

Unit 4- Quiz

Answers

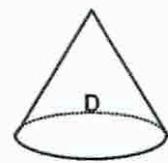
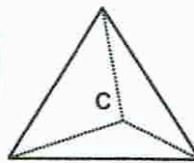
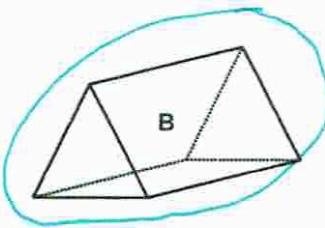
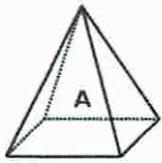
NAME: _____

MATH 8 – Unit 4 Quiz

Multiple Choice (2 points each)

B

1. Which object is NOT a pyramid?



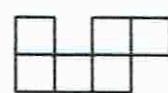
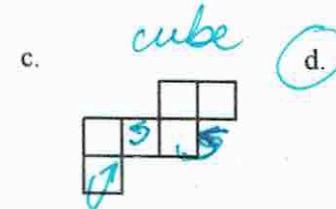
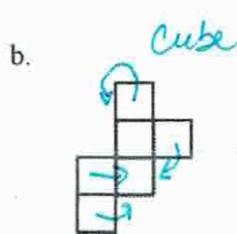
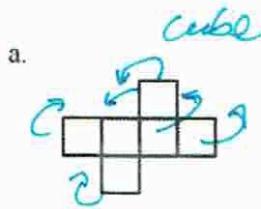
- a. Object A b. Object B c. Object C d. Object D

• Pyramids always have triangular faces (regardless of its base). Prisms have two faces, one of which is the base, and faces that are not triangular.

• Object B is a triangular prism.

D

2. Which diagram CANNOT be folded to make a cube?



• Nets are only

"good" if they fold into a figure or shape without any overlapping faces or land when all the faces are represented.

C

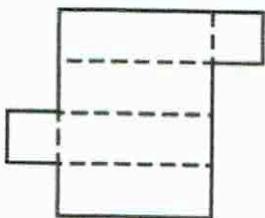
3. What shapes do you need to make a triangular prism?

- 4 triangles
 1 triangle and 3 rectangles

- c. 2 triangles and 3 rectangles
 d. 4 triangles and 1 rectangle

Base: Triangle
then, another triangle
Faces: 3 Rectangles

A 4. Name the polyhedron that can be made from this net.



- Look for the faces that repeat 2 times → one is the base.
- faces are rectangular (NOT a pyramid)

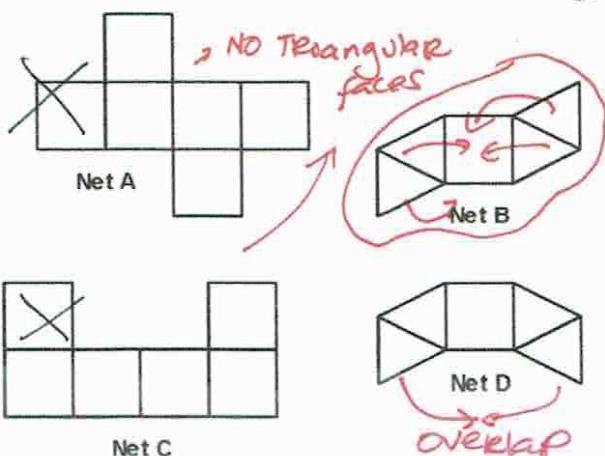
- a. Rectangular prism
b. Hexagonal prism

- ✗ Rectangular pyramid
✗ Hexagonal pyramid

there isn't a hexagon

5. Which diagram is a net of a square pyramid?

(B)

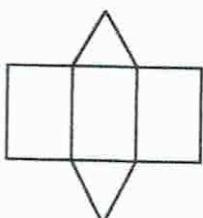


Square pyramid

→ the base is a square

- Because the base is a square, 4 sides, then there are 4 triangular faces

B 6. Name the polyhedron that can be made from this net.



