

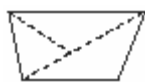
CHAPTER 6-1

CLASSIFYING SOLIDS

1. 080215a

Which piece of paper can be folded into a pyramid?

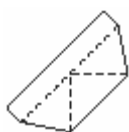
[A]



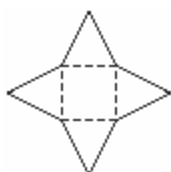
[B]



[C]



[D]



[1] _____

CHAPTER 6-2

2. 089901a

A roll of candy is shown in the accompanying diagram.



The shape of the candy is best described as a

[A] rectangular solid [B] cone

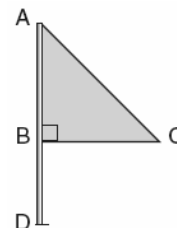
[C] cylinder [D] pyramid

[2] _____

CHAPTER 6-3

3. 010417a

Triangle ABC represents a metal flag on pole AD , as shown in the accompanying diagram. On a windy day the triangle spins around the pole so fast that it looks like a three-dimensional shape.



Which shape would the spinning flag create?

[A] pyramid

[B] cone

[C] sphere

[D] right circular cylinder

[3] _____

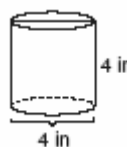
CHAPTER 6-4

VOLUME

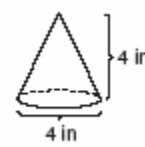
4. 080403a

Which diagram represents the figure with the greatest volume?

[A]



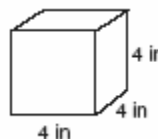
[B]



[C]



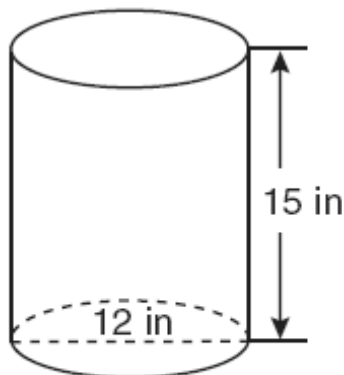
[D]



[4] _____

5. fall0712ia, P.I. A.G.2

A cylindrical container has a diameter of 12 inches and a height of 15 inches, as illustrated in the diagram below.



(Not drawn to scale)

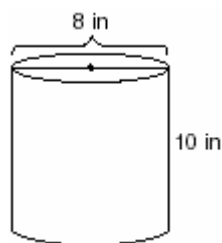
What is the volume of this container to the nearest tenth of a cubic inch?

- [A] 4,241.2 [B] 2,160.0
[C] 1,696.5 [D] 6,785.8

[5] _____

6. 060530a, P.I. A.G.2

A storage container in the shape of a right circular cylinder is shown in the accompanying diagram.



What is the volume of this container, to the nearest hundredth?

- [A] 251.33 in^3 [B] 502.65 in^3
[C] 56.55 in^3 [D] 125.66 in^3

[6] _____

7. 010802a, P.I. A.G.2

A block of wood is 5 inches long, 2 inches wide, and 3 inches high. What is the volume of this block of wood?

- [A] 30 in^3 [B] 10 in^3
[C] 25 in^3 [D] 38 in^3

[7] _____

8. 010123a, P.I. A.G.2

A cardboard box has length $x - 2$, width $x + 1$, and height $2x$.

a Write an expression, in terms of x , to represent the volume of the box.

b If $x = 8$ centimeters, what is the number of cubic centimeters in the volume of the box?

[8] _____

9. 060103a

If the length of a rectangular prism is doubled, its width is tripled, and its height remains the same, what is the volume of the new rectangular prism?

- [A] six times the original volume
[B] triple the original volume
[C] nine times the original volume
[D] double the original volume

[9] _____

10. 060427a

A box in the shape of a cube has a volume of 64 cubic inches. What is the length of a side of the box?

