

Question ID dbb97818

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Geometry and Trigonometry	Area and volume	Medium

ID: dbb97818

A cylinder has a diameter of **8** inches and a height of **12** inches. What is the volume, in cubic inches, of the cylinder?

- A. **16π**
- B. **96π**
- C. **192π**
- D. **768π**

ID: dbb97818 Answer

Correct Answer: C

Rationale

Choice C is correct. The base of a cylinder is a circle with a diameter equal to the diameter of the cylinder. The volume, **V** , of a cylinder can be found by multiplying the area of the circular base, **A** , by the height of the cylinder, **h** , or **$V = Ah$** . The area of a circle can be found using the formula **$A = \pi r^2$** , where **r** is the radius of the circle. It's given that the diameter of the cylinder is **8** inches. Thus, the radius of this circle is **4** inches. Therefore, the area of the circular base of the cylinder is **$A = \pi(4)^2$** , or **16π** square inches. It's given that the height **h** of the cylinder is **12** inches. Substituting **16π** for **A** and **12** for **h** in the formula **$V = Ah$** gives **$V = 16\pi(12)$** , or **192π** cubic inches.

Choice A is incorrect. This is the area of the circular base of the cylinder.

Choice B is incorrect and may result from using **8**, instead of **16**, as the value of **r^2** in the formula for the area of a circle.

Choice D is incorrect and may result from using **8**, instead of **4**, for the radius of the circular base.

Question Difficulty: Medium

Question ID 4ee1c94d

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Geometry and Trigonometry	Area and volume	Medium

ID: 4ee1c94d

A right circular cylinder has a volume of **432** cubic centimeters. The area of the base of the cylinder is **24** square centimeters. What is the height, in centimeters, of the cylinder?

- A. **18**
- B. **24**
- C. **216**
- D. **10,368**

ID: 4ee1c94d Answer

Correct Answer: A

Rationale

Choice A is correct. The volume, V , of a right circular cylinder is given by the formula $V = \pi r^2 h$, where πr^2 is the area of the base of the cylinder and h is the height. It's given that a right circular cylinder has a volume of **432** cubic centimeters and the area of the base is **24** square centimeters. Substituting **432** for V and **24** for πr^2 in the formula $V = \pi r^2 h$ yields **432** = **24** h . Dividing both sides of this equation by **24** yields **18** = h . Therefore, the height of the cylinder, in centimeters, is **18**.

Choice B is incorrect. This is the area of the base, in square centimeters, not the height, in centimeters, of the cylinder.

Choice C is incorrect. This is the height, in centimeters, of a cylinder if its volume is **432** cubic centimeters and the area of its base is **2**, not **24**, cubic centimeters.

Choice D is incorrect. This is the height, in centimeters, of a cylinder if its volume is **432** cubic centimeters and the area of its base is $\frac{1}{24}$, not **24**, cubic centimeters.

Question Difficulty: Medium

Question ID 5714ab73

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Geometry and Trigonometry	Area and volume	Medium

ID: 5714ab73

The length of the edge of the base of a right square prism is **6** units. The volume of the prism is **2,880** cubic units. What is the height, in units, of the prism?

- A. $4\sqrt{30}$
- B. **36**
- C. $24\sqrt{5}$
- D. **80**

ID: 5714ab73 Answer

Correct Answer: D

Rationale

Choice D is correct. The volume, V , of a right square prism is given by the formula $V = s^2h$, where s represents the length of the edge of the base and h represents the height of the prism. It's given that the volume of a right square prism is **2,880** cubic units and the length of the edge of the base is **6** units. Substituting **2,880** for V and **6** for s in the formula $V = s^2h$ yields $2,880 = (6^2)h$, or $2,880 = 36h$. Dividing both sides of this equation by **36** yields $80 = h$. Therefore, the height, in units, of the prism is **80**.

Choice A is incorrect. This is the height, in units, of a right square prism where the length of the edge of the base is **6** units and the volume of the prism is $144\sqrt{30}$, not **2,880**, units.

Choice B is incorrect. This is the area, in square units, of the base, not the height, in units, of the prism.

