MathLinks 8
Chapter 5: Surface Area

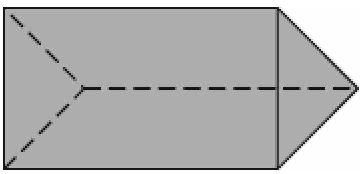
MULTIPLE CHOICE

Choose the best answer.

1. Which combination of views is the minimum required to describe a 3-D object?
a. front only
b. front, side, and top
c. side and front
d. side and top

ANS: B DIF: Average OBJ: Section 5.1 NAT: SS5
TOP: Views of Three-Dimensional Objects KEY: three-dimensional | view

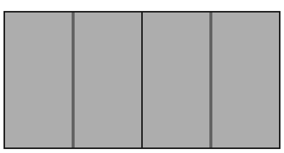
2. Identify the following 3-D object.

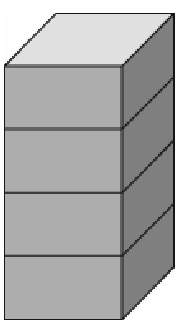


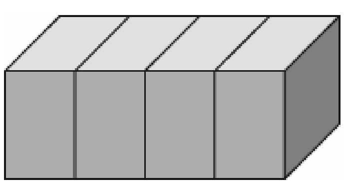
a. triangular pyramid
b. triangular prism
c. rectangular prism
d. cylinder

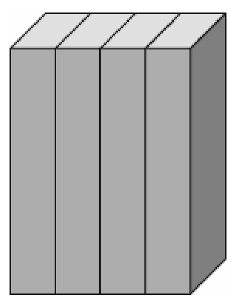
ANS: B DIF: Easy OBJ: Section 5.2 NAT: SS2
TOP: Nets of Three-Dimensional Objects KEY: triangular prism

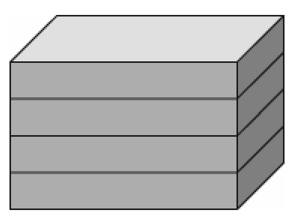
3. Which object has the front view shown below after a rotation of 90° clockwise onto its side?



a.


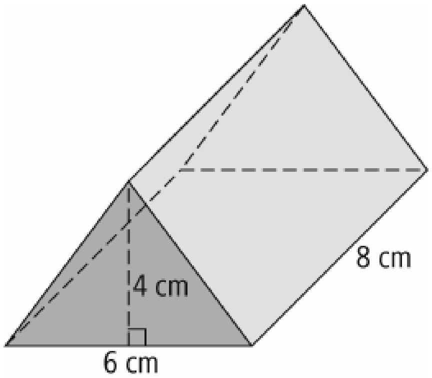
b.


c.


d.


ANS: A DIF: Easy OBJ: Section 5.1 NAT: SS5
TOP: Views of Three-Dimensional Objects KEY: triangular prism | face

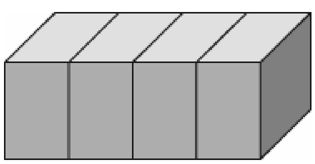
4. The surface area of this triangular prism would be calculated as

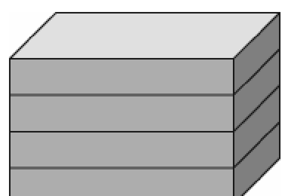


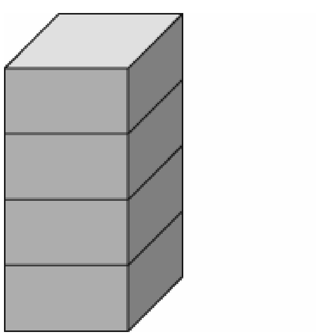
a. $2(5 \times 8) + 2(6 \times 4)$
b. $2(\frac{5 \times 8}{2}) + 2(5 \times 5) + (6 \times 8)$
c. $2(\frac{4 \times 6}{2}) + 2(5 \times 8) + (6 \times 8)$
d. $2(5 \times 8) + 3(6 \times 4)$

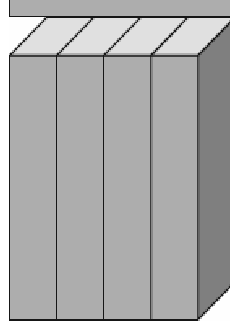
ANS: C DIF: Difficult OBJ: Section 5.3 NAT: SS3
TOP: Surface Area of a Prism
KEY: surface area | triangular prism | calculate hypotenuse

5. Which object has the front view shown below after a rotation of 90° clockwise onto its side?

a. 

c. 

b. 

d. 

ANS: D DIF: Easy OBJ: Section 5.2 NAT: SS5
TOP: Nets of Three-Dimensional Objects KEY: rectangular prism

6. The minimum number of views needed to describe a 3-D object is
a. 1 **b.** 2 **c.** 3 **d.** 6

ANS: C DIF: Average OBJ: Section 5.1 NAT: SS5
TOP: Views of Three-Dimensional Objects KEY: three-dimensional | view

7. A prism with sides that are perpendicular to the bases is called a
a. cube
b. perpendicular prism
c. regular prism
d. right prism

ANS: D DIF: Average OBJ: Section 5.2 NAT: SS5
TOP: Nets of Three-Dimensional Objects
KEY: right prism | base | perpendicular

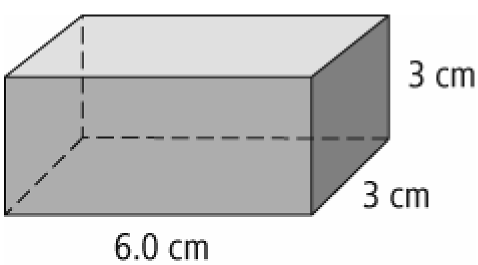
8. A right prism is defined as any prism that has
a. bases that are congruent rectangles
b. bases that are congruent triangles
c. sides that are parallel to the bases
d. sides that are perpendicular to the bases

ANS: D DIF: Average OBJ: Section 5.2 NAT: SS5
TOP: Nets of Three-Dimensional Objects
KEY: right prism | base | perpendicular

9. A triangular prism is a prism with
a. two rectangular bases each the same size and shape
b. two triangular bases each the same size and shape
c. two circular bases each the same size and shape
d. two bases of any shape and size with parallel sides

ANS: B DIF: Average OBJ: Section 5.2 NAT: SS5
TOP: Nets of Three-Dimensional Objects KEY: triangular prism | base

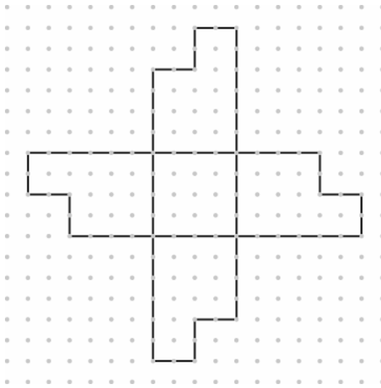
10. Find the surface area of the following rectangular prism.



a. 81 cm^2
b. 90 cm^2
c. 108 cm^2
d. 162 cm^2

ANS: B DIF: Average OBJ: Section 5.3 NAT: SS3
TOP: Surface Area of a Prism KEY: surface area | rectangular prism

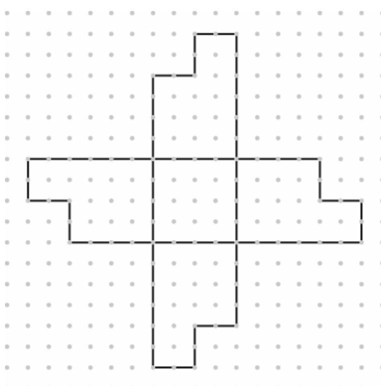
11. What 3-D object can the net illustrated below be folded to create?



a. cube **b.** cylinder **c.** oblong box **d.** sphere

ANS: A DIF: Difficult OBJ: Section 5.2 NAT: SS2
TOP: Nets of Three-Dimensional Objects KEY: net | cube

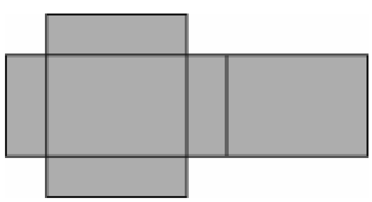
12. The distance between adjacent dots (vertical and horizontal) is 2 cm. What is the total surface area of the 3-D object created by folding the net below?



a. 8 cm^2 **b.** 64 cm^2 **c.** 320 cm^2 **d.** 384 cm^2

ANS: D DIF: Difficult OBJ: Section 5.2 | Section 5.3
NAT: SS2 | SS3 TOP: Nets of Three-Dimensional Objects | Surface Area of a Prism
KEY: net | cube | surface area

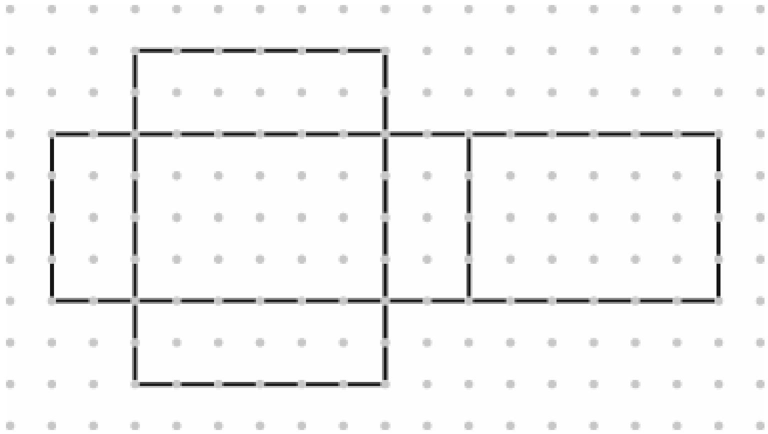
13. What 3-D object can be created by folding this net?



a. cube **c.** rectangular prism
b. cylinder **d.** triangular prism

ANS: C DIF: Average OBJ: Section 5.2 NAT: SS2
TOP: Nets of Three-Dimensional Objects KEY: net | rectangular prism

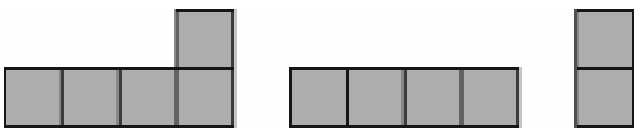
14. The distance between adjacent dots (vertical and horizontal) is 1 cm. What would be the surface area of the 3-D object produced by the net below?

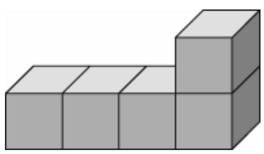


a. 48 cm^2 **b.** 64 cm^2 **c.** 88 cm^2 **d.** 88 cm^3

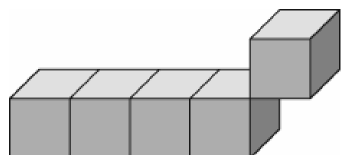
ANS: C DIF: Average OBJ: Section 5.2 | Section 5.3
NAT: SS2 | SS3 TOP: Nets of Three-Dimensional Objects | Surface Area of a Prism
KEY: net | surface area

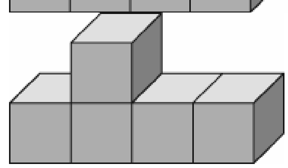
15. Which object do these three views describe?



a. 

b. 

c. 

d. 