- [A] 4 in [B] $21.\bar{3}$ in
[C] 8 in [D] 16 in

[10] _____

11. 080007a

The volume of a cube is 64 cubic inches. Its total surface area, in square inches, is

- [A] 96 [B] 576 [C] 48 [D] 16

[11] _____

12. 010030a

The volume of a rectangular pool is 1,080 cubic meters. Its length, width, and depth are in the ratio 10:4:1. Find the number of meters in each of the three dimensions of the pool.

[12] _____

13. 010324a

A fish tank with a rectangular base has a volume of 3,360 cubic inches. The length and width of the tank are 14 inches and 12 inches, respectively. Find the height, in inches, of the tank.

[13] _____

14. 010711a

A planned building was going to be 100 feet long, 75 feet deep, and 30 feet high. The owner decides to increase the volume of the building by 10% without changing the dimensions of the depth and the height. What will be the new length of this building?

- [A] 110 ft [B] 112 ft
[C] 108 ft [D] 106 ft

[14] _____

15. 069927a

The dimensions of a brick, in inches, are 2 by 4 by 8. How many such bricks are needed to have a total volume of exactly 1 cubic foot?

[15] _____

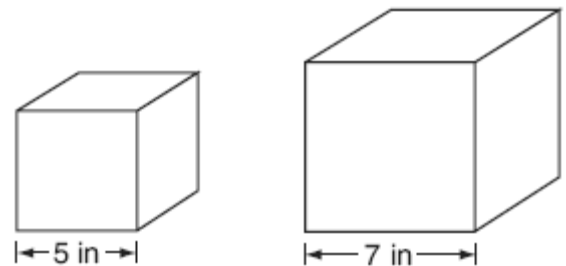
16. 060327a

Tina's preschool has a set of cardboard building blocks, each of which measures 9 inches by 9 inches by 4 inches. How many of these blocks will Tina need to build a wall 4 inches thick, 3 feet high, and 12 feet long?

[16] _____

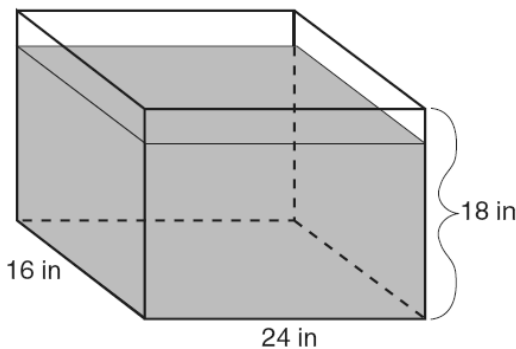
17. 060737a

Tracey has two empty cube-shaped containers with sides of 5 inches and 7 inches, as shown in the accompanying diagram. She fills the smaller container completely with water and then pours all the water from the smaller container into the larger container. How deep, to the *nearest tenth of an inch*, will the water be in the larger container?



[17] _____

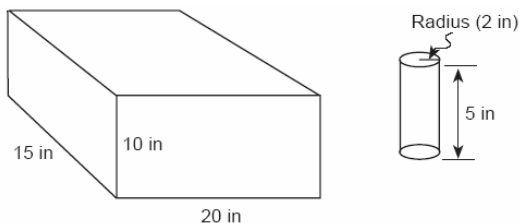
18. 010537a
- As shown in the accompanying diagram, the length, width, and height of Richard's fish tank are 24 inches, 16 inches, and 18 inches, respectively. Richard is filling his fish tank with water from a hose at the rate of 500 cubic inches per minute. How long will it take, to the *nearest minute*, to fill the tank to a depth of 15 inches?



(Not drawn to scale)

[18] _____

19. 010227a, P.I. A.G.2
- In the accompanying diagram, a rectangular container with the dimensions 10 inches by 15 inches by 20 inches is to be filled with water, using a cylindrical cup whose radius is 2 inches and whose height is 5 inches. What is the maximum number of full cups of water that can be placed into the container without the water overflowing the container?