- 2 Triangles (one is the base)
- Since the faces are rectangular,

Triangular Prism

- a. Rectangular pyramid
b. Triangular prism

- c. Rectangular prism
d. Triangular pyramid

C 7. How many triangular faces are there in a hexagonal prism?

a. 2

b. 1

c. 0

d. 6

- A Tricky Question → A prism does not have triangular faces. A HEXAGONAL PRISM has a hexagon as base, and 6 rectangular sides.

B 8. How many triangular faces are there in a pentagonal pyramid?

- a. 1 b. 5 c. 2 d. 3

• Figure out the base: a PENTAGON (5 sides)

• A pentagonal pyramid, then, has 5 triangular faces.

B 9. The area of one face of a cube is 25 cm^2 . What is the surface area of the cube?

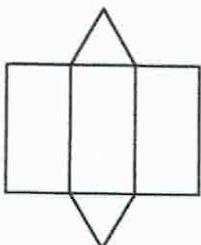
- a. 100 cm^2 b. 150 cm^2 c. 30 cm^2 d. 125 cm^2

• Remember that: Surface Area = SUM of the area of individual faces

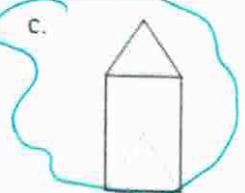
• A cube has **6** faces (equal)

$$\hookrightarrow \text{so, } S_A \text{ cube} = (\text{Area of 1 face}) \times 6 = 25 \times 6 \text{ cm}^2 = \underline{\underline{150 \text{ cm}^2}}$$

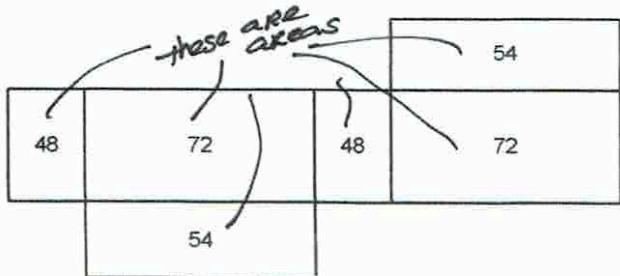
C 10. Draw the object that has this net.



again → 2 triangles (1 is the base)
3 rectangular faces
↪ Triangular Prism

- a.  b.  c.  d. 

D 11. This is the net of a right rectangular prism. The area of each face, in square centimetres, is given. What is the surface area of the prism?

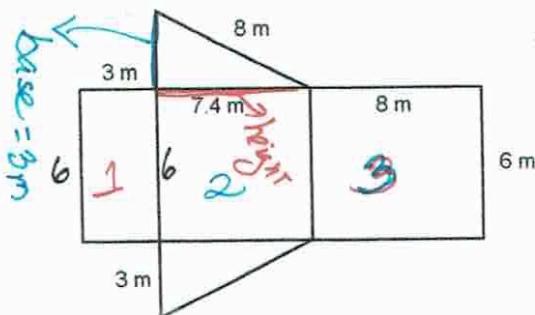


S_A = Sum of the area of all faces

$$S_A = 48 + 72 + 48 + 72 + 54 + 54 = \underline{\underline{348 \text{ cm}^2}}$$

- a. 178 cm^2 b. 174 cm^2 c. 228 cm^2 d. 348 cm^2

B 12. Calculate the area of this net of a right triangular prism.