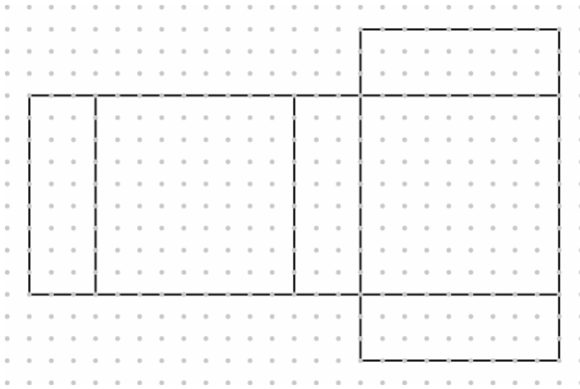
ANS: A DIF: Average OBJ: Section 5.1 NAT: SS5
TOP: Views of Three-Dimensional Objects KEY: views | three-dimensional

16. Which 3-D object would the following net create?

a. cube
b. cylinder
c. rectangular prism
d. triangular prism

ANS: C DIF: Easy OBJ: Section 5.2 NAT: SS2
TOP: Nets of Three-Dimensional Objects KEY: net | rectangular prism

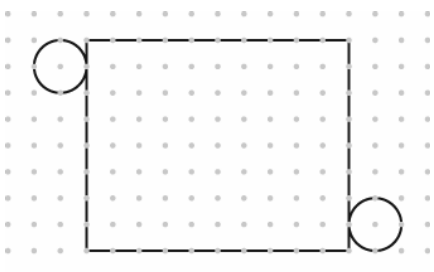
17. The following net would create a

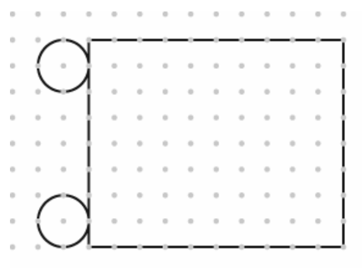


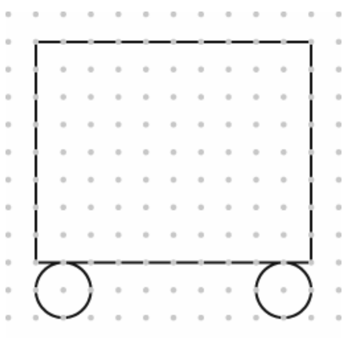
a. cube
b. cylinder
c. right rectangular prism
d. right triangular prism

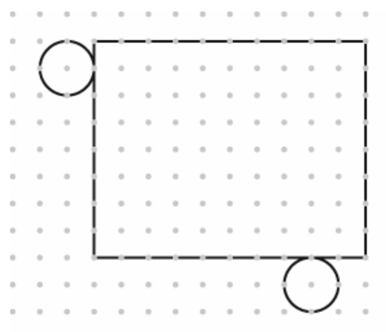
ANS: C DIF: Easy OBJ: Section 5.2 NAT: SS2
TOP: Nets of Three-Dimensional Objects KEY: net | right rectangular prism

18. Which net would create a cylinder?

a.


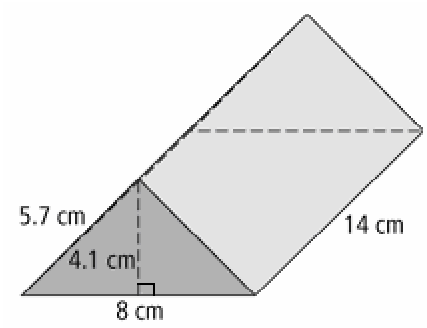
c.


b.


d.


ANS: A DIF: Average OBJ: Section 5.2 NAT: SS2
TOP: Nets of Three-Dimensional Objects KEY: cylinder | net

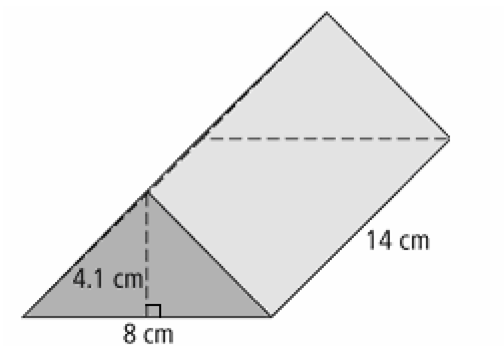
19. If only the two ends of the roof area need to be painted, what is the total surface area that needs to be painted?



a. 16.4 m^2 **b.** 32.8 m^2 **c.** 45.6 m^2 **d.** 65.6 m^2

ANS: B DIF: Average OBJ: Section 5.3 NAT: SS3
TOP: Surface Area of a Prism KEY: surface area | triangle

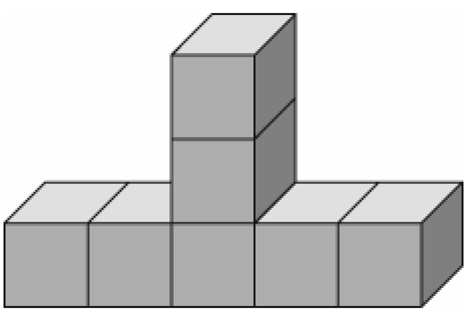
20. If you wanted to shingle the roof and each package of shingles covered an area of 5.6 m^2, what would be the minimum number of packages of shingles needed to do the job?

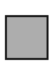


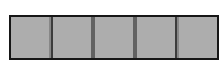
a. 21 **b.** 26 **c.** 29 **d.** 37

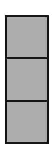
ANS: C DIF: Difficult OBJ: Section 5.3 NAT: SS3
TOP: Surface Area of a Prism KEY: area | calculate hypotenuse

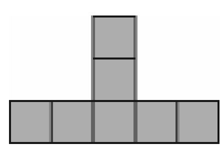
21. Which view best represents the front of this 3-D object?



a. 

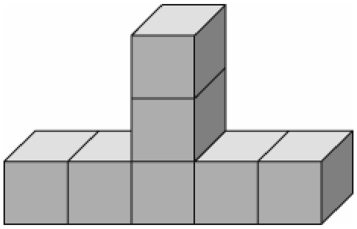
c. 

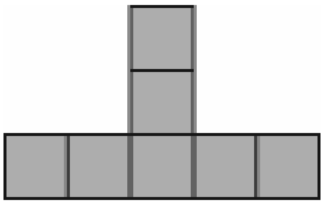
b. 

d. 

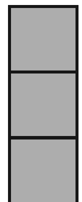
ANS: D DIF: Easy OBJ: Section 5.1 NAT: SS5
TOP: Views of Three-Dimensional Objects KEY: three-dimensional | front

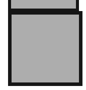
22. Which view best represents the top of this 3-D object?



a. 

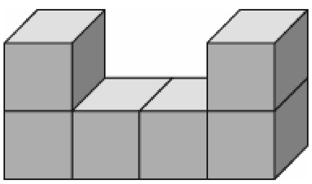
b. 

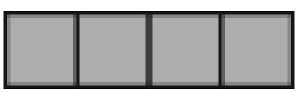
c. 

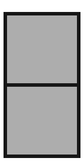
d. 

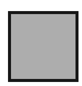
ANS: B DIF: Average OBJ: Section 5.1 NAT: SS5
TOP: Views of Three-Dimensional Objects KEY: three-dimensional | top

23. Which view best represents the top of this 3-D object?



a. 

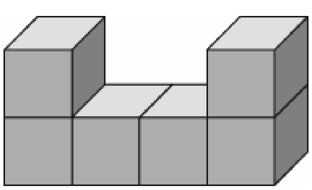
b. 

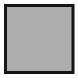
c. 

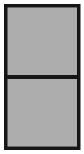
d. 

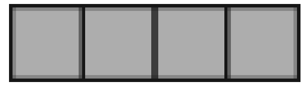
ANS: A DIF: Average OBJ: Section 5.1 NAT: SS5
TOP: Views of Three-Dimensional Objects KEY: three-dimensional | top

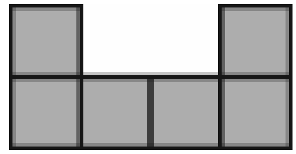
24. Which view best represents the front of this 3-D object?



a. 

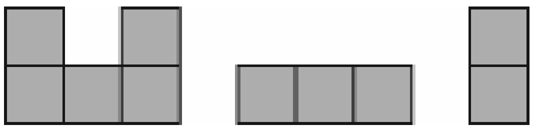
b. 

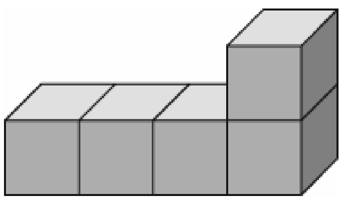
c. 

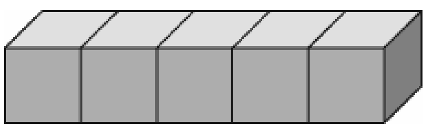
d. 

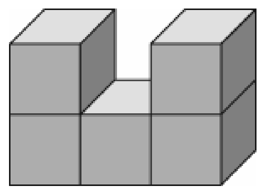
ANS: D DIF: Easy OBJ: Section 5.1 NAT: SS5
TOP: Views of Three-Dimensional Objects KEY: three-dimensional | front

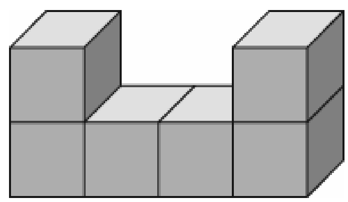
25. Which 3-D object do these three views describe?



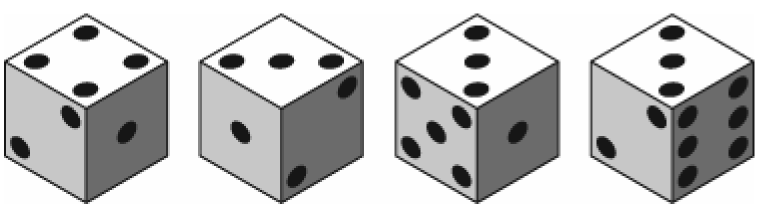
a. 

b. 

c. 

d. 

ANS: C DIF: Average OBJ: Section 5.1 NAT: SS5
TOP: Views of Three-Dimensional Objects KEY: three-dimensional | view



26. Given these four views of the same die, how many dots will be found on the face on the opposite side of the die from the face showing 5 dots?

a. 1 **b.** 2 **c.** 4 **d.** 6

ANS: B DIF: Difficult OBJ: Section 5.2 NAT: SS5
TOP: Nets of Three-Dimensional Objects KEY: net | die | face

27. Given these four views of the same die, how many dots will be found on the face on the opposite side of the die from the face showing 1 dot?

a. 1 **b.** 3 **c.** 4 **d.** 6

ANS: D DIF: Difficult OBJ: Section 5.2 NAT: SS5

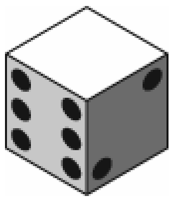
TOP: Nets of Three-Dimensional Objects KEY: net | die | face

28. Given these four views of the same die, how many dots will be found on the face on the opposite side of the die from the face showing 3 dots?

a. 1 **b.** 3 **c.** 4 **d.** 6

ANS: C DIF: Difficult OBJ: Section 5.2 NAT: SS5
TOP: Nets of Three-Dimensional Objects KEY: net | die | face

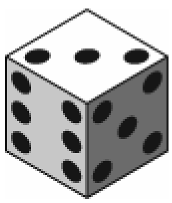
29. Given the four views of the same die, how many dots will be found on the top face of this die?



a. 1 **b.** 3 **c.** 4 **d.** 6

ANS: C DIF: Difficult+ OBJ: Section 5.2 NAT: SS5
TOP: Nets of Three-Dimensional Objects KEY: net | die | face

30. Given the four views of the same die, how many dots will be found on the bottom face of this die?



a. 2 **b.** 3 **c.** 4 **d.** 6

ANS: C DIF: Difficult+ OBJ: Section 5.2 NAT: SS5
TOP: Nets of Three-Dimensional Objects KEY: net | die | face

31. To find the total surface area of a rectangular prism, you must calculate and add the areas of

a. 2 faces **b.** 3 faces **c.** 4 faces **d.** 6 faces

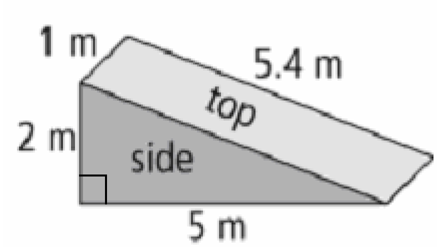
ANS: D DIF: Average OBJ: Section 5.3 NAT: SS3
TOP: Surface Area of a Prism KEY: surface area | face | rectangular prism

32. To find the surface area of a cube, you must know the dimensions of

a. 1 face **b.** 2 faces **c.** 3 faces **d.** 6 faces

ANS: A DIF: Average OBJ: Section 5.3 NAT: SS3
TOP: Surface Area of a Prism KEY: surface area | face | cube

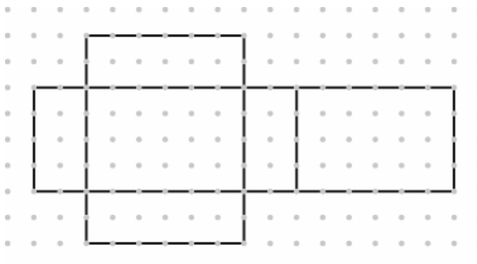
33. How much non-skid material would be required to cover the top surface of the ramp shown below?

