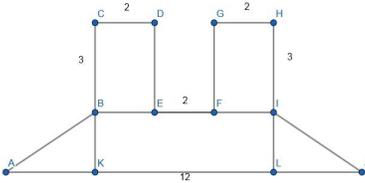
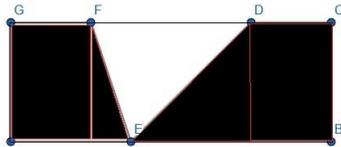
Trapezoid	Circle	Semi-Circle	Quarter-Circle
			
$Area = \frac{1}{2}(b_1 + b_2)h$	$Area = \pi(r)^2$	$Area = \frac{1}{2}\pi(r)^2$	$Area = \frac{1}{4}\pi(r)^2$
$42 = \frac{1}{2}(9 + 5) * 6$	$16\pi = \pi(4)^2$	$8\pi = \frac{1}{2}\pi(4)^2$	$4\pi = \frac{1}{4}\pi(4)^2$

Pythagorean Theorem	30-60-90 Triangle	45-45-90 Triangle
		
$a^2 + b^2 = c^2$	Triangle sides in ratio	Triangle sides in ratio
	$(x): (x\sqrt{3}): (2x)$	$(x): (x): (x\sqrt{2})$

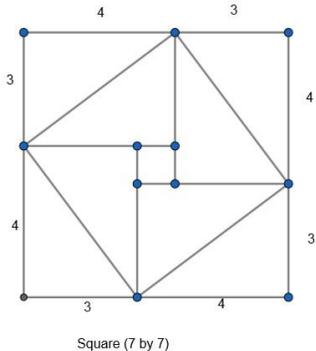
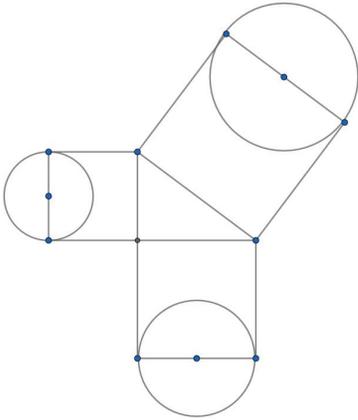
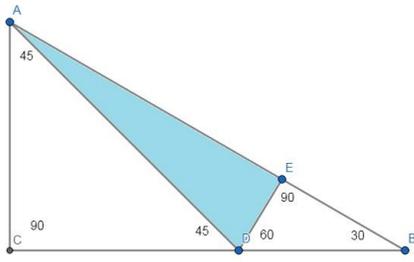
SAT Lesson #18 Classwork: Area Compositions

1)	What is the area of a square that has a perimeter of 44 ?	A) 44 B) 100 C) 121 D) 144
2)	What is the length of a rectangle with area 80 that has a length 11 units longer than its width ?	A) 20 B) 16 C) 10 D) None of these
3)	What are the base and height of a parallelogram with area 84 if <i>base length</i> = (x) and <i>height</i> = $(x + 8)$?	A) 4 and 21 B) 6 and 14 C) 8 and 10.5 D) 14 and 6 E) 16 and 5.25
4)	What is the area of a triangle with base <i>base</i> = $x + 5$ and <i>height</i> = $5x$ if $x = 3$?	A) 30 B) 34 C) 60 D) 75
5)	A trapezoid is constructed from a rectangle with base 20 and height 12 by drawing a diagonal straight line through the center of the figure. What is the area of each trapezoid ?	A) 180 B) 160 C) 140 D) 120
6)	What is the area of a semicircle with diameter 18 ?	A) 360π B) 162π C) 81π D) 40.5π
7)	A bay window has a base rectangle of 10 feet and a height of 24 feet. It is topped by a semi-circle that reaches both ends of the window. What is the total area, to the nearest square foot ?	A) $240 + 25\pi$ B) $240 + 15\pi$ C) $240 + 12.5\pi$ D) $240 + 6.25\pi$
8)	Triangle ABC is 30-60-90. If the long leg is $6\sqrt{3}$, then what is the length of the hypotenuse ?	A) 18 B) 16 C) 15 D) 12