• Find the area of each face

a. 88.2 m^2

b. 132.6 m^2

c. 56 m^2

d. 66.6 m^2

• Notice that the 2 triangles are identical : *area of 2 triangles*

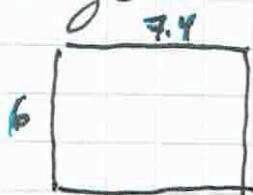
$$2 \times \left(\frac{b \times h}{2} \right) = b \times h = (3 \times 7.4) \text{ m}^2 = 22.2 \text{ m}^2$$

• Rectangle 1:



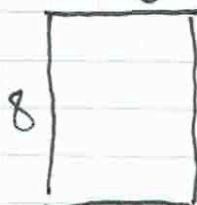
$$\text{Area} = (6 \times 3) \text{ m}^2 = 18 \text{ m}^2$$

Rectangle 2:



$$\text{Area} = 44.4 \text{ m}^2$$

• Rectangle 3:



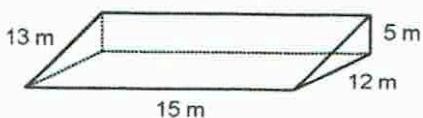
$$\text{Area} = (8 \times 6) = 48 \text{ m}^2$$

Total Area

$$\begin{aligned} & 22.2 \text{ m}^2 \text{ (triangles)} \\ & 18.0 \text{ m}^2 \text{ (Rect. 1)} \\ & 44.4 \text{ m}^2 \text{ (Rect. 2)} \\ & 48.0 \text{ m}^2 \text{ (Rect 3)} \end{aligned}$$

132.6 m²

C 13. Use the net to find the surface area of the right triangular prism.



S_A total : 075

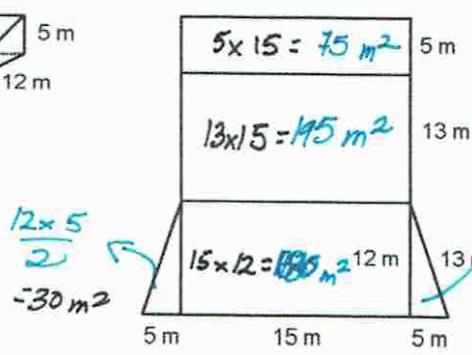
195

180

30

30

510.5 m²



Find the area of the individual faces

$$\begin{aligned} & \frac{b \times h}{2} = \frac{12 \times 5}{2} \\ & = 30 \text{ m}^2 \end{aligned}$$

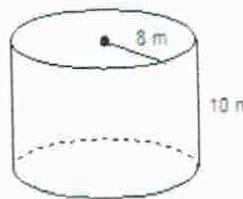
a. 90 m^2

b. 585 m^2

c. 510 m²

d. 2340 m^2

- A** 14. Find the surface area of this cylinder to the nearest square metre.



$$\text{Radius} = 8 \text{ m}$$

$h = 10 \text{ m}$ (of cylinder)

- a. 905 m^2 b. 704 m^2 c. 653 m^2 d. 452 m^2

$$S_A = \text{Area of 2 circles} + \text{Area of Rectangle}$$

$$2(\pi r^2) + (base) \times h \quad \begin{matrix} \downarrow \\ \text{base = circumference} \end{matrix} \quad \begin{matrix} \downarrow \\ 2\pi r \end{matrix}$$

$$2\pi r^2 + (2\pi r \times h) =$$

$$2\pi(8 \text{ m})^2 + (2\pi(8 \text{ m}) \times 10 \text{ m}) =$$

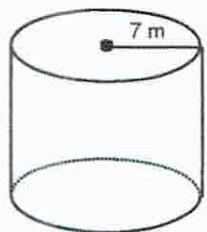
$$2\pi(64 \text{ m}^2) + 160\pi \text{ m}^2$$

$$128\pi \text{ m}^2 + 160\pi \text{ m}^2 = 288\pi \text{ m}^2$$

$$= 904.77 \text{ m}^2$$

$\overbrace{905}^{\text{m}^2}$

- B** 15. Find the surface area of this cylinder. Leave π in your answer.