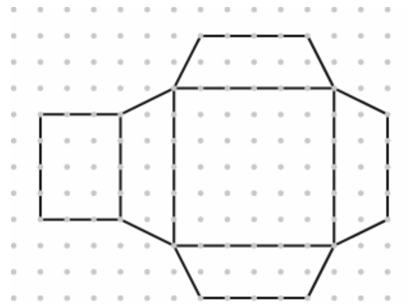


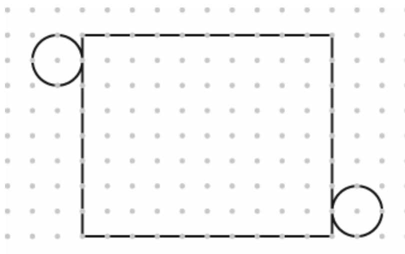
a. 5.4 m^2 **b.** 6.4 m^2 **c.** 27 m^2 **d.** 29.16 m^2

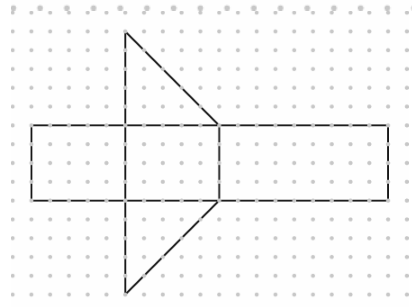
ANS: A DIF: Average OBJ: Section 5.3 NAT: SS3
TOP: Surface Area of a Prism KEY: surface | ramp

34. Which of the following nets will produce a cylinder?

a.


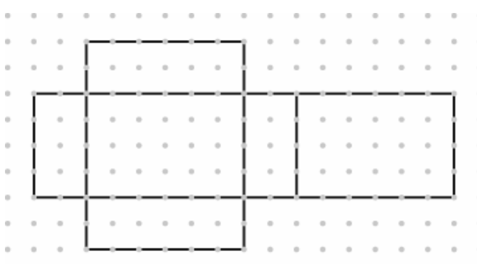
c.


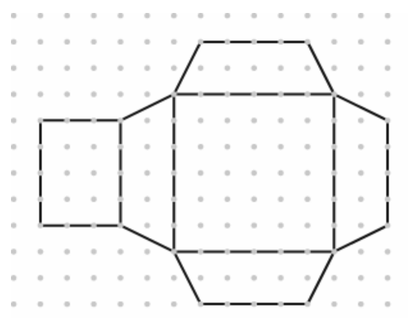
b.


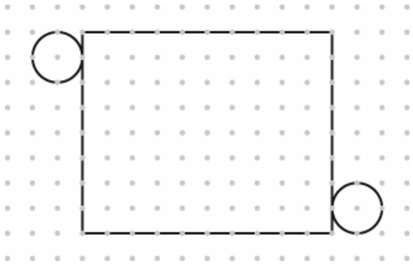
d.


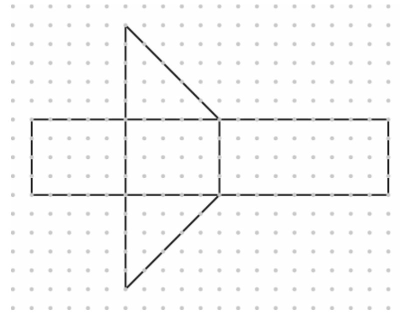
ANS: B DIF: Average OBJ: Section 5.2 NAT: SS2
TOP: Nets of Three-Dimensional Objects KEY: net | cylinder

35. Which of the following nets will produce a triangular prism?

a.


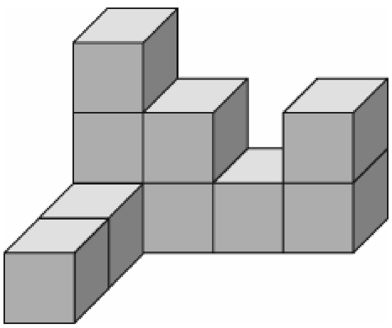
c.


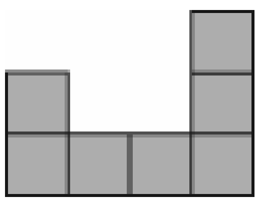
b. 

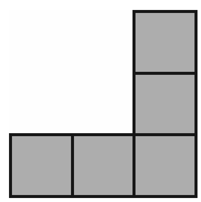
d. 

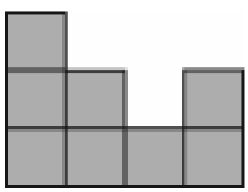
ANS: D DIF: Average OBJ: Section 5.2 NAT: SS2
TOP: Nets of Three-Dimensional Objects KEY: net | triangular prism

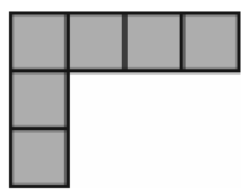
36. Which view does not correspond to a face of this 3-D object?



a. 

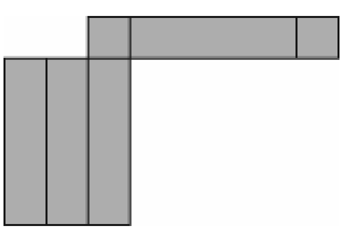
c. 

b. 

d. 

ANS: A DIF: Difficult OBJ: Section 5.1 NAT: SS5
TOP: Views of Three-Dimensional Objects
KEY: view | face | three-dimensional

37. The 3-D object created by folding this net will be a



a. triangular prism
b. rectangular prism
c. cylinder
d. cube

ANS: B DIF: Average OBJ: Section 5.2 NAT: SS2
TOP: Nets of Three-Dimensional Objects KEY: net | rectangular prism

38. A 3-D object that is turned so that the top moves to the right and downward is said to be turning in a(n)
a. anti-clockwise rotation
b. clockwise rotation
c. corner rotation
d. counter clockwise rotation

ANS: B DIF: Average OBJ: Section 5.1 NAT: SS5
TOP: Views of Three-Dimensional Objects KEY: clockwise | rotation

39. A 3-D object with two parallel and congruent circular bases is a
a. cylinder
b. rectangular prism
c. sphere
d. triangular prism

ANS: A DIF: Average OBJ: Section 5.4 NAT: SS3
TOP: Surface Area of a Cylinder KEY: cylinder | three-dimensional

40. A tube for potato chips is a cylinder with a diameter of 6 cm and a height of 28 cm. What is the total surface area of the tube?
a. 584.04 cm^2 **b.** 527.52 cm^2 **c.** 56.52 cm^2 **d.** 18.84 cm^2

ANS: A DIF: Average OBJ: Section 5.4 NAT: SS3
TOP: Surface Area of a Cylinder KEY: cylinder | surface area

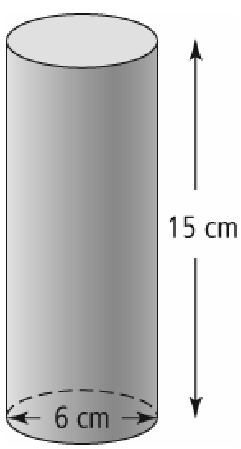
41. What is the total surface area of a cylinder with a circumference of 37.68 cm and a height of 34 cm?
a. 37.68 cm^2 **b.** 226.08 cm^2 **c.** 1281.12 cm^2 **d.** 1507.2 cm^2

ANS: D DIF: Difficult OBJ: Section 5.4 NAT: SS3
TOP: Surface Area of a Cylinder KEY: cylinder | surface area | calculate diameter

42. What is the total surface area of a cylinder with a radius of 1 cm and a height of 12 cm?
a. 12.56 cm^2 **b.** 78.5 cm^2 **c.** 81.64 cm^2 **d.** 175.8 cm^2

ANS: C DIF: Easy OBJ: Section 5.4 NAT: SS3
TOP: Surface Area of a Cylinder KEY: cylinder | surface area

43. What is the surface area of the two bases of a cylinder with a diameter of 6 cm and a height of 15 cm?

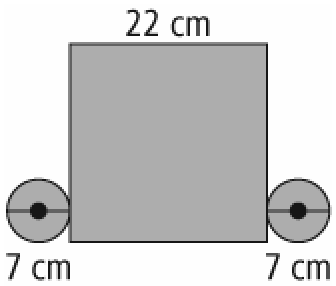


a. 282.6 cm^2 **b.** 56.52 cm^2 **c.** 28.26 cm^2 **d.** 18.84 cm^2

ANS: B DIF: Average OBJ: Section 5.4 NAT: SS3

TOP: Surface Area of a Cylinder KEY: cylinder | surface area | base

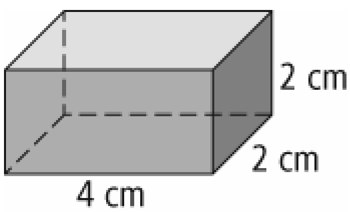
44. The total surface area of the 3-D object created by the net shown below would be



a. 38.465 cm^2 **b.** 483.56 cm^2 **c.** 522.025 cm^2 **d.** 560.49 cm^2

ANS: D DIF: Average OBJ: Section 5.2 | Section 5.4
NAT: SS2 | SS3 TOP: Nets of Three-Dimensional Objects | Surface Area of a Cylinder
KEY: surface area | cylinder | net

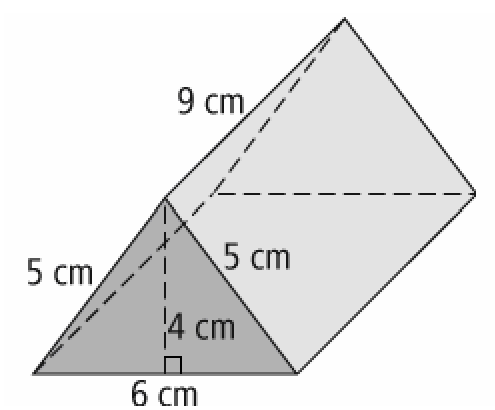
45. What is the surface area of the 3-D object shown below?



a. 8 cm^2
b. 16 cm^2
c. 32 cm^2
d. 40 cm^2

ANS: D DIF: Easy OBJ: Section 5.3 NAT: SS3
TOP: Surface Area of a Prism KEY: rectangular prism | surface area

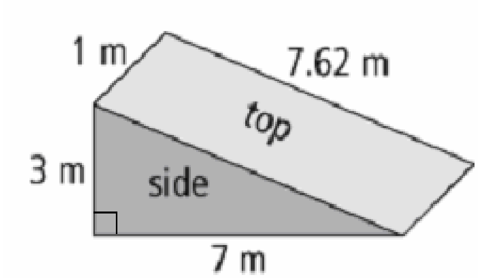
46. What is the surface area of the 3-D object shown below?



a. 12 cm^2 **b.** 135 cm^2 **c.** 168 cm^2 **d.** 318 cm^2

ANS: C DIF: Easy OBJ: Section 5.3 NAT: SS3
TOP: Surface Area of a Prism KEY: triangular prism | surface area

