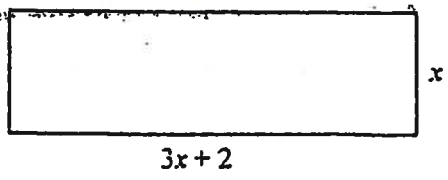
JUNE EXAM

MATHEMATICS REVIEW PACKAGE SEC.2

1. The length and width of a rectangle are shown in the diagram below.



The perimeter of the rectangle is:

A) $4x + 2$ B) $8x + 4$

C) $8x + 2$ D) $4x + 4$

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2. **If $x = 3$ and $y = -4$, then the algebraic expression with the <u>greatest value</u> would be:**

A) $7x - 2y$ B) $2x + 5y$

C) $x^2 + y^2$ D) $(y + x)^2$

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3. The instructions to prepare a glass of juice say to use 60 mL of concentrate for each 250 mL of water.

Which of the following mixtures is too strong?

A) 60 mL of concentrate in 500 mL of water

B) 30 mL of concentrate in 200 mL of water

C) 60 mL of concentrate in 200 mL of water

D) 90 mL of concentrate in 500 mL of water

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4. **Which of the following pairs of ratios is equivalent?**

A) 9:15 and 5:3 B) 3:5 and 9:15

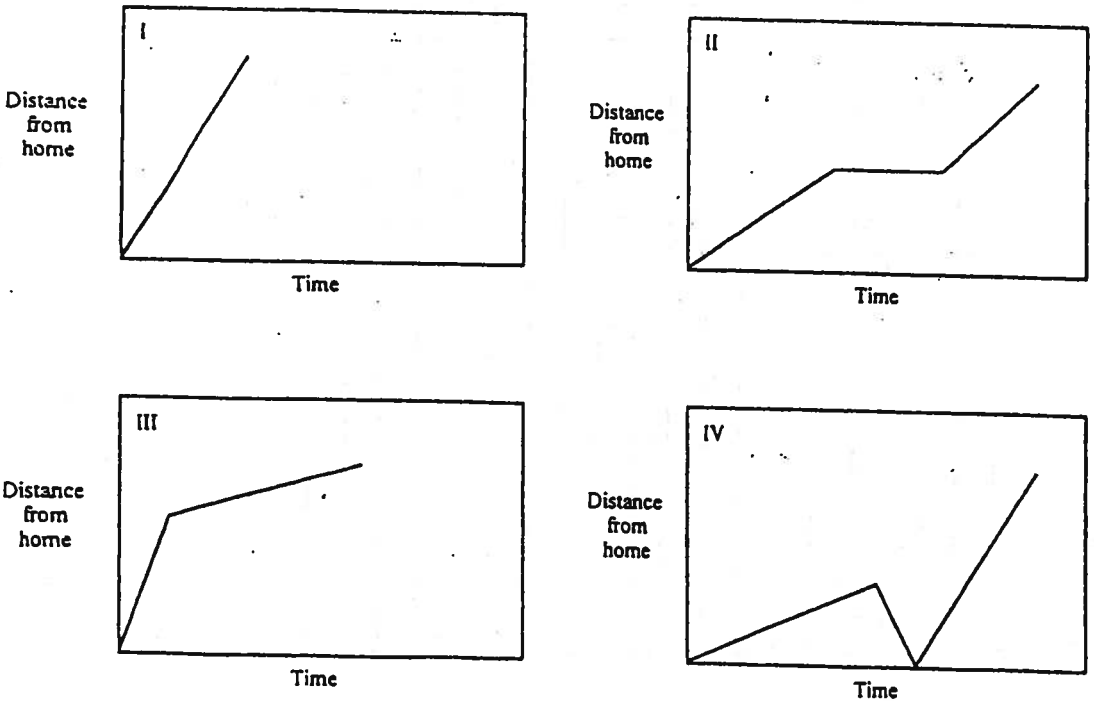
C) 15:3 and 9:5 D) 3:9 and 15:5

(5) Four sisters live in the same house, and go to the same school.
Their names are Amanda, Barbara, Cathy and Daria.
On Monday morning, they all leave home to go to school.

Barbara starts out for school, then remembers that her math homework is at home, so she runs home to get it, then goes to school quickly so she won't be late.
Cathy starts out in a rush, then realizes she'll be too early for school, so she continues the trip at a slower place.
Daria was late getting out of bed and eating breakfast, so she runs to school to get there on time.

The following graphs represent each of the four sisters' trips to school.

a) **Write the name of the girl inside each graph.**
b) **Write a description of what might have happened on Amanda's trip to school.**