$$\text{Radius} = 7 \text{ m}$$

$$\text{height} = 15 \text{ m}$$

this means
multiply all
numbers but
do not multiply by
 π

a. $210\pi \text{ m}^2$

b. $308\pi \text{ m}^2$

c. $602\pi \text{ m}^2$

d. $238\pi \text{ m}^2$

$$S_A = 2\pi r^2 + (2\pi r \times h)$$

$$= 2\pi(7)^2 \text{ m}^2 + (2\pi(7 \text{ m}) \times 15 \text{ m})$$

$$= 2\pi(49) \text{ m}^2 + 210\pi \text{ m}^2$$

$$= 98\pi \text{ m}^2 + 210\pi \text{ m}^2 = \underbrace{308\pi \text{ m}^2}_{\text{m}^2}$$

SHORT ANSWERS (3 Points Each)

16. A circle has diameter 17 cm. Find the circumference to the nearest centimetre.

- This question had as a goal to make you think and revisit the S_A equation for a cylinder.
- $S_A = \text{Surface Area of 2 circles} + \text{Surface Area of Rectangle}$
- But remember that the Rectangle has, as its base, the circumference



this (the base), goes around the circle, or its circumference.

$$\text{So, in } S_A = 2\pi r^2 + (2\pi r \times h)$$

Diameter = 17 cm, so Radius = $\frac{17}{2} = 8.5$ cm

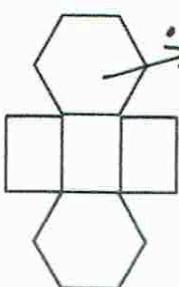
→ this is the circumference

$$\text{Circumference} = 2\pi r$$

$$= 2\pi(8.5 \text{ cm}) \\ = \frac{2\pi(8.5)}{17\pi} = 53.40 \text{ cm}$$

17. The diagram shows part of the net of a hexagonal prism. How many shapes are missing? What are they?

Missing:
3 Rectangles

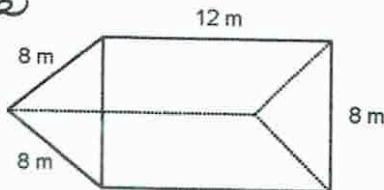


The hexagon is the base

- hexagons have 6 sides, which means there should be 6 rectangles.

18. The base of this right triangular prism is an equilateral triangle. Find the sum of the areas of the 3 rectangular faces.

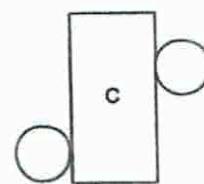
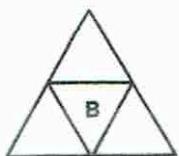
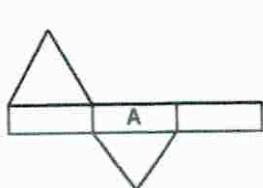
$$\text{Area of 1 Rect.} = 12 \text{ m} \times 8 \text{ m} = 96 \text{ m}^2$$



Notice that the triangles are equilateral
this means that All 3 rectangles are equal

so the area of the 3 rectangles = $(96 + 96 + 96) = 288 \text{ m}^2$

19. Identify the object that can be made from each net.

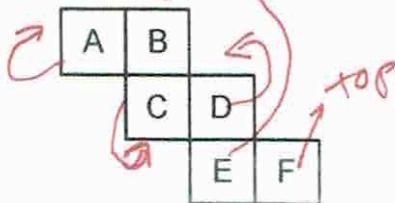


- (A) • 2 rectangles means the base is a triangle
 • 2 triangles and 3 rectangles (Prism) → Triangular Prism
- (B) • Base is a triangle
 • there are 3 triangular faces → Triangular pyramid
- (C) 2 circles and 1 rectangle → Cylinder

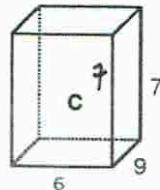
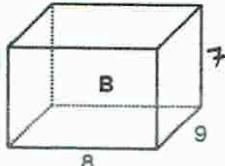
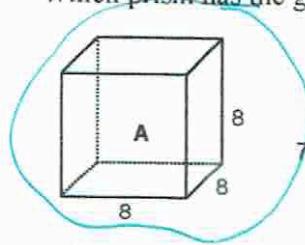
Problems (5 points each)

PLEASE MAKE SURE YOU SHOW ALL YOUR WORK ON THE ANSWER SHEET.