SAT Lesson #18: Classwork (continued)

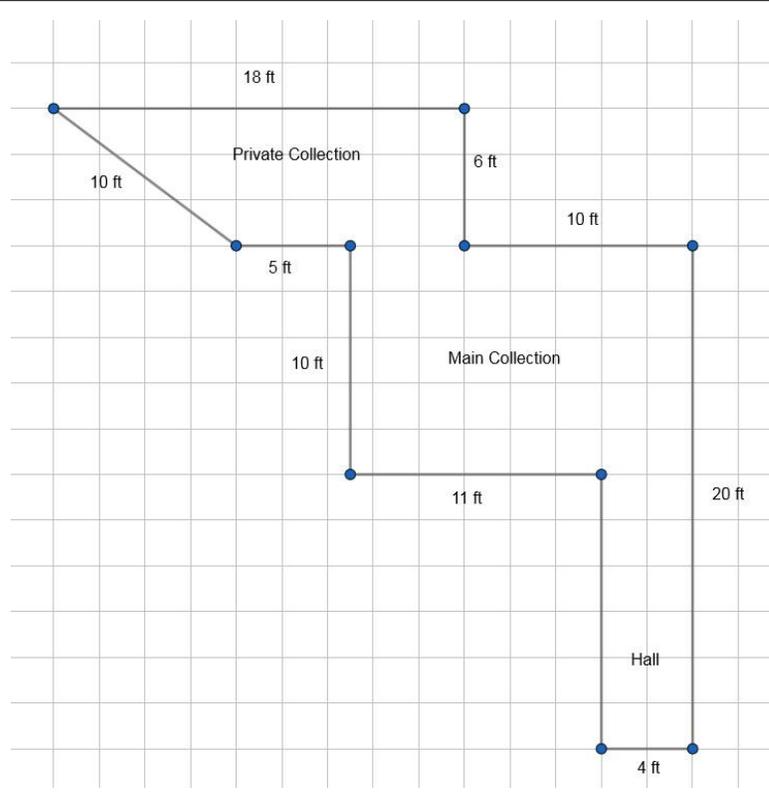
<p>9) A shoe store makes wooden clog stands with the following design: If $AB = 12$, $AC = 4$ and diameter $CD = 4$, what is the total area of the overlapping trapezoid and circle wood design?</p>		<p>A) $32 + 2\pi$ B) $32 + 4\pi$ C) $48 + 2\pi$ D) $64 + 2\pi$</p>
<p>10) An entertainment center is designed with the following system: Rectangles BCDE and FGHI sit atop Rectangle BILK (Area = 12). Base AJ equals 12. What is the total square footage of the wall space of the design?</p>		<p>A) 42 B) 36 C) 30 D) 24</p>
<p>11) If a marble slab is chiseled so that a triangle is removed. The cross sectional view has rectangle ABCG has base 8 and height 3, and $FD=4$, what is the area of the shaded region?</p>		<p>A) 20 B) 18 C) 16 D) 14</p>
<p>12) The playground architect designs a climbing wall rectangle with perimeter 22 meters has length and width that are natural numbers. The width is 3 more than the length. A circle is bored with a radius 1.6m for the children. What is the area of the shaded region?</p>	 <p>radius = 1.6. rectangle has perimeter 22.</p>	<p>A) $28 - 5.12\pi$ B) $28 - 2.56\pi$ C) $24 - 1.28\pi$ D) $24 - 2.56\pi$</p>

SAT Lesson #18: Classwork (continued)