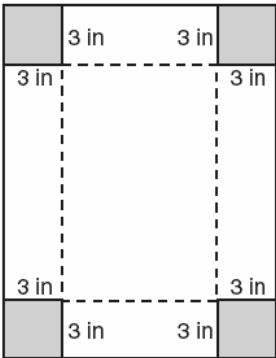


[19] _____

20. 060028a, P.I. G.G.16
- Tamika has a hard rubber ball whose circumference measures 13 inches. She wants to box it for a gift but can only find cube-shaped boxes of sides 3 inches, 4 inches, 5 inches, or 6 inches. What is the *smallest* box that the ball will fit into with the top on?

[20] _____

21. 060331a
- Deborah built a box by cutting 3-inch squares from the corners of a rectangular sheet of cardboard, as shown in the accompanying diagram, and then folding the sides up. The volume of the box is 150 cubic inches, and the longer side of the box is 5 inches more than the shorter side. Find the number of inches in the shorter side of the *original* sheet of cardboard.



[21] _____

22. 060724b
- Denise is designing a storage box in the shape of a cube. Each side of the box has a length of 10 inches. She needs more room and decides to construct a larger box in the shape of a cube with a volume of 2,000 cubic inches. By how many inches, to the *nearest tenth*, should she *increase* the length of each side of the original box?

[22] _____

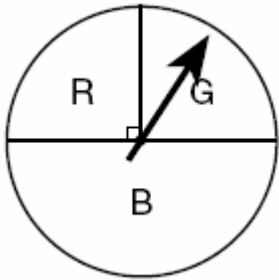
CHAPTER 6-8

GEOMETRIC PROBABILITY

23.

010106a, P.I. A2.S.13

At a school fair, the spinner represented in the accompanying diagram is spun twice.



What is the probability that it will land in section *G* the first time and then in section *B* the second time?

- [A] $\frac{1}{4}$

[B] $\frac{1}{2}$

[C] $\frac{1}{16}$

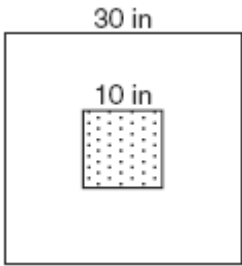
[D] $\frac{1}{8}$

[23] _____

24.

010634a, P.I. A2.S.13

The accompanying diagram shows a square dartboard. The side of the dartboard measures 30 inches. The square shaded region at the center has a side that measures 10 inches. If darts thrown at the board are equally likely to land anywhere on the board, what is the theoretical probability that a dart does *not* land in the shaded region?

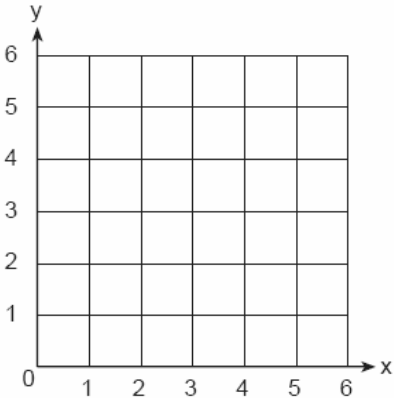


[24] _____

25.

010231a, P.I. A2.S.13

A square dartboard is represented in the accompanying diagram. The entire dartboard is the first quadrant from $x = 0$ to 6 and from $y = 0$ to 6. A triangular region on the dartboard is enclosed by the graphs of the equations $y = 2$, $x = 6$, and $y = x$. Find the probability that a dart that randomly hits the dartboard will land in the triangular region formed by the three lines.



[25] _____

[1] D

[2] C

[3] B

[4] D

[5] C

[6] B

[7] A

a [1] Either $(x - 2)(x + 1)(2x) = V$ or the same expression without “ $= V$ ” is shown.

or [1] $2x^3 - 2x^2 - 4x$ or an equivalent expression is shown.

b [1] 864

or [1] The student substitutes appropriately into an incorrect part a equation.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously

[8] incorrect procedure.