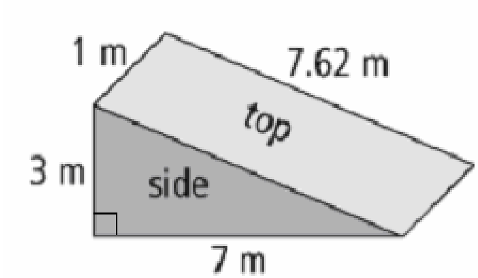
47. The 3-D object shown below is a loading ramp. This is an example of a



a. cube
b. cylinder
c. rectangular prism
d. triangular prism

ANS: D DIF: Easy OBJ: Section 5.1 NAT: SS5
TOP: Views of Three-Dimensional Objects KEY: triangular prism

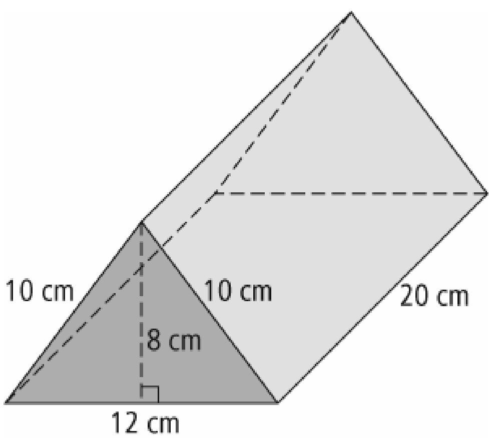
48. The total surface area of this 3-D object would be



a. 7.62 m^2 **b.** 25.12 m^2 **c.** 38.62 m^2 **d.** 45.62 m^2

ANS: C DIF: Average OBJ: Section 5.3 NAT: SS3
TOP: Views of Three-Dimensional Objects
KEY: triangular prism | surface area

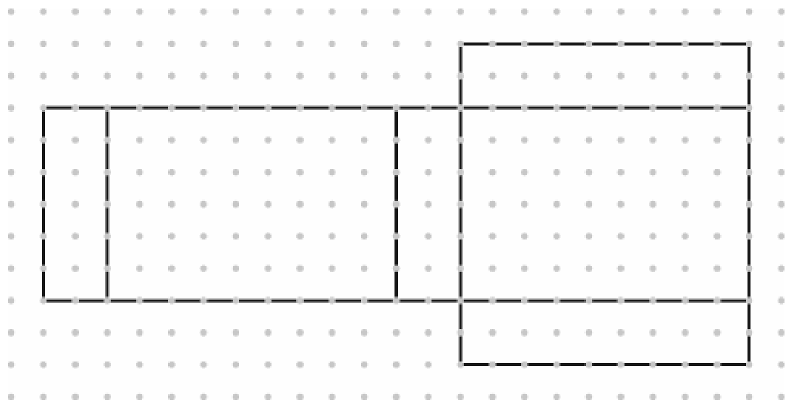
49. The total surface area of this 3-D object is



a. 836 cm^2 **b.** 736 cm^2 **c.** 696 cm^2 **d.** 688 cm^2

ANS: B DIF: Easy OBJ: Section 5.3 NAT: SS3
TOP: Views of Three-Dimensional Objects
KEY: triangular prism | surface area

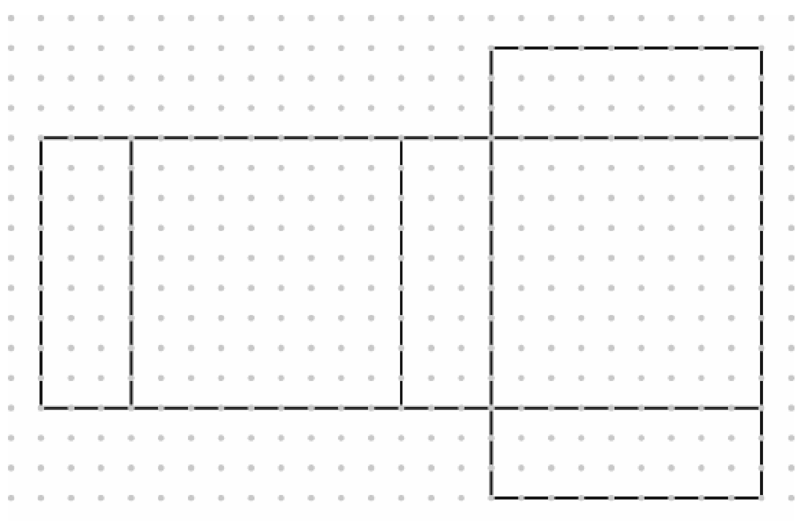
50. The distance between adjacent dots (vertical and horizontal) is 1 cm. What is the surface area of the rectangular prism created by folding the net below?



a. 136 cm^2 **b.** 168 cm^2 **c.** 176 cm^2 **d.** 216 cm^2

ANS: B DIF: Easy OBJ: Section 5.2 | Section 5.3
NAT: SS2 | SS3 TOP: Nets of Three-Dimensional Objects | Surface Area of a Prism
KEY: surface area | rectangular prism | net

51. The distance between adjacent dots (vertical and horizontal) is 2.5 cm. What is the surface area of the rectangular prism shown in the net below?

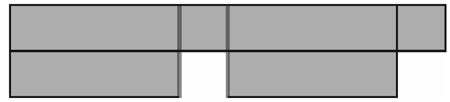


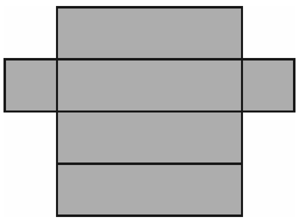
a. 340 cm^2 **b.** 405 cm^2 **c.** 675 cm^2 **d.** 900 cm^2

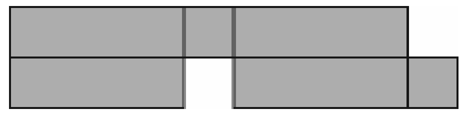
ANS: C DIF: Average OBJ: Section 5.2 | Section 5.3
NAT: SS2 | SS3 TOP: Nets of Three-Dimensional Objects | Surface Area of a Prism
KEY: surface area | rectangular prism | net

52. Which net could be folded to create this 3-D object?

a. 

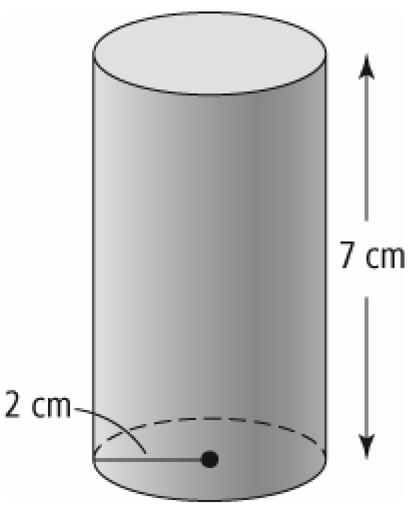
c. 

b. 

d. 

ANS: B DIF: Average OBJ: Section 5.2 NAT: SS2
TOP: Nets of Three-Dimensional Objects KEY: net

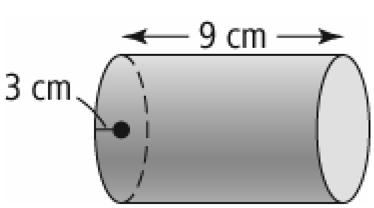
53. What is the total surface area of this cylinder?



a. 87.92 cm^2 **b.** 100.48 cm^2 **c.** 113.04 cm^2 **d.** 138.16 cm^2

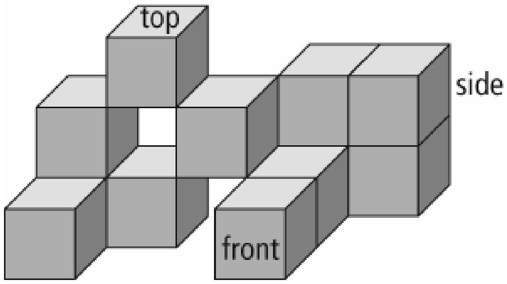
ANS: C DIF: Average OBJ: Section 5.4 NAT: SS3
TOP: Surface Area of a Cylinder KEY: cylinder | surface area | radius

54. The total surface area of this 3-D object is

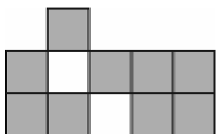


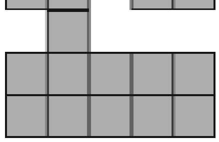
a. 169.56 cm^2 **b.** 197.82 cm^2 **c.** 226.08 cm^2 **d.** 282.6 cm^2

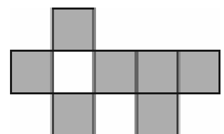
ANS: C DIF: Average OBJ: Section 5.4 NAT: SS3
TOP: Surface Area of a Cylinder KEY: cylinder | surface area | radius

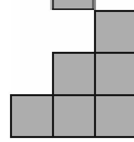


55. Which view best represents the front of the 3-D object shown above?

a. 

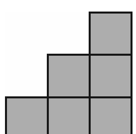
b. 

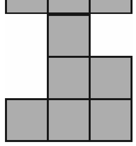
c. 

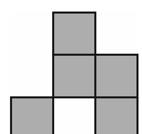
d. 

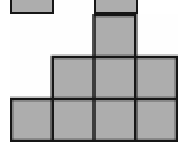
ANS: A DIF: Difficult OBJ: Section 5.1 NAT: SS5
TOP: Views of Three-Dimensional Objects
KEY: view | three-dimensional | front

56. The view that best represents the side of this 3-D object is

a. 

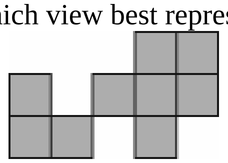
b. 

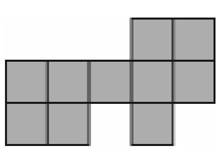
c. 

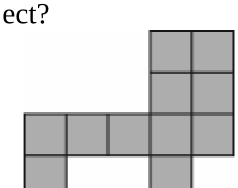
d. 

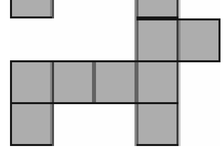
ANS: B DIF: Difficult OBJ: Section 5.1 NAT: SS5
TOP: Views of Three-Dimensional Objects
KEY: view | three-dimensional | side

57. Which view best represents the top of this 3-D object?

a. 

b. 

c. 

d. 

ANS: D DIF: Difficult OBJ: Section 5.1 NAT: SS5
TOP: Views of Three-Dimensional Objects
KEY: view | three-dimensional | top

COMPLETION

Write your answer in the space provided.

1. A prism with six square faces with exactly the same dimensions is a ________________________.

ANS: cube

DIF: Easy OBJ: Section 5.3 NAT: SS3 TOP: Surface Area of a Prism
KEY: cube | prism | square | face

2. A 3-D object with two parallel circular bases is a ________________________.

ANS: cylinder

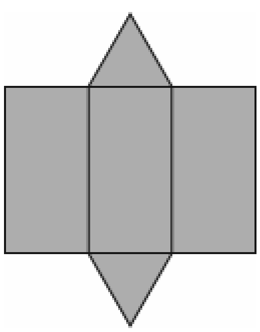
DIF: Easy OBJ: Section 5.4 NAT: SS3 TOP: Surface Area of a Cylinder
KEY: cylinder | three-dimensional | parallel | circular | base

3. A prism with two triangular bases each the same size and shape is a ________________________.

ANS: triangular prism

DIF: Average OBJ: Section 5.1 NAT: SS3
TOP: Views of Three-Dimensional Objects
KEY: triangular prism | three-dimensional | congruent

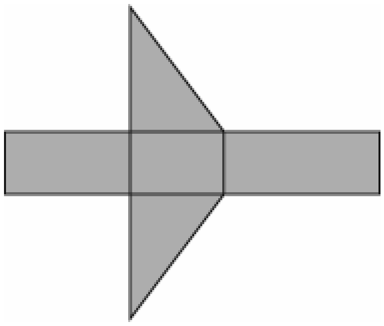
4. The net shown below can be folded to create a ________________________.