<p>13) The picture of a 7 by 7 square has each side partitioned into 3 & 4 length segments. This forms 8 right triangles. What is the perimeter of the larger center square?</p>	 <p style="text-align: center;">Square (7 by 7)</p>	<p>A) 36 B) 24 C) 20 D) 16</p>
<p>14) A large office space is designed with one section having an area for president, and two vice presidents. This space has three squares sides 3,4,5 meters that are connected to a triangle in the center. The external side of each square is drawn a circle with a diameter equal to each side. What is the total area of the figure?</p>		<p>A) $56 + 12.5\pi$ B) $28 + 6.25\pi$ C) $28 + 3.125\pi$ D) $56 + 6.25\pi$</p>
<p>15) Triangle ACD is 45-45-90. Triangle ABC and DBE are 30-60-90. If AC = 1, what is the length of AE?</p>		<p>A) $\sqrt{3} - 1$ B) $\frac{3-\sqrt{3}}{2}$ C) $\frac{\sqrt{3}-1}{2}$ D) $\frac{1+\sqrt{3}}{2}$</p>

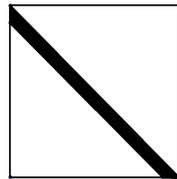
SAT Lesson #18: Classwork (continued)

16) An art gallery has a narrow hallway that leads to a gallery that also contains a private collection. The owner would like to carpet at \$3.25 per square foot the gallery for guests. What is the total and cost to carpet the space?



- A) \$472.00
- B) \$754.00
- C) \$832.00
- D) \$890.50

17. The 10m by 10m rectangular garden has a 1 meter gate at the top left and lower right and a diagonal path across the area made of gravel. What is the area of the shaded gravel path?



- A. 9.5 sq. m
- B. 10.5 sq. m
- C. 11.5 sq. m
- D. 12.5 sq. m

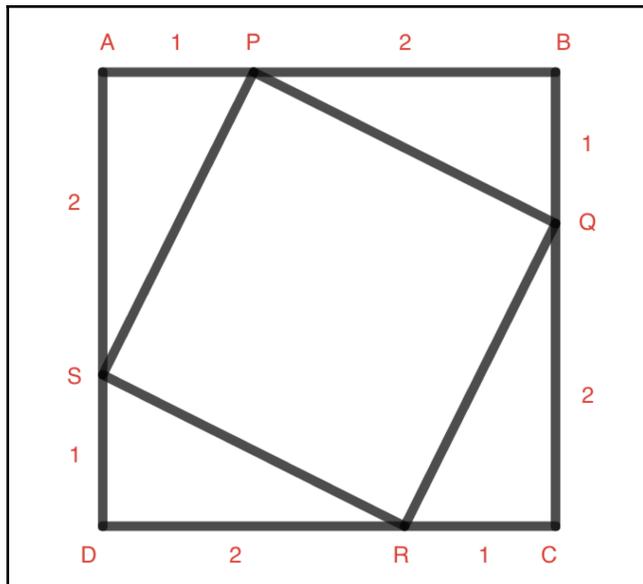
18. If an 8 by 8 by 8 cube is painted red on all 6 faces, the cube is split in half and each new inside face is painted red. How many cubes are NOT painted on any face ?

- A. 196
- B. 144
- C. 124
- D. 72

SAT Lesson #18: Classwork (continued)