Choice C is incorrect. This is the height, in units, of a right square prism where the length of the edge of the base is **6** units and the volume of the prism is $864\sqrt{5}$, not **2,880**, units.

Question Difficulty: Medium

Question ID bccbe438

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Geometry and Trigonometry	Area and volume	Medium

ID: bccbe438

A triangular prism has a height of **8 centimeters (cm)** and a volume of **216 cm³**. What is the area, **in cm²**, of the base of the prism? (The volume of a triangular prism is equal to ***Bh***, where ***B*** is the area of the base and ***h*** is the height of the prism.)

ID: bccbe438 Answer

Correct Answer: 27

Rationale

The correct answer is **27**. It's given that a triangular prism has a volume of **216 cubic centimeters (cm³)** and the volume of a triangular prism is equal to ***Bh***, where ***B*** is the area of the base and ***h*** is the height of the prism. Therefore, **216 = *Bh***. It's also given that the triangular prism has a height of **8 cm**. Therefore, ***h* = 8**. Substituting **8** for ***h*** in the equation **216 = *Bh*** yields **216 = *B*(8)**. Dividing both sides of this equation by **8** yields **27 = *B***. Therefore, the area, **in cm²**, of the base of the prism is **27**.

Question Difficulty: Medium

Question ID f9c5558d

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Geometry and Trigonometry	Area and volume	Medium

ID: f9c5558d

Square X has a side length of **12** centimeters. The perimeter of square Y is **2** times the perimeter of square X. What is the length, in centimeters, of one side of square Y?

- A. **6**
- B. **10**
- C. **14**
- D. **24**

ID: f9c5558d Answer

Correct Answer: D

Rationale

Choice D is correct. The perimeter, P , of a square can be found using the formula $P = 4s$, where s is the length of each side of the square. It's given that square X has a side length of **12** centimeters. Substituting **12** for s in the formula for the perimeter of a square yields $P = 4(12)$, or $P = 48$. Therefore, the perimeter of square X is **48** centimeters. It's also given that the perimeter of square Y is **2** times the perimeter of square X. Therefore, the perimeter of square Y is **2(48)**, or **96**, centimeters. Substituting **96** for P in the formula $P = 4s$ gives **96** = $4s$. Dividing both sides of this equation by **4** gives **24** = s . Therefore, the length of one side of square Y is **24** centimeters.

Choice A is incorrect and may result from conceptual or calculation errors.

Choice B is incorrect and may result from conceptual or calculation errors.

Choice C is incorrect and may result from conceptual or calculation errors.

Question Difficulty: Medium

Question ID f92d252b

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Geometry and Trigonometry	Area and volume	Medium

ID: f92d252b

A right circular cylinder has a volume of **377** cubic centimeters. The area of the base of the cylinder is **13** square centimeters. What is the height, in centimeters, of the cylinder?

ID: f92d252b Answer

Correct Answer: 29

Rationale

The correct answer is **29**. The volume, V , of a right circular cylinder is given by the formula $V = \pi r^2 h$, where r is the radius of the base of the cylinder and h is the height of the cylinder. Since the base of the cylinder is a circle with radius r , the area of the base of the cylinder is πr^2 . It's given that a right circular cylinder has a volume of **377** cubic centimeters; therefore, $V = 377$. It's also given that the area of the base of the cylinder is **13** square centimeters; therefore, $\pi r^2 = 13$. Substituting **377** for V and **13** for πr^2 in the formula $V = \pi r^2 h$ yields $377 = 13h$. Dividing both sides of this equation by **13** yields $29 = h$. Therefore, the height of the cylinder, in centimeters, is **29**.

Question Difficulty: Medium

Question ID 489aba1c

Assessment	Test	Domain	Skill	Difficulty
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ID: 489aba1c

A circle has a circumference of 31π centimeters. What is the diameter, in centimeters, of the circle?