[9] A

[10] A

[11] A

[3] 3, 12, and 30 and an appropriate arithmetic method or equation is shown, such as $40x^3 = 1080$.

[2] An appropriate equation or method is shown, but not all three dimensions are found. or [2] An appropriate method is shown, and although one computational mistake is made, the student does find three dimensions based on this mistake, such as dividing 1080 by 40 incorrectly.

[1] The student shows that multiplication is required to find volume but sets up an incorrect method and does not find three dimensions.

or [1] 3, 12, and 30 and no work is shown.

[0] The sum is used instead of the product, or [0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.

[12]

[2] 20, and appropriate work is shown, such as $3,360 \div (14 \times 12)$.

[1] Appropriate work is shown, but one computational error is made.

or [1] 20, but no work is shown.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.

[13]

[14] A

[3] 27 and an appropriate method or explanation is shown, such as

$$\left(\frac{1}{6}\right)\left(\frac{1}{3}\right)\left(\frac{2}{3}\right) = \frac{1}{27} \text{ of a cubic foot, thus } 27$$

bricks needed or, in inches, $\frac{1728}{64} = 27$. A

labeled drawing is an acceptable explanation.

[2] An appropriate method for finding volume is shown, but one computational mistake is made.

[1] Correct conversion into feet is shown.

or [1] The volume of 64 cubic inches is found.

or [1] 27 and no explanation is given.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.

[15]

[3] 64, and appropriate work is shown, such as calculating $\frac{(36 \times 144)}{(9 \times 9)}$ or drawing a

labeled diagram.

[2] Appropriate work is shown, but one computational error is made.

[1] Appropriate work is shown, but more than one computational error is made.

or [1] Appropriate work is shown, but one conceptual error is made.

or [1] 64, but no work is shown.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously

[16]

incorrect procedure.

[3] 2.6, and appropriate work is shown, such as $(5 \bullet 5 \bullet 5) = (7 \bullet 7)h$.

[2] Appropriate work is shown, but one computational or rounding error is made.

[1] Appropriate work is shown, but two or more computational or rounding errors are made.

or [1] Appropriate work is shown, but one conceptual error is made, such as using an incorrect formula.

or [1] The volume of both of the cubes is found correctly, but no further correct work is shown.

or [1] 2.6, but no work is shown.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.

[17]

[3] 12, and appropriate work is shown, such as calculating volume = $5,760 \text{ in}^3$ and dividing by 500 in^3 .

[2] Appropriate work is shown, but one computational or rounding error is made.

or [2] The volume is found incorrectly by multiplying $24 \times 16 \times 18$, but it is divided by 500 and rounded appropriately, resulting in an answer of 14.

[1] Appropriate work is shown, but two or more computational or rounding errors are made.

or [1] Appropriate work is shown, but one conceptual error is made.

or [1] The volume of 5,760 is found correctly, but no further correct work is shown.

or [1] 12, but no work is shown.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously

[18]

incorrect procedure.

- [3] 47, and appropriate work is shown.
[2] Appropriate work is shown, but one computational or rounding error is made.
or [2] The correct numerical value of the volume of the cup (20π or its equivalent) and the volume of the tank (3,000) are shown, but the solution is not completed.
[1] The correct volume of only the cup or only the tub is shown.
or [1] 47, but no work is shown.
[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.
-

- [3] 5-inch box and appropriate work is shown, including showing a diameter between 4 and 5.
[2] The correct diameter is shown, but the wrong box size is chosen.
or [2] The correct radius is shown, but the 3-inch box is chosen.
[1] The correct diameter or radius is shown, but no box is chosen.
or [1] An appropriate radius between 2 and 3 is shown, using the incorrect formula $A = \pi r^2$, and the 3-inch box is chosen.
or [1] An appropriate diameter, using $A = \pi r^2$, is shown, but the appropriate box is chosen.
or [1] An appropriate radius, using $A = \pi r^2$, is shown, but no box is chosen.
or [1] The 5-inch box is chosen, but no work is shown.
[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.
-