ANS: triangular prism

DIF: Easy OBJ: Section 5.2 NAT: SS2
TOP: Nets of Three-Dimensional Objects KEY: triangular prism | net

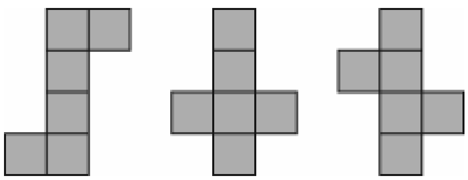
5. The net shown below can be folded to create a ________________________.



ANS: triangular prism

DIF: Average OBJ: Section 5.2 NAT: SS2
TOP: Nets of Three-Dimensional Objects KEY: triangular prism | net

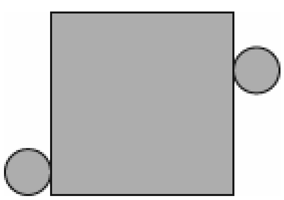
6. When folded, each of the following nets will create a ________________________.



ANS: cube

DIF: Easy OBJ: Section 5.2 NAT: SS2
TOP: Nets of Three-Dimensional Objects KEY: net | cube

7. The net shown below can be folded to create a ________________________.



ANS: cylinder

DIF: Average OBJ: Section 5.2 NAT: SS2
TOP: Nets of Three-Dimensional Objects KEY: cylinder | net

8. ________________________ is defined as the sum of the areas of all the faces of a 3-D object.

ANS: surface area

DIF: Average OBJ: Section 5.3 NAT: SS3 TOP: Surface Area of a Prism
KEY: face | surface area

9. Two figures that have the same shape and size are said to be ________________________.

ANS: congruent

DIF: Average OBJ: Section 5.1 NAT: SS2 | SS3

TOP: Views of Three-Dimensional Objects KEY: congruent | figures

10. A 3-D object whose bases are congruent, parallel hexagons would be described as a hexagonal _________________________.

ANS: prism

DIF: Difficult OBJ: Section 5.1 NAT: SS5
TOP: Views of Three-Dimensional Objects
KEY: hexagonal | congruent | parallel

MATCHING

Match the correct term to each of the following descriptions. A term may be used more than once or not at all.

a. edge
b. face
c. dimensions
d. prism
e. top
f. vertex

1. a line segment where two faces meet
2. the point where three or more edges meet
3. one of the three views required to describe a 3-D object
4. a flat or curved surface

1. ANS: A DIF: Easy OBJ: Section 5.1 NAT: SS3
TOP: Views of Three-Dimensional Objects KEY: edge | face
2. ANS: F DIF: Easy OBJ: Section 5.1 NAT: SS3
TOP: Views of Three-Dimensional Objects KEY: vertex | edge
3. ANS: E DIF: Easy OBJ: Section 5.1 NAT: SS5
TOP: Views of Three-Dimensional Objects KEY: view | top
4. ANS: B DIF: Easy OBJ: Section 5.1 NAT: SS3
TOP: Views of Three-Dimensional Objects KEY: face

Match the correct term to each of the following descriptions. A term may be used more than once or not at all.

a. cylinder
b. dimensions
c. net
d. side
e. three-dimensional

5. a two-dimensional figure that when folded creates a 3-D object
6. a 3-D object with two parallel and congruent circular bases
7. the length, width, and height of a 3-D object
8. one of the three views required to describe a 3-D object

5. ANS: C DIF: Easy OBJ: Section 5.2 NAT: SS2
TOP: Nets of Three-Dimensional Objects KEY: net | three-dimensional
6. ANS: A DIF: Easy OBJ: Section 5.4 NAT: SS3
TOP: Surface Area of a Cylinder KEY: cylinder
7. ANS: B DIF: Easy OBJ: Section 5.3 NAT: SS3
TOP: Surface Area of a Prism KEY: dimensions
8. ANS: D DIF: Easy OBJ: Section 5.1 NAT: SS5
TOP: Views of Three-Dimensional Objects KEY: view | side

Match the correct term to each of the following descriptions. A term may be used more than once or not at all.

a.	front	**d.**	rectangular prism
b.	net	**e.**	surface area
c.	prism	**f.**	triangular prism

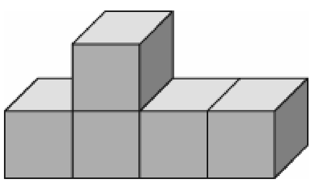
9. a prism whose bases are congruent rectangles
10. a prism whose bases are congruent triangles
11. the sum of all the areas or all the faces of a 3-D object
12. one of the three views required to describe a 3-D object

9. ANS: D DIF: Easy OBJ: Section 5.2 NAT: SS3
TOP: Nets of Three-Dimensional Objects KEY: rectangular prism
10. ANS: F DIF: Easy OBJ: Section 5.2 NAT: SS3
TOP: Nets of Three-Dimensional Objects KEY: triangular prism
11. ANS: E DIF: Easy OBJ: Section 5.3 NAT: SS3
TOP: Surface Area of a Prism KEY: surface area
12. ANS: A DIF: Easy OBJ: Section 5.1 NAT: SS5
TOP: Views of Three-Dimensional Objects KEY: view | front

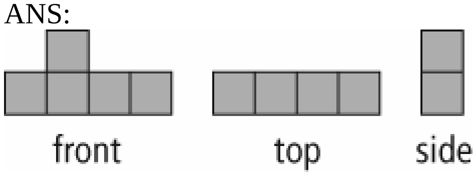
SHORT ANSWER

Write your answer in the space provided.

1. Draw the front, top, and side views for this 3-D object.

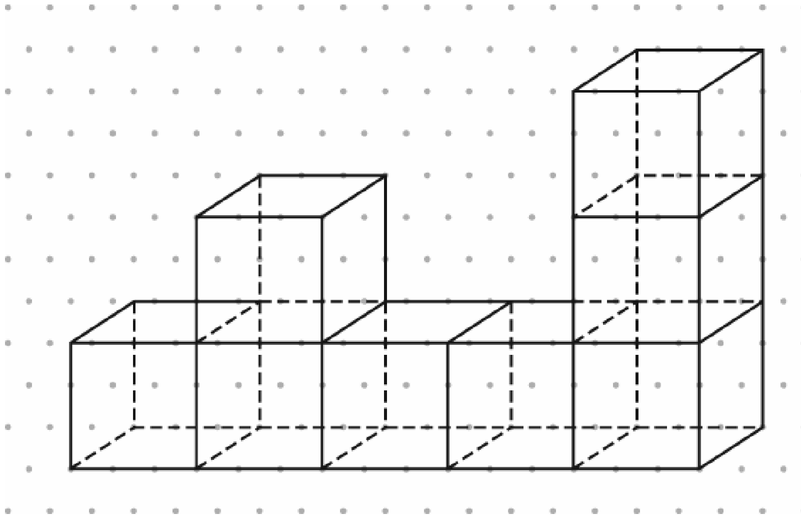


ANS:

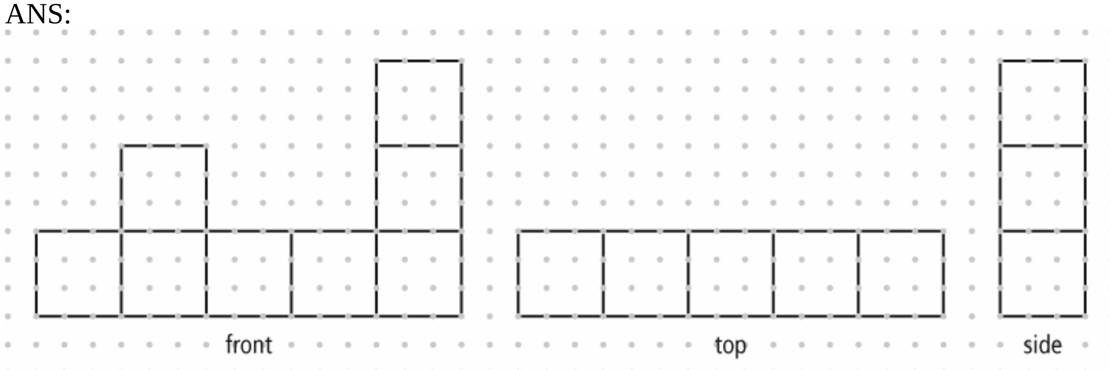


DIF: Average OBJ: Section 5.1 NAT: SS5
TOP: Views of Three-Dimensional Objects KEY: view | three-dimensional

2. Draw the front, top, and side views for the 3-D object shown below.

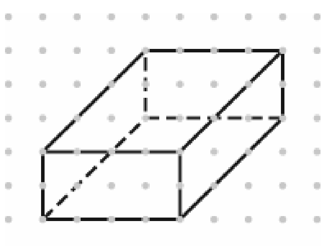


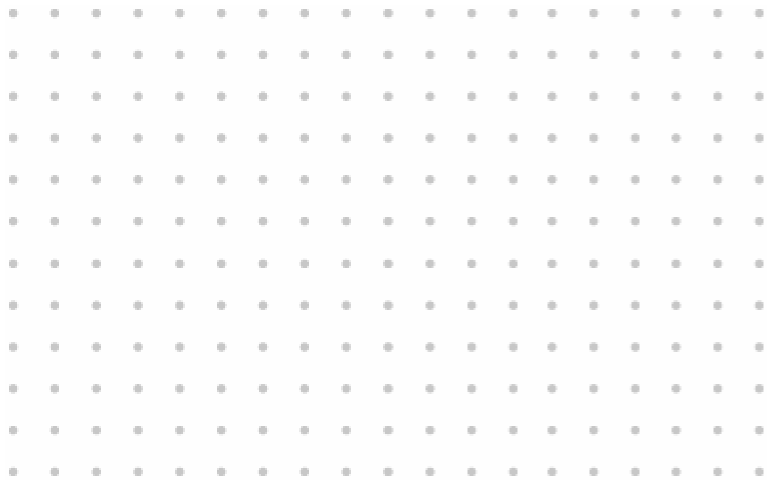
ANS:



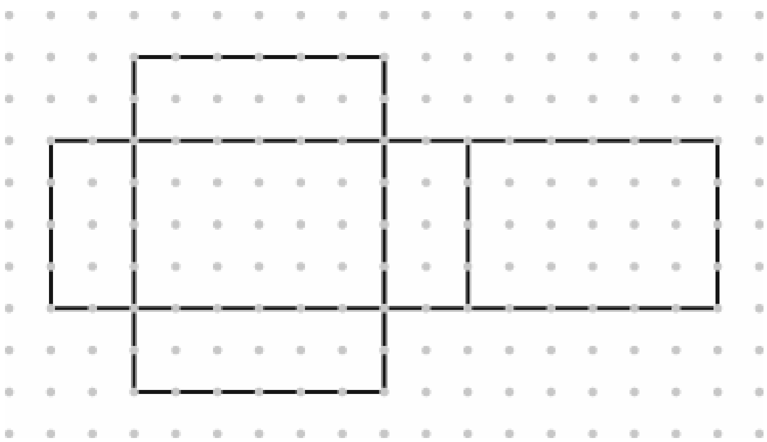
DIF: Average OBJ: Section 5.1 NAT: SS5
TOP: Views of Three-Dimensional Objects KEY: views | three-dimensional

3. Draw a net for the 3-D object shown below.



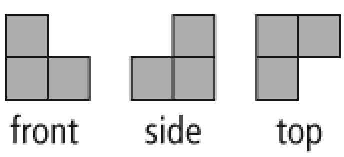


ANS:
Answers may vary. Example:

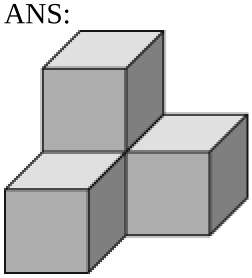


DIF: Easy OBJ: Section 5.2 NAT: SS2
TOP: Nets of Three-Dimensional Objects KEY: net | rectangular prism