ID: 489aba1c Answer

Correct Answer: 31

Rationale

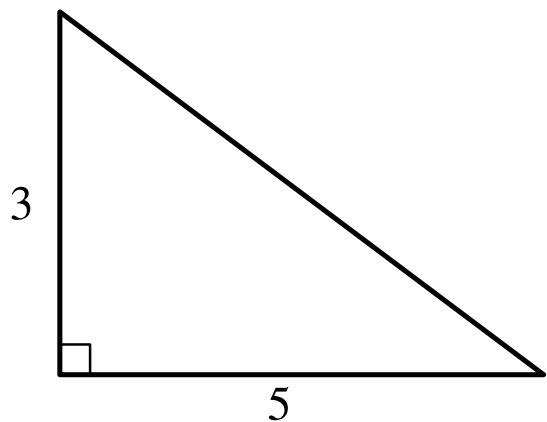
The correct answer is **31**. The circumference of a circle is equal to $2\pi r$ centimeters, where r represents the radius, in centimeters, of the circle, and the diameter of the circle is equal to $2r$ centimeters. It's given that a circle has a circumference of 31π centimeters. Therefore, $31\pi = 2\pi r$. Dividing both sides of this equation by π yields $31 = 2r$. Since the diameter of the circle is equal to $2r$ centimeters, it follows that the diameter, in centimeters, of the circle is **31**.

Question Difficulty: Medium

Question ID 919b2d08

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Geometry and Trigonometry	Area and volume	Medium

ID: 919b2d08



Note: Figure not drawn to scale.

The figure shows the lengths, in inches, of two sides of a right triangle. What is the area of the triangle, in square inches?

ID: 919b2d08 Answer

Correct Answer: 7.5, 15/2

Rationale

The correct answer is $\frac{15}{2}$. The area, A , of a triangle is given by the formula $A = \frac{1}{2}bh$, where b is the length of the base of the triangle and h is the height of the triangle. In the right triangle shown, the length of the base of the triangle is 5 inches, and the height is 3 inches. It follows that $b = 5$ and $h = 3$. Substituting 5 for b and 3 for h in the formula $A = \frac{1}{2}bh$ yields $A = \frac{1}{2}(5)(3)$, which is equivalent to $A = \frac{1}{2}(15)$, or $A = \frac{15}{2}$. Therefore, the area of the triangle, in square inches, is $\frac{15}{2}$. Note that 15/2 and 7.5 are examples of ways to enter a correct answer.

Question Difficulty: Medium

Question ID e582b600

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Geometry and Trigonometry	Area and volume	Medium

ID: e582b600

A circle has a radius of **43** meters. What is the area, in square meters, of the circle?

- A. $\frac{43\pi}{2}$
- B. **43** π
- C. **86** π
- D. **1,849** π

ID: e582b600 Answer

Correct Answer: D

Rationale

Choice D is correct. The area, **A**, of a circle is given by the formula $A = \pi r^2$, where **r** is the radius of the circle. It’s given that the circle has a radius of **43** meters. Substituting **43** for **r** in the formula $A = \pi r^2$ yields $A = \pi(43)^2$, or $A = 1,849\pi$. Therefore, the area, in square meters, of the circle is **1,849** π .

Choice A is incorrect. This is the area, in square meters, of a circle with a radius of $\sqrt{\frac{43}{2}}$ meters.

Choice B is incorrect. This is the area, in square meters, of a circle with a radius of $\sqrt{43}$ meters.

Choice C is incorrect. This is the circumference, in meters, of the circle.

Question Difficulty: Medium

Question ID 41b0fa3d

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Geometry and Trigonometry	Area and volume	Medium

ID: 41b0fa3d

The length of each edge of a box is **29** inches. Each side of the box is in the shape of a square. The box does not have a lid. What is the exterior surface area, in square inches, of this box without a lid?

ID: 41b0fa3d Answer

Correct Answer: 4205

Rationale

The correct answer is **4,205**. The exterior surface area of a figure is the sum of the areas of all its faces. It's given that the box does not have a lid and that each side of the box is in the shape of a square. Therefore, the box consists of **5** congruent square faces. It's also given that the length of each edge is **29** inches. Let ***s*** represent the length of an edge of a square. It follows that the area of a square is equal to ***s*²**. Therefore, the area of each of the **5** square faces is equal to **29²**, or **841**, square inches. Since the box consists of **5** congruent square faces, it follows that the sum of the areas of all its faces, or the exterior surface area of this box without a lid, is **5(841)**, or **4,205**, square inches.