20. This diagram is a net of a cube. Once the cube is made, which letters face each other (on opposite side)



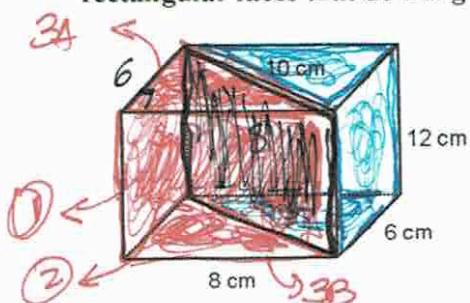
21. The diagrams shows the dimensions, in centimetres, of three right rectangular prisms. Which prism has the greatest surface area? Show your work.



- (A) is a cube → $S_A = (\text{Area of 1 face}) \times 6 = (8 \times 8) \times 6 = 384 \text{ cm}^2$
- (B) Front, back = $2(7 \times 8) = 112$
 R, L = $2(9 \times 8) = 144$
 Top, bottom = $2(7 \times 9) = 126$ } 382 cm^2
- (C) Fr, Back = $2(6 \times 7) = 84$
 R, L = $2(9 \times 7) = 126$
 Top, Bottom = $2(6 \times 9) = 108$ } 318 cm^2

22. This rectangular prism is divided into 2 equal halves by a line drawn along the diagonal. Each half is in the shape of a right triangular prism and will be painted in a different colour. Find the surface area covered by each colour paint. Explain your answer.

HINT: Find the surface area of 1 figure (which is identical to the other), BUT, DO NOT include the rectangular faces that do not get painted.



- Only the outside faces will be painted
- The faces in the middle do not get painted

One Colour → Red

the surface (faces) to be painted (only 4 on each triangular prism)

$$\rightarrow 2 \text{ EQUAL TRIANGLES} \quad \text{Area} = 2 \left(\frac{6 \times 8}{2} \right) = 48 \text{ cm}^2$$

→ 1 Rectangle

$$6 \quad | \quad 12$$

① → Area = $6 \times 12 = 72 \text{ cm}^2$

total Area
Painted
per
colour

→ 2 Rectangles

$$8 \quad | \quad 12$$

② → Area = $8 \times 12 = 96 \text{ cm}^2$

$$\begin{array}{r} 48 \text{ cm}^2 \\ + 72 \text{ cm}^2 \\ \hline 96 \text{ cm}^2 \\ \hline 216 \text{ cm}^2 \end{array}$$

per colour

23. A cylindrical storage container has radius 4 m and height 8 m.

a) What is the surface area of this container? Round your answer to the nearest square unit.

Show your work. Because the square of a number original $\rightarrow 30.6$ is always higher than doubled radius

b) If either the radius or the height of the container is doubled, which will give a greater area increase compared to the original container? Explain.

Radius $\rightarrow 2.7$ times vs. 1.7 with doubled height

$\frac{804.24}{301.6} \approx 2.7$

double height

$$a) SA = 2\pi r^2 + (2\pi r \times h) = 2\pi(4)^2 + (2\pi(4) \times 8) = 2\pi(16) + 64\pi = 32\pi + 64\pi \quad \text{increase of } 1.7$$

b) Try it → double radius $\rightarrow 8\text{m}$

$$\text{so } SA = 2\pi(8)^2 + (2\pi(8) \times 8) = 128\pi + 128\pi = 256\pi = 804.24 \text{ m}^2$$

$$\text{double height} \rightarrow SA = 2\pi(4)^2 + 2\pi(4) \times 16 = 32\pi + 128\pi = 160\pi = 502.65$$