4. Draw the 3-D object described by the three views shown below.

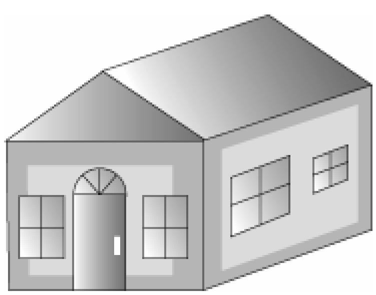


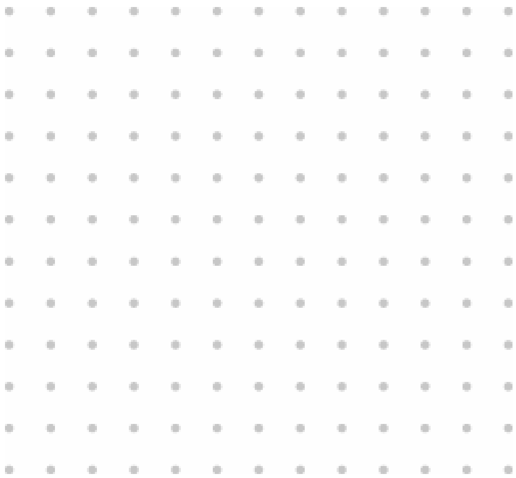
ANS:



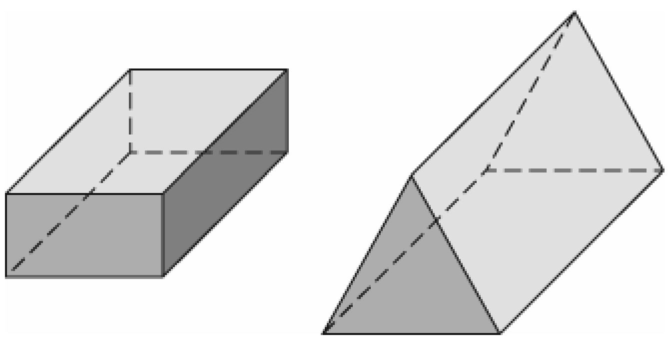
DIF: Difficult OBJ: Section 5.1 NAT: SS5
TOP: Views of Three-Dimensional Objects KEY: views | three-dimensional

5. Identify and sketch the two 3-D objects that together form this house.



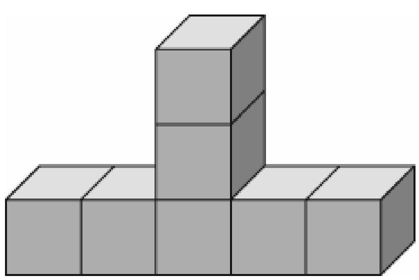


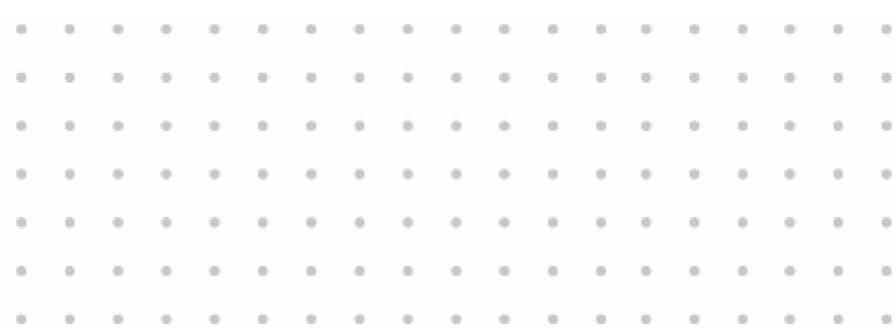
ANS:
The house is a combination of a triangular prism and a rectangular prism.



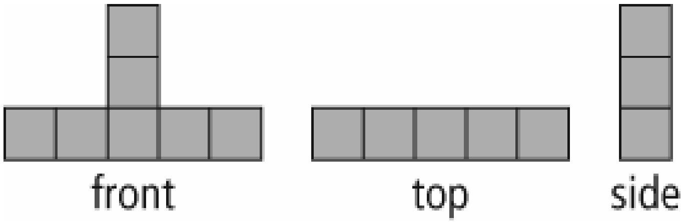
DIF: Average OBJ: Section 5.1 NAT: SS3
TOP: Views of Three-Dimensional Objects
KEY: three-dimensional | rectangular prism | triangular prism

6. Draw the front, side, and top views of this 3-D object.



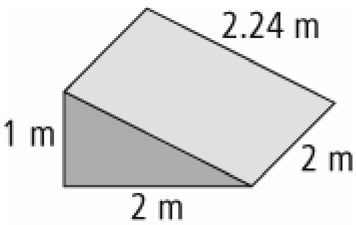


ANS:

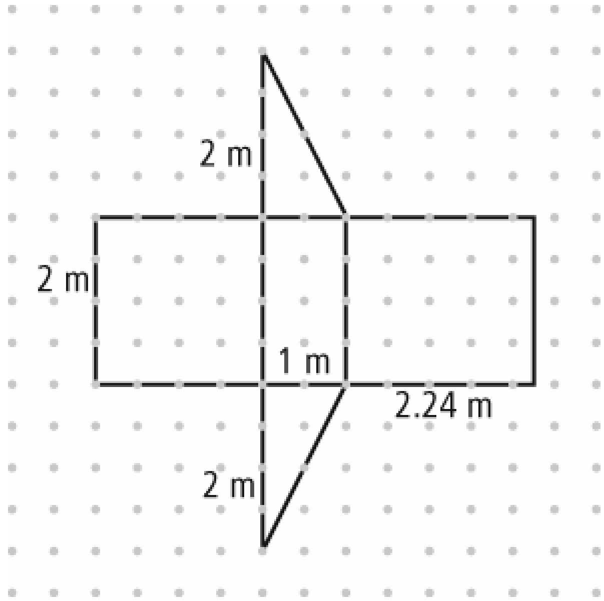


DIF: Average OBJ: Section 5.1 NAT: SS5
TOP: Views of Three-Dimensional Objects KEY: view | front | side | top

7. Draw a net for the right triangular prism shown. Label the measurements on the net.

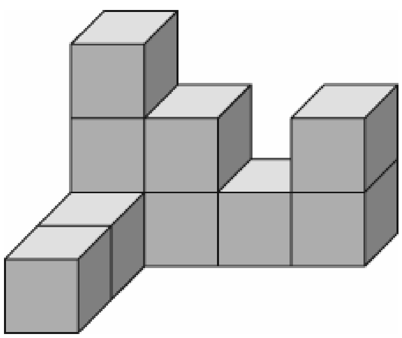


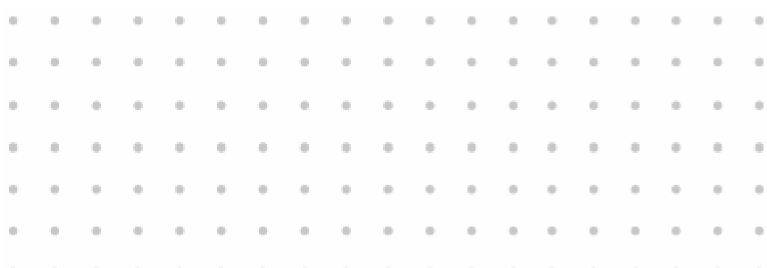
ANS:
Answers may vary. Example:



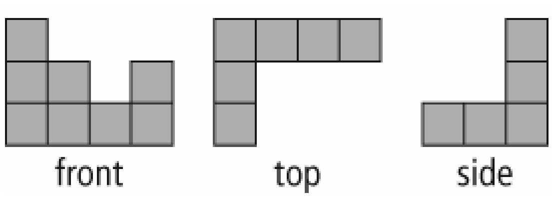
DIF: Average OBJ: Section 5.2 NAT: SS2
TOP: Nets of Three-Dimensional Objects KEY: net | triangular prism

8. Draw the front, top, and side views for this 3-D object.





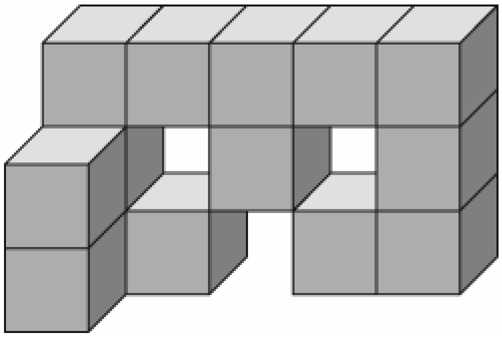
ANS:

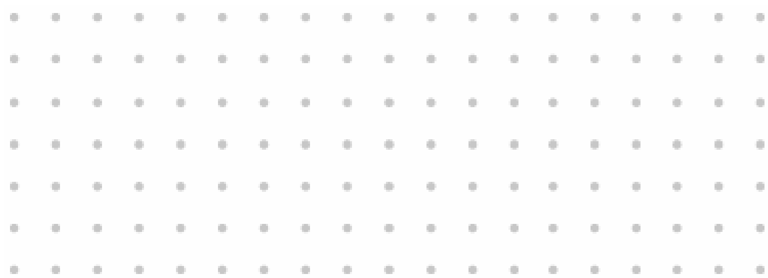


DIF: Average OBJ: Section 5.1 NAT: SS5

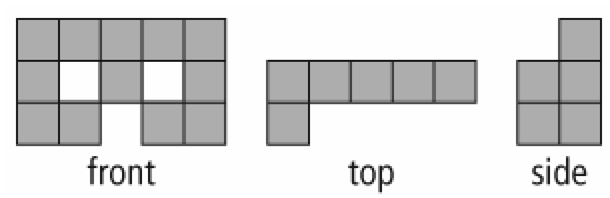
TOP: Views of Three-Dimensional Objects KEY: view | three-dimensional

9. Draw the front, top, and side views for this 3-D object.



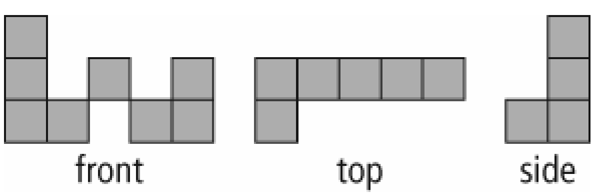


ANS:

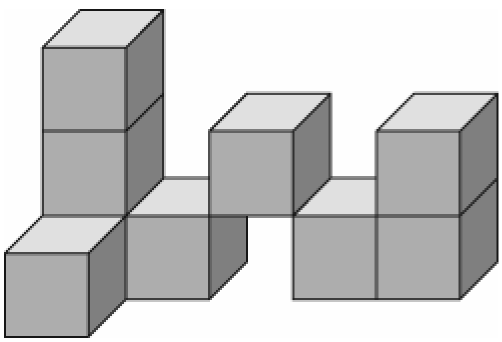


DIF: Difficult OBJ: Section 5.1 NAT: SS5
TOP: Views of Three-Dimensional Objects KEY: view | three-dimensional

10. Draw the 3-D object described by the three views below.



ANS:

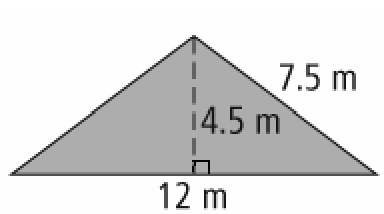


DIF: Difficult OBJ: Section 5.1 NAT: SS5
TOP: Views of Three-Dimensional Objects KEY: view | three-dimensional

PROBLEM

Write your answer in the space provided.

1. A roof is being constructed with an end as shown below. The roof is 14 m long. What will the surface area of the top and two ends of the roof be?