19. ABCD and PQRS are squares, as shown. ABCD is 3 by 3.

$AP=BQ=CR=DS=1$. The area of PQRS is

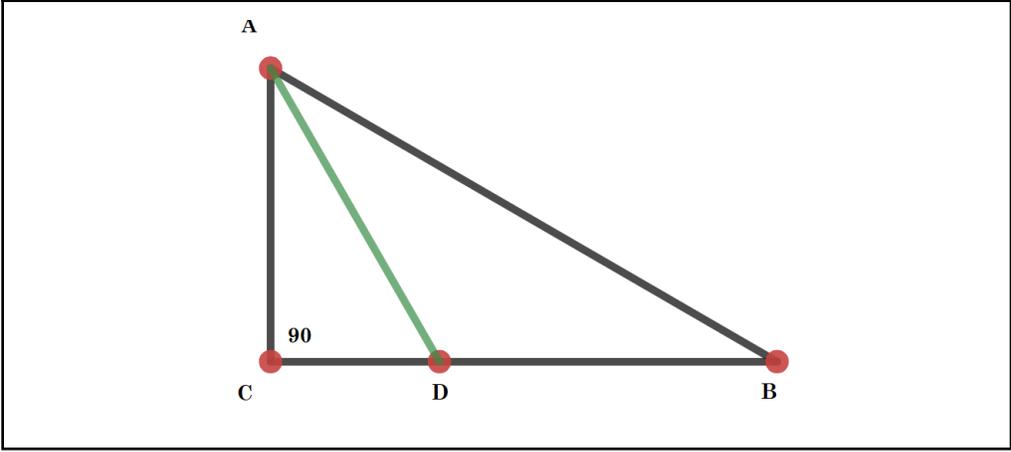


- A. 3
- B. 4
- C. 5
- D. 6

20. A square of side 4 is topped by a semicircle, forming a bay window. Point P is the center of the arc at the top of the semicircle. If a line is drawn from the top to the lower left corner of the square, what is the area of the portion of the figure to the left of this line?

- A. $\pi + 2$
- B. $\frac{\pi}{2} + 2$
- C. $2\pi + 2$
- D. $2\pi - 4$

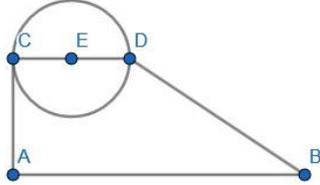
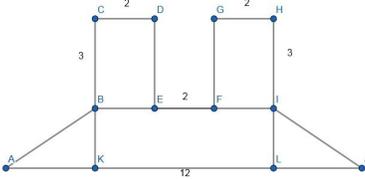
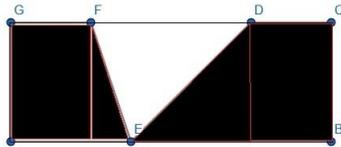
SAT Lesson #18: Classwork SAT Exam Grid-In

<p>21. (Easy Level)</p> <p>Keiko has taken 5 science tests. She earned the following grades: {75, 85, 90, 85, 92}. How many more points does she need total on the next two exams to raise her average to an 88 ?</p>	Grid-In
<p>22. (Easy Level)</p> <p>A computer originally costs \$1,500. The store decides to give a 20% discount for a store sale. They sell 35 computers. After the sale, there are still come computers remaining in stock. So, the store takes an additional 10% off the sale price. They then sell 45 more computers. How much more were the sales receipts for the second sale than the first ?</p>	Grid-In
<p>23. (Mid Level)</p> <p>A job company has a recruiting day and 10 prospects arrive in the company meeting room. If each person meets another person with a handshake, what are the minimum number of handshakes needed for all 10 prospects & 1 recruiter to meet ?</p>	Grid-In
<p>24. (Mid Level)</p> <p>In right triangle ABC, $AC = 1$, angle $c = 90^\circ$ and angle $b = 0.5a$. Segment AD bisects angle a. What is the length of AD ? (Round to the nearest tenth).</p> 	Grid-In
<p>25. (Challenge Level)</p> <p>How many degrees are in a dodecagon (12 sided polygon) ?</p>	Grid-In

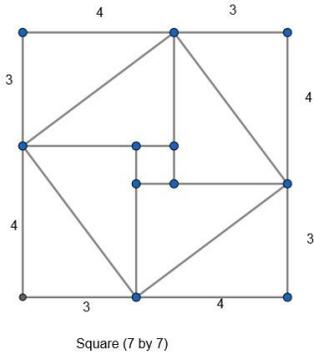
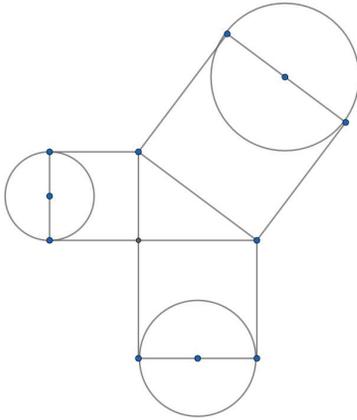
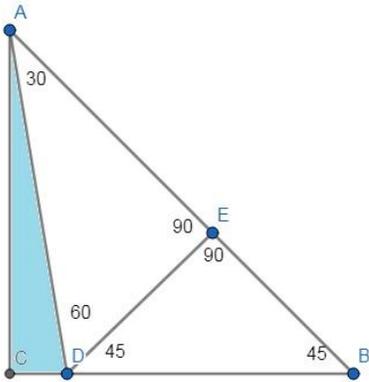
SAT Lesson #18 Homework: Area Compositions