Question Difficulty: Medium

Question ID 221df55b

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Geometry and Trigonometry	Area and volume	Medium

ID: 221df55b

The table gives the perimeters of similar triangles TUV and XYZ , where \overline{TU} corresponds to \overline{XY} . The length of \overline{TU} is 18.

	Perimeter
Triangle TUV	37
Triangle XYZ	333

What is the length of \overline{XY} ?

- A. 2
- B. 18
- C. 55
- D. 162

ID: 221df55b Answer

Correct Answer: D

Rationale

Choice D is correct. It's given that triangle XYZ is similar to triangle TUV . Therefore, each side of triangle XYZ is k times its corresponding side of triangle TUV , where k is a constant. It follows that the perimeter of triangle XYZ is k times the perimeter of triangle TUV . It's also given that \overline{TU} corresponds to \overline{XY} and the length of \overline{TU} is 18. Let x represent the length of \overline{XY} . It follows that $x = 18k$. The table shows that the perimeters of triangles TUV and XYZ are 37 and 333, respectively. It follows that $333 = 37k$, or $9 = k$. Substituting 9 for k in the equation $x = 18k$ yields $x = (18)(9)$, or $x = 162$. Therefore, the length of \overline{XY} is 162.

Choice A is incorrect and may result from conceptual or calculation errors.

Choice B is incorrect. This is the length of \overline{TU} , not the length of \overline{XY} .

Choice C is incorrect and may result from conceptual or calculation errors.

Question Difficulty: Medium

Question ID 1c15c90f

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Geometry and Trigonometry	Area and volume	Medium

ID: 1c15c90f

A circle has a radius of **2.1** inches. The area of the circle is $b\pi$ square inches, where b is a constant. What is the value of b ?

ID: 1c15c90f Answer

Correct Answer: 4.41, 441/100

Rationale

The correct answer is **4.41**. The area, A , of a circle is given by the formula $A = \pi r^2$, where r is the radius of the circle. It's given that the area of the circle is $b\pi$ square inches, where b is a constant, and the radius of the circle is **2.1** inches. Substituting $b\pi$ for A and **2.1** for r in the formula $A = \pi r^2$ yields $b\pi = \pi(2.1^2)$. Dividing both sides of this equation by π yields $b = 4.41$. Therefore, the value of b is **4.41**.

Question Difficulty: Medium

Question ID 04bbdda6

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Geometry and Trigonometry	Area and volume	Medium

ID: 04bbdda6

A sphere has a radius of $\frac{17}{5}$ feet. What is the volume, in cubic feet, of the sphere?

- A. $\frac{5\pi}{17}$
- B. $\frac{68\pi}{15}$
- C. $\frac{32\pi}{5}$
- D. $\frac{19,652\pi}{375}$

ID: 04bbdda6 Answer

Correct Answer: D

Rationale

Choice D is correct. The volume, V , of a sphere can be found using the formula $V = \frac{4}{3}\pi r^3$, where r is the radius of the sphere. It's given that the sphere has a radius of $\frac{17}{5}$ feet. Substituting $\frac{17}{5}$ for r in the formula $V = \frac{4}{3}\pi r^3$ yields $V = \frac{4}{3}\pi\left(\frac{17}{5}\right)^3$, which is equivalent to $V = \frac{4}{3}\pi\left(\frac{4,913}{125}\right)$, or $V = \frac{19,652\pi}{375}$. Therefore, the volume, in cubic feet, of the sphere is $\frac{19,652\pi}{375}$.

Choice A is incorrect and may result from conceptual or calculation errors.

Choice B is incorrect. This is the volume, in cubic feet, of a sphere with a radius of $\sqrt[3]{\frac{17}{5}}$ feet.

Choice C is incorrect and may result from conceptual or calculation errors.