ANS:

$$\text{Surface area of two ends } = 2 \times \frac{b \times h}{2}$$
$$= 2 \times \frac{12 \times 4.5}{2}$$
$$= 54$$
$$\text{Surface area of the top} = 2 \times 7.5 \times 14$$
$$= 210$$
$$\text{Total surface area} = 54 + 210$$
$$= 264$$
$$\text{Surface area of the top} = 2 \times 7.5 \times 14$$
$$= 210$$

The total surface area is 264 m^2.

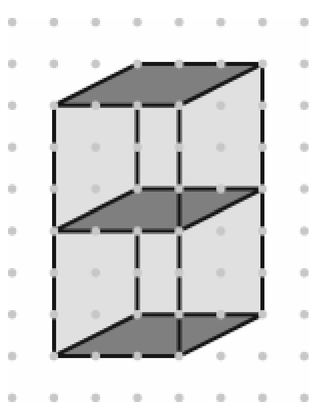
DIF: Average OBJ: Section 5.3 NAT: SS3 TOP: Surface Area of a Prism
KEY: roof | height | surface area

2. A local artist wants to include a rectangular prism in her newest sculpture. The prism has a length of 2 m, a width of 2 m, and a height of 5 m. The artist has decided to paint all of the faces of the prism except the bottom. She has not yet decided which face will be the bottom. If paint costs \$2/m^2, what is the lowest possible cost for painting the prism?

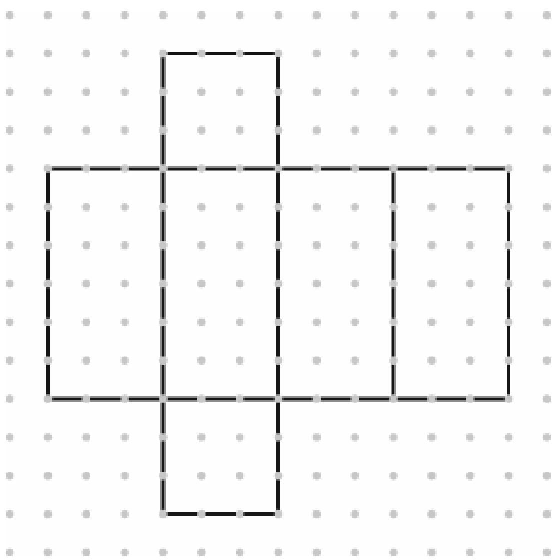
ANS:
Total surface area of the prism = $4(5 \times 2) + 2(2 \times 2) = 48$
Area of the largest surface = $5 \times 2 = 10$
Surface area to be painted = $48 - 10 = 38$
There is 38 m^2 to be painted.
Cost to paint surfaces = \$2/$m^2 \times 38 =$ \$76
The lowest possible cost for painting the prism is \$76.

DIF: Difficult OBJ: Section 5.3 NAT: SS3 TOP: Surface Area of a Prism
KEY: surface area

3. Draw a net that would create the 3-D object below.



ANS:
Answers may vary. Example:



DIF: Difficult OBJ: Section 5.2 NAT: SS2
TOP: Nets of Three-Dimensional Objects
KEY: net | three-dimensional | rectangular prism

4. A cylinder has two circular ends, each with an area of 1256 cm^2. The height of the cylinder is 60 cm. What is the surface area of the cylinder?

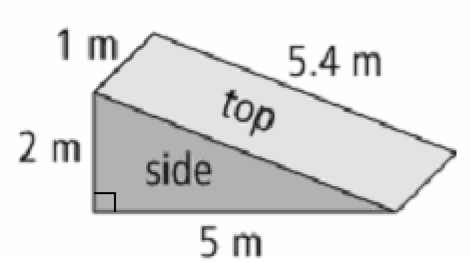
ANS:

$$
\begin{aligned}
\text{Area of two ends} &= 2 \times 1256 \\
&= 2512 \\
\text{Area of a circle} &= \pi \times r^2 \\
1256 &= 3.14 \times r^2 \\
r^2 &= \frac{1256}{3.14} \\
r^2 &= 400 \\
r &= 20 \\
\text{Diameter} &= 2 \times \text{radius} \\
&= 2 \times 20 \\
&= 40 \\
\text{Circumference} &= \pi \times d \\
&= 3.14 \times 40 \\
&= 125.6 \\
\text{Area of the rectangle} &= \text{height} \times \text{circumference} \\
&= 60 \times 125.6 \\
&= 7536 \\
\text{Total surface area} &= \text{area of ends} + \text{area of the rectangle} \\
&= 2512 + 7536 \\
&= 10\,048
\end{aligned}
$$

The total surface area of the cylinder is 10 048 cm^2.

DIF: Difficult+ OBJ: Section 5.4 NAT: SS3 TOP: Surface Area of a Cylinder
KEY: surface area | cylinder | calculate diameter

5. The ramp shown below requires painting on all of its surfaces, including the bottom. What surface area needs to be painted?

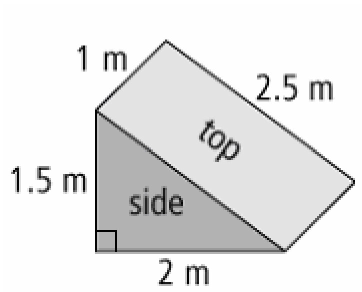


ANS:
Area of the top: $1 \times 5.4 = 5.4$
Area of the end: $1 \times 2 = 2$
Area of the bottom: $1 \times 5 = 5$
Area of the 2 sides: $2\left(\frac{5 \times 2}{2}\right) = 10$

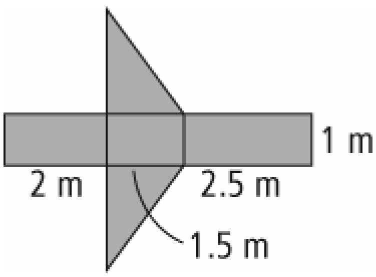
Total surface area: 5.4 + 2 + 5 + 10 = 22.4
The total surface area requiring paint is 22.4 m^2.

DIF: Average OBJ: Section 5.3 NAT: SS3 TOP: Surface Area of a Prism
KEY: surface area | triangular prism

6. Draw a net for the following 3-D object. Label the measurements on the net.

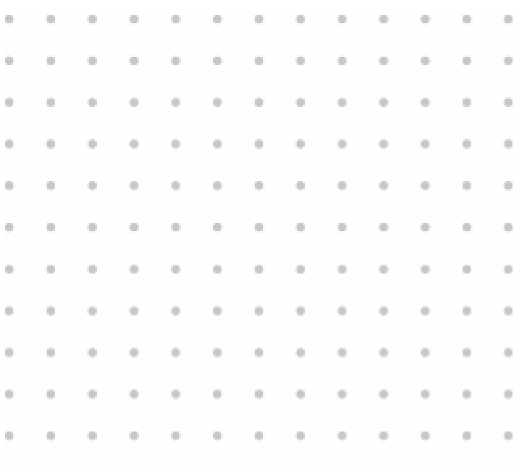


ANS:
Answers may vary slightly but the basic figure should look like the following.

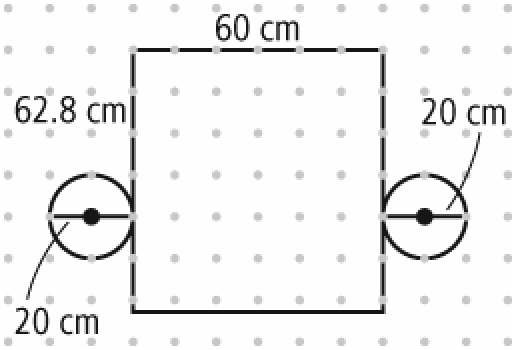


DIF: Average OBJ: Section 5.2 NAT: SS2
TOP: Nets of Three-Dimensional Objects KEY: net | triangular prism

7. Draw the net for a cylinder with a circumference 62.8 cm and a height of 60 cm. Label the measurements on the net.



ANS:
Answers may vary. The basic result should be the following.



DIF: Difficult OBJ: Section 5.2 NAT: SS2
TOP: Nets of Three-Dimensional Objects
KEY: net | cylinder | calculate diameter

8. Calculate the surface area of a cylinder with a height of 60 cm and a circumference of 62.8 cm.

ANS:

Circumference = $\pi \times$ diameter

$$62.8 = 3.14 \times d$$

$$d = \frac{62.8}{3.14}$$

$$d = 20$$

Area of one circular end = $2(\pi \times r^2)$

$$= 2 \times 3.14 \times 10^2$$

$$= 628$$

Area of two circular ends $= 628 \times 628$

$$= 1256$$

Area of the rectangle = $\pi \times d \times h$

$$= 3.14 \times 20 \times 60$$

$$= 3768$$

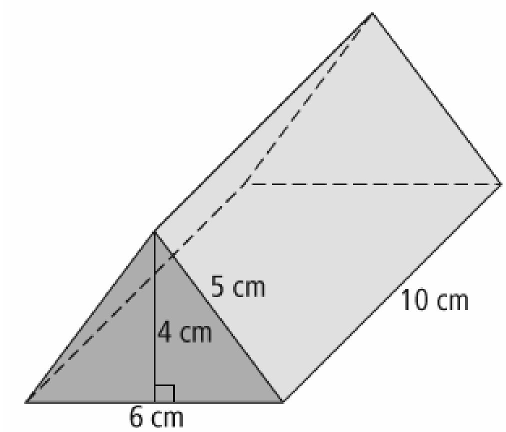
Total surface area = $1256 + 3768$

$$= 5024$$

The total surface area of this cylinder is 5024 cm^2.

DIF: Difficult OBJ: Section 5.4 NAT: SS3 TOP: Surface Area of a Cylinder
KEY: cylinder | surface area | calculate diameter

9. Calculate the total surface area of the triangular prism shown below.



ANS:

Surface area of 2 triangular faces $= 2 \times (\frac{b \times h}{2})$

$= 2 \times (\frac{6 \times 4}{2})$

$= 24$

Surface area of 3 rectangular faces $= 3 \times l \times w$

$= 3 \times 10 \times 5$

$= 150$

Total surface area $= 24 + 150$

$= 174$

The total surface area for this triangular prism is 174 cm^2.

DIF: Average OBJ: Section 5.3 NAT: SS3 TOP: Surface Area of a Prism
KEY: triangular prism | surface area

10. The box for a computer game measures 19 cm by 14 cm by 1.5 cm. What is the total amount of plastic wrapping needed to cover the entire box if an extra 66 cm^2 is needed to allow for the overlapping at the edges?

ANS:

Area of front and back faces $= 2 \times 19 \times 14$

$= 532$

Area of long edges $= 2 \times 19 \times 1.5$

$= 57$

Area of short edges $= 2 \times 14 \times 1.5$

$= 42$

Area needed for overlapping = 66

Total area to be wrapped $= 532 + 57 + 42 + 66$

$= 697$

The total amount of plastic needed to cover the box is 679 cm^2.

DIF: Average OBJ: Section 5.3 NAT: SS3 TOP: Surface Area of a Prism
KEY: box | rectangular prism | surface area

11. A map case is a round tube with 2 end caps. The case is 200 cm long and has a radius of 4 cm. What is the total surface area of this cylinder?

ANS:

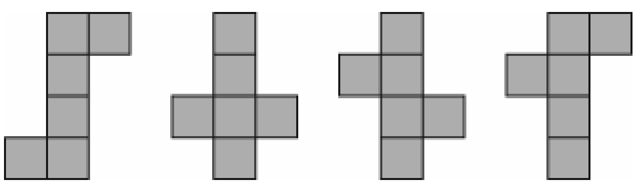
$$\text{Area of circular ends} = 2(\pi \times r^2)$$
$$= 2 \times 3.14 \times 4^2$$
$$= 100.48$$
$$\text{Area of the rectangle} = \pi \times d \times h$$
$$= 3.14 \times 8 \times 200$$
$$= 5024$$
$$\text{Total surface area} = 100.48 + 5024$$
$$= 5124.48$$

The total surface area of this map case is 5124.48 cm^2.