1)	What is the area of a square that has a perimeter of 40 ?	A) 44 B) 64 C) 100 D) 121
2)	What is the length of a rectangle with area 90 that has a length 13 units longer than its width ?	A) 20 B) 18 C) 16 D) 10
3)	What are the base and height of a parallelogram with area 84 if <i>base length = (x) and height = (x + 17) ?</i>	A) 4 and 21 B) 6 and 14 C) 8 and 10.5 D) 14 and 6
4)	What is the area of a triangle with base <i>base = x + 5 and height = 5x</i> if $x = 6$?	A) 120 B) 145 C) 160 D) 165
5)	A trapezoid is constructed from a rectangle with base 35 and height 20 by drawing a diagonal straight line through the center of the figure. What is the area of each trapezoid ?	A) 240 B) 300 C) 350 D) 420
6)	What is the area of a semicircle with diameter 24 ?	A) 144π B) 96π C) 72π D) 36π
7)	A bay window has a base rectangle of 24 feet and a height of 10 feet. It is topped by a semi-circle that reaches both ends of the window. What is the total area, to the nearest square foot ?	A) $240 + 144\pi$ B) $240 + 72\pi$ C) $240 + 36\pi$ D) $68 + 72\pi$ E) $34 + 144\pi$
8)	Triangle ABC is 45-45-90. If the legs are $3\sqrt{5}$, what is the hypotenuse ?	A) 15 B) $3\sqrt{10}$ C) $6\sqrt{10}$ D) $9\sqrt{5}$

SAT Lesson #18: Homework (continued)

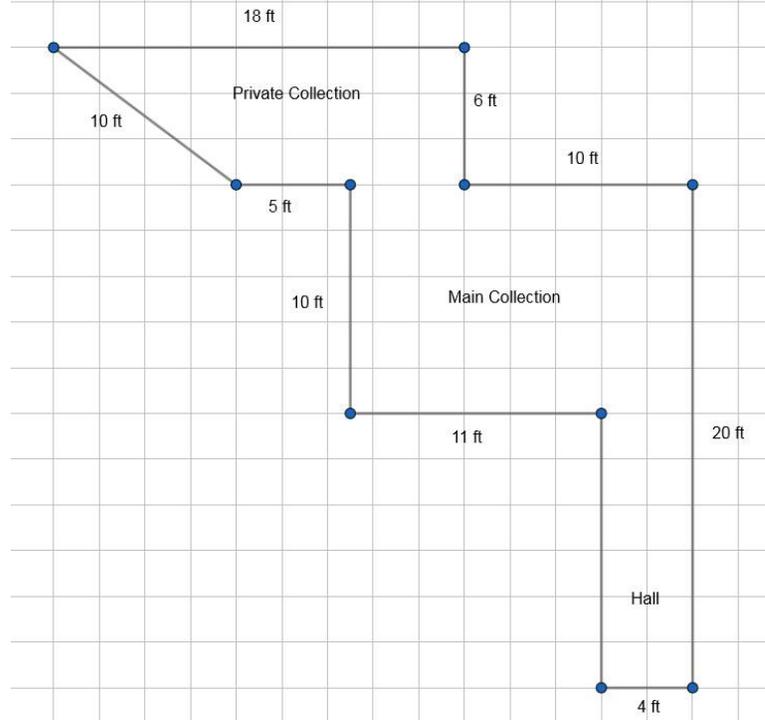
<p>9) A shoe store makes wooden clog stands with the following design: If $AB = 16$, $AC = 6$ and diameter $CD = 6$, what is the total area of the overlapping trapezoid and circle wood design?</p>		<p>A) $66 + 9\pi$ B) $66 + 4.5\pi$ C) $54 + 9\pi$ D) $64 + 4.5\pi$</p>
<p>10) An entertainment center is designed with the following system: Rectangles BCDE and FGHI sit atop Rectangle BILK (Area = 12). Base AJ equals 12. What is the total square footage of the wall space of the two base triangles in the design?</p>		<p>A) 6 B) 8 C) 10 D) 12</p>
<p>11) If a marble slab is chiseled so that a triangle is removed. The cross sectional view has rectangle ABCG has base 12 and height 5, and $FD=6$, what is the area of the shaded region?</p>		<p>A) 60 B) 54 C) 45 D) 40</p>
<p>12) The playground architect designs a climbing wall rectangle with perimeter 22 meters has length and width that are natural numbers. The width is 5 more than the length. A circle is bored with a radius 1.6m for the children. What is the area of the shaded region?</p>	 <p>radius = 1.6. rectangle has perimeter 22.</p>	<p>A) $28 - 5.12\pi$ B) $28 - 2.56\pi$ C) $24 - 1.28\pi$ D) $24 - 2.56\pi$</p>

