

# SAT2-MATHEMATICS Q&As

# SAT Section 2: Mathematics

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**QUESTION 1** 



 $FC = 6\sqrt{3}$ 

In the diagram above, ABDE is a square and BCD is an equilateral triangle. If cm, what is the perimeter of ABCDE?

- A.  $30\sqrt{3}$  cm B.  $36\sqrt{3}$  cm C. 60 cm D.  $60\sqrt{3}$  cm E. 84 cm
- A. Option A
- B. Option B
- C. Option C
- D. Option D
- E. Option E

Correct Answer: C

Since BCD is an equilateral triangle, angles CBD, BDC, and BCD all measure 60 degrees. FCD and BCF are both 30-60-90 right triangles that are congruent to each other. The side opposite the 60-degree angle of triangle BCF, side



FC, is equal to times the length of the side opposite the 30-degree angle, side BF. Therefore, BF is equal to = 6 cm. The hypotenuse, BC, is equal to twice the length of side BF. The length of BC is 2(6) = 12 cm. Since BC= 12 cm, CD and BD are also 12 cm. BD is one side of square ABDE; therefore, each side of ABDE is equal to 12 cm. The perimeter of ABCDE = 12 cm + 12 cm + 12 cm + 12 cm = 60 cm.

#### **QUESTION 2**



In the diagram above, the length of a side of square ABCD is four units. What is the area of the shaded region?

A. 4

B. 4 – ?

C. 4 – 4?

D. 16?

E. 16 – 4?

Correct Answer: B

Explanation:

The area of a square is equal to S2, where s is the length of a side of the square. The area of ABCD is 42=

16 square units. The area of a circle is equal to ?r2, where r is the radius of the circle.



The diameter of the circle is four units. The radius of the circle is 4/2 = 2 square units. The area of the circle is equal to ?(2)2=4?. The shaded area is equal to one-fourth of the difference between the area of the square and the area of the circle:1/4(16 - 4?) = 4 - ?.

#### **QUESTION 3**



In the diagram above, line AB is parallel to line CD, both lines are tangents to circle O and the diameter of circle O is equal in measure to the length of line OH. If the diameter of circle O is 24 in, what is the measure of angle BGH?

A. 30 degrees

- B. 45 degrees
- C. 60 degrees
- D. 75 degrees
- E. cannot be determined

Correct Answer: A

Lines OF and OE are radii of circle O and since a tangent and a radius form a right angle, triangles OFH and OGE are right triangles. If the length of the diameter of the circle is 24 in, then the length of the radius is 12 in. The sine of angle OHF is equal to 12/24, or1/2. The measure of an angle with a sine of 1/2 is 30 degrees. Therefore, angle OHF measures 30 degrees. Since angles BGH and OHF are alternating angles,

they are equal in measure. Therefore, angle BGH also measures 30 degrees.

#### **QUESTION 4**

The measures of the length, width, and height of a rectangular prism are in the ratio 2:6:5. If the volume of the prism is



1,620 mm3, what is the width of the prism?

- A. 3 mm
- B. 6 mm
- C. 9 mm
- D. 18 mm
- E. 27 mm

Correct Answer: D

The volume of a prism is equal to lwh, where is the length of the prism, w is the width of the prism, and h is the height of the prism:

$$(2x)(6x)(5x)=1,620$$
  
 $60x^3 = 1,620$   
 $x^3 = 27$   
 $x=3$ 

The length of the prism is 2(3) = 6 mm, the width of the prism is 6(3) = 18 mm, and the height of the prism is 5(3)=15 mm.

#### **QUESTION 5**

Line AC is a diagonal of square ABCD. What is the sine of angle ACB?





### E. cannot be determined

- A. Option A
- B. Option B
- C. Option C
- D. Option D
- E. Option E
- Correct Answer: C

A square has four right (90-degree) angles. The diagonals of a square bisect its angles. Diagonal AC bisects C, forming two 45-degree angles, angle ACB and angle ACD. The sine of 45 degrees is equal to 2/2

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