DIF: Average OBJ: Section 5.4 NAT: SS3 TOP: Surface Area of a Cylinder
KEY: surface area | cylinder | calculate diameter

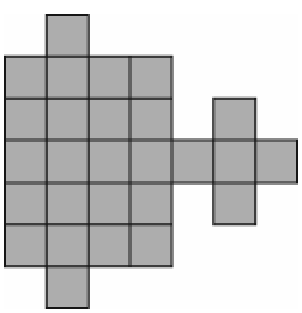
12. Draw 3 different nets that will each create a cube of the same size.

ANS:
Answers may vary. Examples:

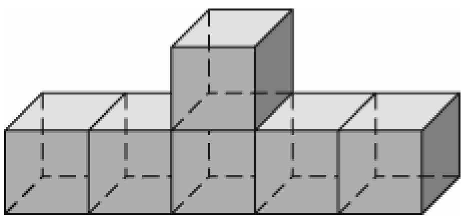


DIF: Difficult+ OBJ: Section 5.2 NAT: SS2
TOP: Nets of Three-Dimensional Objects KEY: net | cube

13. Draw the 3-D object created by folding this net.



ANS:



DIF: Difficult+ OBJ: Section 5.1 NAT: SS2
TOP: Views of Three-Dimensional Objects
KEY: net | three-dimensional | rectangular prism

14. Scones are round, flat buns measuring 9 cm in diameter and 3.5 cm in thickness. They are usually sold in a plastic bag shaped like a cylinder with 6 scones in the bag. When you get the bag home, you decide to wrap the scones in plastic wrap to keep them fresh. Allowing an extra centimetre on each edge for overlap, what are the minimum dimensions of the rectangular piece of plastic wrap needed to hold the 6 scones you have just purchased? Show your thinking.

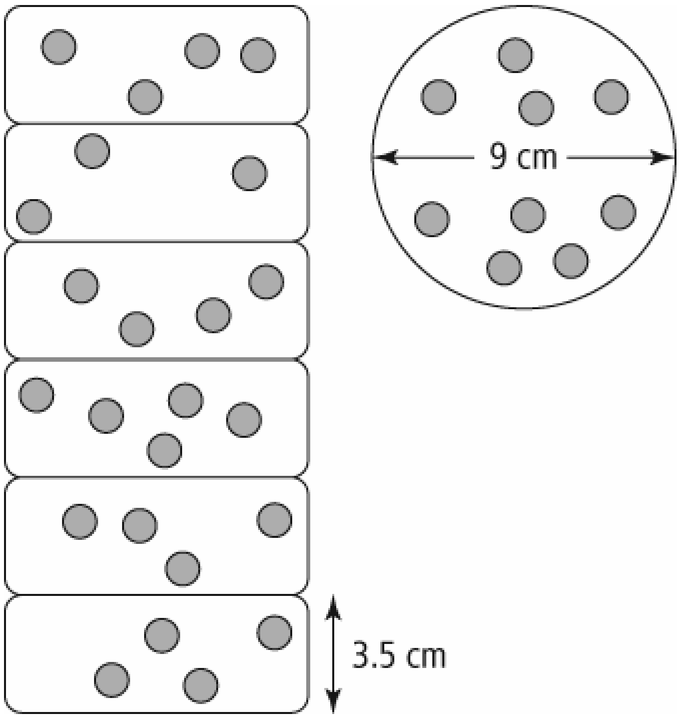
ANS:

$$\begin{aligned}
\text{Amount needed at top to cover scone} &= 9 \div 2 \\
&= 4.5 \\
\text{Height of plastic} &= 21 + 4.5 + 4.5 + 1 + 1 \\
&= 32 \\
\text{Circumference of Scones} &= 3.14 \times 9 \\
&= 28.26 \\
\text{Width of Paper} &= 28.26 + 1 + 1 \\
&= 30.26
\end{aligned}$$

The minimum dimensions of the plastic would be 32.6 cm by 32 cm.

DIF: Difficult+ OBJ: Section 5.4 NAT: SS3 TOP: Surface Area of a Cylinder
KEY: cylinder | surface area

15. Scones are round, flat buns measuring 9 cm in diameter and 3.5 cm in thickness. They are usually sold stacked like a cylinder with 6 scones in a bag. Once you have the scones home, you decide to wrap them stacked as a cylinder. What is the minimum surface area of the plastic wrap covering the stack of 6 scones?



ANS:

$$\text{Surface area of 2 ends} = 2 \times \pi \times r^2$$
$$= 2 \times 3.14 \times 4.5^2$$
$$= 127.17$$
$$\text{Circumference of scone} = \pi d$$
$$= 3.14 \times 9$$
$$= 28.26$$
$$\text{Height of stack of scones} = 6 \times 3.5$$
$$= 21$$
$$\text{Surface area of tube} = 28.26 \times 21$$
$$= 593.46$$
$$\text{Minimum surface area of the wrap} = 127.17 + 593.46$$
$$= 720.63$$

The minimum surface area of the wrap would be 720.63 cm^2.

DIF: Difficult+ OBJ: Section 5.4 NAT: SS3 TOP: Surface Area of a Cylinder
KEY: cylinder | surface area

16. Scones are round, flat buns measuring 9 cm in diameter and 3.5 cm in thickness. They are usually sold stacked like a cylinder with 6 scones in the bag. Once you have the scones home, you decide to wrap them stacked as a cylinder. How much more or less wrap would be needed if the scones were made 8 cm in diameter and 4.5 cm thick?

ANS:

Surface area of 2 ends $= 2 \times \pi \times r^2$

$= 2 \times 3.14 \times 4.5^2$

$= 127.17$

Circumference of scone $= \pi d$

$= 3.14 \times 9$

$= 28.26$

Height of stack of scones $= 6 \times 3.5$

$= 21$

Area of rectangle $= 28.26 \times 21$

$= 593.46$

Minimum surface area $= 127.17 + 593.46$

$= 720.63$

Surface area of 2 ends $= 2 \times \pi \times r^2$

$= 2 \times 3.14 \times 4^2$

$= 100.48$

Circumference of scone $= \pi d$

$= 3.14 \times 8$

$= 25.12$

Height of stack of scones $= 6 \times 4.5$

$= 27$

Area of rectangle $= 25.12 \times 27$

$= 378.24$

Minimum surface area $= 100.48 + 678.24$

$= 778.72$

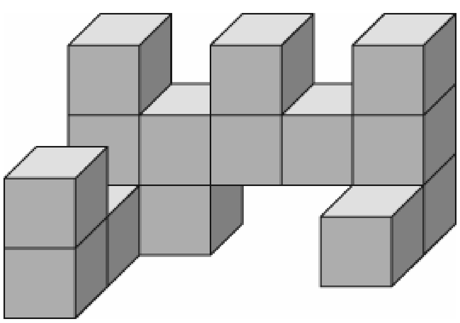
Difference between surface areas of two stacks $= 778.72 - 720.63$

$= 58.09$

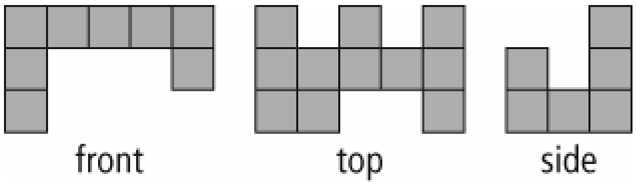
The stack of scones measuring 8 cm by 4.5 cm would require 58.09 cm^2 more wrap.

DIF: Difficult+ OBJ: Section 5.4 NAT: SS3 TOP: Surface Area of a Cylinder
KEY: cylinder | surface area

17. Draw the top, front, and side views of this 3-D object.

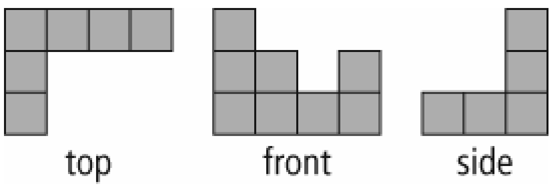


ANS:

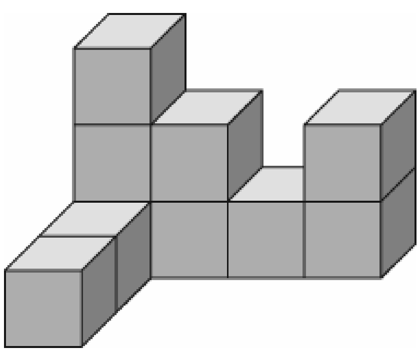


DIF: Difficult+ OBJ: Section 5.1 NAT: SS5
TOP: Views of Three-Dimensional Objects KEY: views

18. Draw the 3-D object described by the three views provided below.

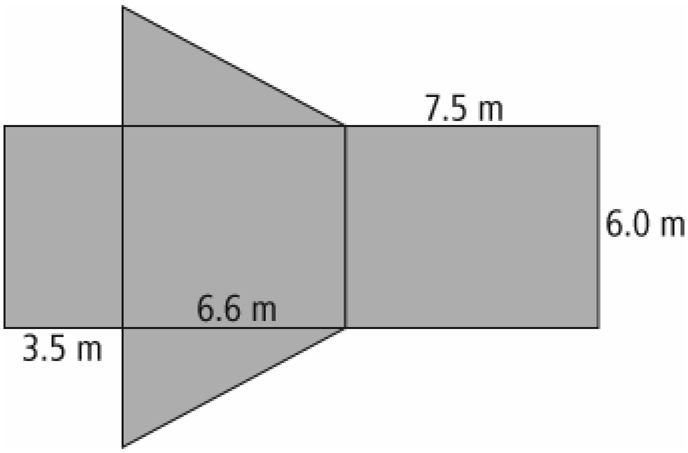


ANS:

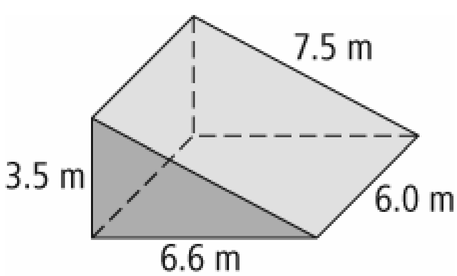


DIF: Difficult+ OBJ: Section 5.1 NAT: SS5
TOP: Views of Three-Dimensional Objects KEY: three-dimensional | views

19. Draw the 3-D object that would be created by folding the following net.

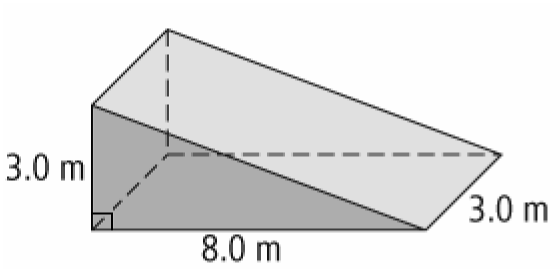


ANS:



DIF: Difficult+ OBJ: Section 5.1 NAT: SS2
TOP: Views of Three-Dimensional Objects KEY: three-dimensional | net

20. Determine the surface area of the right triangular prism shown below. Round all measurements to one decimal place.



ANS:

$$\text{Area of 2 triangular faces} = 2\left(\frac{b \times h}{2}\right)$$
$$= 2\left(\frac{8 \times 3}{2}\right)$$
$$= 24$$
$$\text{Area of the back} = 3 \times 3$$
$$= 9$$
$$\text{Area of the base} = 8 \times 3$$
$$= 24$$
$$\text{Length of ramp} = \sqrt{3^2 + 8^2}$$
$$= \sqrt{73}$$
$$= 8.544$$
$$= 8.5$$
$$\text{Area of ramp surface} = 8.5 \times 3$$
$$= 25.5$$
$$\text{Total surface area} = 24 + 9 + 24 + 25.5$$
$$= 82.5$$

The total surface area is 82.5 m^2.

DIF: Difficult+ OBJ: Section 5.3 NAT: SS3 TOP: Surface Area of a Prism
KEY: right triangular prism | surface area