SAT Lesson #18: Homework (continued)

<p>13) The picture of a 7 by 7 square has each side partitioned into 3 & 4 length segments. This forms 8 right triangles. What is the difference in perimeter of the larger center square to the smaller square?</p>		<p>A) 36 B) 24 C) 20 D) 16</p>
<p>14) A large office space is designed with one section having an area for the president, and two vice presidents. This space has three squares sides 3,4,5 meters that are connected to a triangle in the center. The external side of each square is drawn a circle with a diameter equal to each side. What is the total area of the figure?</p>		<p>A) $56 + 12.5\pi$ B) $28 + 6.25\pi$ C) $28 + 3.125\pi$ D) $56 + 6.25\pi$</p>
<p>15) Triangle ABC and BDE are 45-45-90. Triangle ADE is 30-60-90. If $DE = 1$ and CE equals $\frac{\sqrt{6}-\sqrt{2}}{2}$, what is the length of AD?</p>		<p>A) $\sqrt{3}$ B) $\sqrt{3} + 1$ C) 2 D) $\frac{\sqrt{6}+\sqrt{2}}{2}$</p>

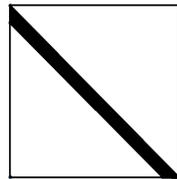
SAT Lesson #18: Homework (continued)

16) An art gallery has a narrow hallway that leads to a gallery that also contains a private collection. The owner would like to carpet at \$3.25 per square foot of the gallery for guests. What is the total cost to carpet the space?



- A) \$754.00
- B) \$832.00
- C) \$890.50
- D) \$959.00

17. The 10m by 10m rectangular garden has a 1 meter gate at the top left and lower right and a diagonal path across the area made of gravel. What is the cost of the shaded gravel path, if gravel is \$1.20 per square meter?



- A. \$10.20
- B. \$11.40
- C. \$12.60
- D. \$13.80

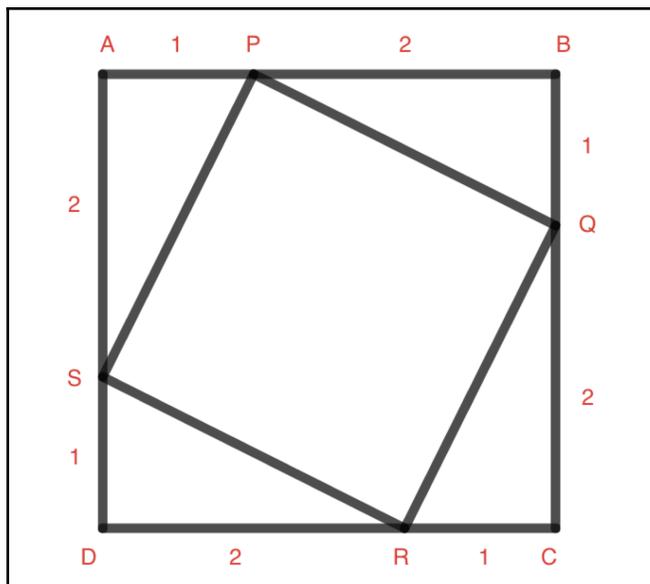
18. If an 8 by 8 by 8 cube is painted red on all 6 faces, the cube is split in half and each new inside face is painted red. How many cubes are painted on two or more faces ?