Question Difficulty: Medium

Question ID e5ba4117

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Geometry and Trigonometry	Area and volume	Medium

ID: e5ba4117

A right circular cylinder has a base diameter of **22** centimeters and a height of **6** centimeters. What is the volume, in cubic centimeters, of the cylinder?

- A. **132π**
- B. **264π**
- C. **726π**
- D. **$2,904\pi$**

ID: e5ba4117 Answer

Correct Answer: C

Rationale

Choice C is correct. The volume, V , of a right circular cylinder is given by the formula $V = \pi r^2 h$, where r is the radius of the base of the cylinder and h is the height of the cylinder. It's given that a right circular cylinder has a height of **6** centimeters. Therefore, $h = 6$. It's also given that the cylinder has a base diameter of **22** centimeters. The radius of a circle is half the diameter of the circle. Since the base of a right circular cylinder is a circle, it follows that the radius of the base of the right circular cylinder is $\frac{22}{2}$, or **11**, centimeters. Therefore, $r = 11$. Substituting **11** for r and **6** for h in the formula $V = \pi r^2 h$ yields $V = \pi(11)^2(6)$, which is equivalent to $V = \pi(121)(6)$, or $V = 726\pi$. Therefore, the volume, in cubic centimeters, of the cylinder is **726π** .

Choice A is incorrect. This is the volume of a right circular cylinder that has a base diameter of **$2\sqrt{22}$** , not **22**, centimeters and a height of **6** centimeters.

Choice B is incorrect. This is the volume of a right circular cylinder that has a base diameter of **$4\sqrt{11}$** , not **22**, centimeters and a height of **6** centimeters.

Choice D is incorrect. This is the volume of a right circular cylinder that has a base diameter of **44**, not **22**, centimeters and a height of **6** centimeters.

Question Difficulty: Medium

Question ID 3b66e6a3

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Geometry and Trigonometry	Area and volume	Medium

ID: 3b66e6a3

Circle K has a radius of 4 millimeters (mm). Circle L has an area of $100\pi \text{ mm}^2$. What is the total area, in mm^2 , of circles K and L ?

- A. 14π
- B. 28π
- C. 56π
- D. 116π

ID: 3b66e6a3 Answer

Correct Answer: D

Rationale

Choice D is correct. The area, A , of a circle is given by the formula $A = \pi r^2$, where r represents the radius of the circle. It's given that circle K has a radius of 4 millimeters (mm). Substituting 4 for r in the formula $A = \pi r^2$ yields $A = \pi(4)^2$, or $A = 16\pi$. Therefore, the area of circle K is $16\pi \text{ mm}^2$. It's given that circle L has an area of $100\pi \text{ mm}^2$. Therefore, the total area, in mm^2 , of circles K and L is $16\pi + 100\pi$, or 116π .

Choice A is incorrect. This is the sum of the radii, in mm, of circles K and L multiplied by π , not the total area, in mm^2 , of the circles.

Choice B is incorrect. This is the sum of the diameters, in mm, of circles K and L multiplied by π , not the total area, in mm^2 , of the circles.

Choice C is incorrect and may result from conceptual or calculation errors.

Question Difficulty: Medium

Question ID 5c415b89

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Geometry and Trigonometry	Area and volume	Medium

ID: 5c415b89

A cube has an edge length of **41** inches. What is the volume, in cubic inches, of the cube?

- A. **164**
- B. **1,681**
- C. **10,086**
- D. **68,921**

ID: 5c415b89 Answer

Correct Answer: D

Rationale

Choice D is correct. The volume, V , of a cube can be found using the formula $V = s^3$, where s is the edge length of the cube. It's given that a cube has an edge length of **41** inches. Substituting **41** inches for s in this equation yields $V = 41^3$ cubic inches, or $V = \mathbf{68,921}$ cubic inches. Therefore, the volume of the cube is **68,921** cubic inches.

Choice A is incorrect. This is the perimeter, in inches, of the cube.

Choice B is incorrect. This is the area, in square inches, of a face of the cube.

Choice C is incorrect. This is the surface area, in square inches, of the cube.

Question Difficulty: Medium