- [4] 11, and appropriate work is shown, such as solving the quadratic equation $3x(x+5) = 150$ or trial and error with at least three trials and appropriate checks.
[3] Appropriate work is shown, but one computational error is made.
or [3] Appropriate work is shown to determine that 5 is the shorter side of the box, but the shorter side of the original sheet is not found or is found incorrectly.
or [3] An incorrect quadratic equation of equal difficulty is solved appropriately, and an appropriate shorter side of the original sheet is found.
[2] Appropriate work is shown, but more than one computational error is made.
or [2] Appropriate work is shown, but one conceptual error is made.
or [2] An incorrect quadratic equation of equal difficulty is solved appropriately, but the shorter side of the original sheet is not found.
or [2] A correct quadratic equation is set equal to zero, but no further correct work is shown.
or [2] The trial-and-error method is used to find a correct solution, but only two trials and appropriate checks are shown.
[1] Appropriate work is shown, but one conceptual error and one computational error are made.
or [1] One conceptual error is made in finding the shorter side of the box, and the corresponding shorter side of the original sheet is not found or is found incorrectly.
or [1] A correct quadratic equation is written, but it is not set equal to zero, and no further correct work is shown.
or [1] 11, but no work or only one trial with an appropriate check is shown.
[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.
-

[2] 2.6, and appropriate work is shown, such as solving the equation $(10 + x)^3 = 2000$.

[1] Appropriate work is shown, but one computational or rounding error is made.

or [1] Appropriate work is shown, but one conceptual error is made.

or [1] The equation $(10 + x)^3 = 2000$ is written, but no further correct work is shown.

or [1] An incorrect equation of equal difficulty is solved appropriately.

or [1] 2.6, but no work is shown.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously

[22] incorrect procedure.

[23] D

[2] $\frac{800}{900}$ or an equivalent answer, and

appropriate work is shown, such as finding the areas of the two squares, subtracting the area of the smaller square from the area of the larger square, and setting up a correct ratio.

[1] Appropriate work is shown, but one computational error is made.

or [1] Appropriate work is shown, but one conceptual error is made, such as calculating the perimeters of the squares instead of the areas.

or [1] Appropriate work is shown, but $\frac{100}{900}$ or

an equivalent answer (the complement of the correct answer) is found.

or [1] The areas of the squares are calculated incorrectly, but an appropriate probability is found.

or [1] $\frac{800}{900}$ or an equivalent answer, but no work is shown.

[0] The areas of the squares are calculated correctly, but no probability is stated.

or [0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an

[24] obviously incorrect procedure.

[4] $\frac{8}{36}$ or $\frac{2}{9}$ or 2:9, and all three lines are

graphed correctly and the triangle's area is shown to be 8 and the square's area is shown to be 36.

[3] The three lines are graphed correctly, but one area is incorrect, but the probability is appropriate, based on this error.

or [3] The graphs and areas are correct, but the probability is incorrect, based on one computational error.

or [3] The three lines are graphed correctly and both areas are calculated correctly, but the probability is not found.

or [3] One equation is graphed incorrectly, but the area is appropriate, based on the graph, and the probability is appropriate, based on the areas.

[2] The three lines are graphed correctly, but the area of the smaller triangle is used, but the probability is appropriate, such as $\frac{2}{36}$.

or [2] Two or three lines are graphed incorrectly, but the areas and the probability are appropriate.

or [2] The lines are graphed correctly, but the areas are incorrect, but the probability is appropriate, based on the errors.

[1] All graphs and the areas are incorrect, but the probability is appropriate.

or [1] $\frac{8}{36}$ or $\frac{2}{9}$ or 2:9, but no work is shown.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously

[25] incorrect procedure.