- A. 80
- B. 96
- C. 120
- D. 144

SAT Lesson #18: Homework (continued)

19. ABCD and PQRS are squares, as shown. ABCD is 3 by 3.

$AP=BQ=CR=DS=1$. The area of PQRS is how much more than the area of the four triangles?

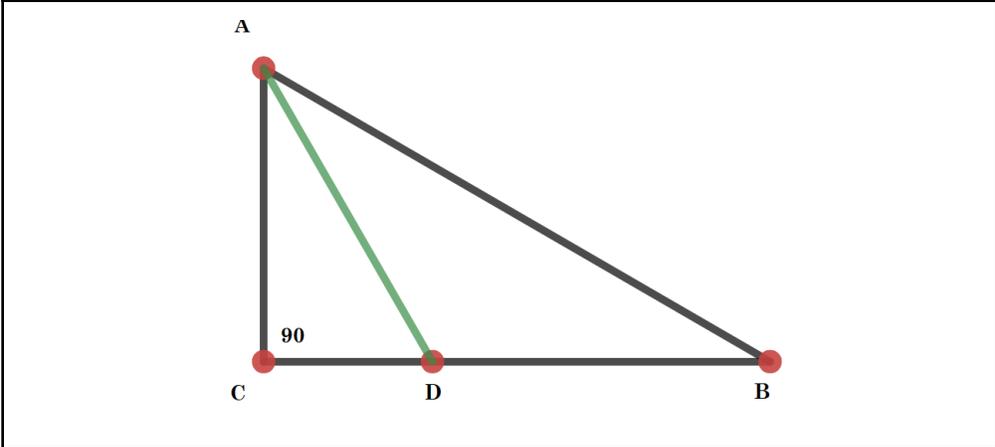


- A. 3
- B. 2
- C. 1
- D. 0

20. A square of side 4 is topped by a semicircle, forming a bay window. Point P is the center of the arc at the top of the semicircle. If a line is drawn from the top to the lower left corner of the square, what is the area of the portion of the figure to the right of this line?

- A. $\pi + 14$
- B. $\frac{\pi}{2} + 12$
- C. $2\pi + 2$
- D. $2\pi - 4$

SAT Lesson #18: Homework SAT Exam Grid-In

<p>21. (Easy Level)</p> <p>Keiko has taken 5 science tests. She earned the following grades {75, 85, 90, 85, 92}. How many more points does she need on the next three exams to raise her average to a 90 ?</p>	Grid-In
<p>22. (Easy Level)</p> <p>A computer originally costs \$2,500. The store decides to give a 20% discount for a store sale. They sell 35 computers. After the sale, there are still some computers remaining in stock. So, the store takes an additional 10% off the sale price. They then sell 45 more computers. How much more were the sales receipts for the second sale than the first ?</p>	Grid-In
<p>23. (Mid Level)</p> <p>A job company has a recruiting day and 15 prospects arrive in the company meeting room. If each person meets another person with a handshake, what are the minimum number of handshakes needed for all 15 prospects & 1 recruiter to meet ?</p>	Grid-In
<p>24. (Mid Level)</p> <p>In right triangle $\triangle ABC$, $AC = 1$, angle $c = 90^\circ$ and angle $b = 0.5a$. Segment AD bisects angle a. What is the area of triangle $\triangle ADB$? (Round to the nearest tenth).</p> 	Grid-In
<p>25. (Challenge Level)</p> <p>How many degrees are in a pentadecagon (15 sided polygon) ?</p>	Grid-In