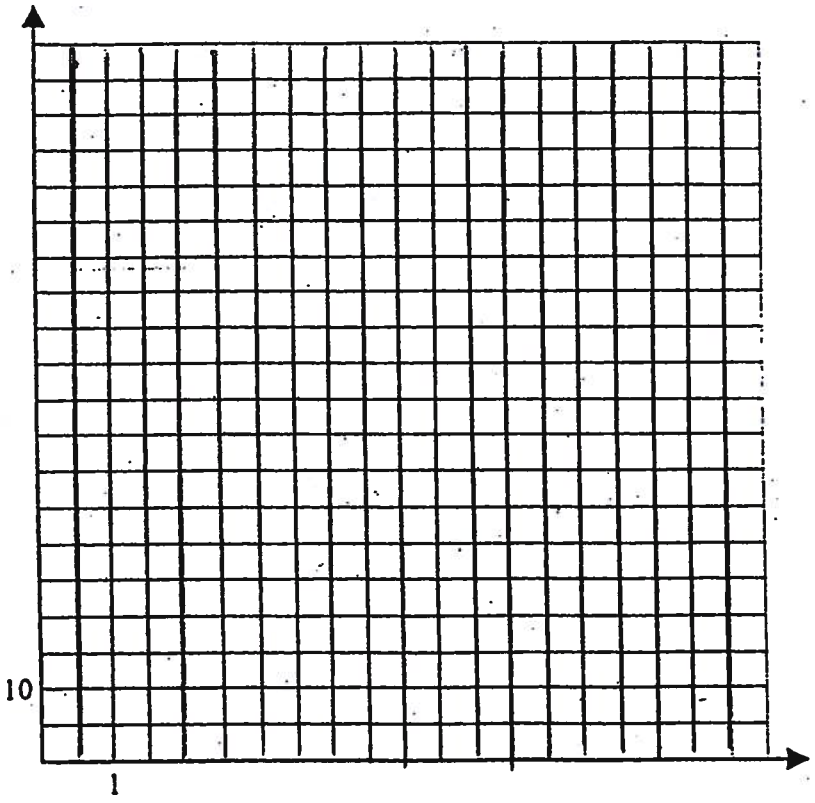
(6) Joshua wants to enter the science fair. He is conducting a temperature experiment. He begins his experiment at room temperature (20°C), and he heats some liquid at a constant rate of 10 degrees per minute.

a) **Make a table of values to represent Joshua's experiment.**

Time (minutes)	0	1		4	5		8
Temperature (°C)							

b) **Draw a graph that shows how the temperature of the liquid changed with time. Be sure to label your axes.**

Temperature Experiment



c) **What is the temperature of the liquid after 6.5 minutes?** _____ °C

(7) Which of the following pairs of experiments is random?

A) Flipping a coin and improving marks in Math

B) Winning a game of chess and winning a basketball game

C) Rolling a die and cutting a deck of cards

D) Winning the lottery and growing older

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(8) A bin contains 10 bingo balls, numbered from 1 to 10.

(1) (2) (3) (4) (5) (6) (7) (8) (9) (10)

2 balls are taken out, one after another without replacing. What is the probability you get : (an even#, 7)

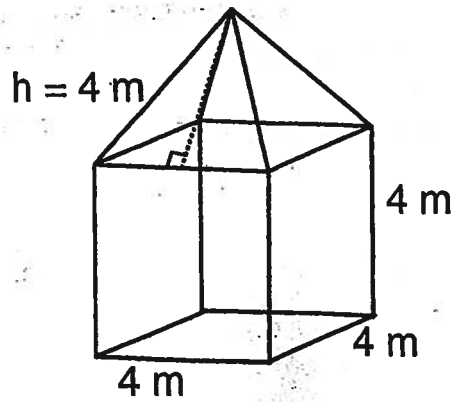
A) $\frac{1}{20}$

B) $\frac{1}{18}$

C) $\frac{7}{20}$

D) $\frac{7}{2}$

(9) **What is the total surface area of the following decomposable solid?**



A) 144 m^2

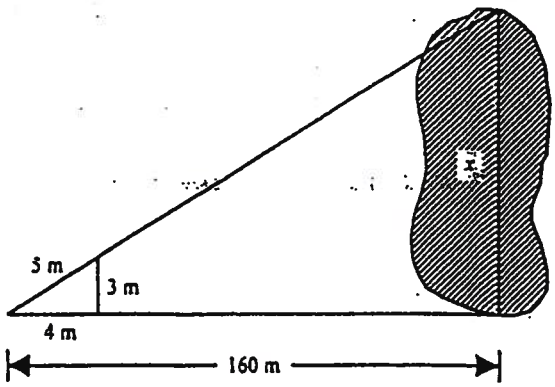
B) 112 m^2

C) 96 m^2

D) 64 m^2

(10) To determine the length of his fishpond, Zeke measured the distances shown in this diagram. He asked his friends for help to do the math.

Fred said he could find the length using the proportion $x : 160 = 3 : 4$.
Barney said he should use $x : 160 = 3 : 5$.



a) **Which friend gave Zeke the correct proportion?** _____

b) **Explain why the other friend was not correct.**

c) **What is the length of the pond?**

(11) Val's hamster is exercising on his wheel. The diameter of the wheel is 0.14 m. He runs until the wheel has turned 25 times.

How far did the hamster run? Round your answer to the nearest metre.

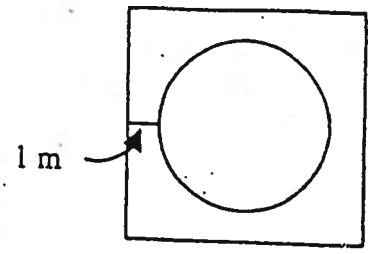
(12) A special coin has the number 3 marked on one side and the number 5 on the other side. It is tossed three times and the sum of the three tosses is recorded for each outcome.

What is the probability of obtaining a sum of 13?

13 Lenny installed a circular pool in the centre of his square yard as shown in the diagram. The yard has an area of 196 m^2.

The edge of the pool is 1 m from the midpoint of each side of the square.

What is the area of the pool?



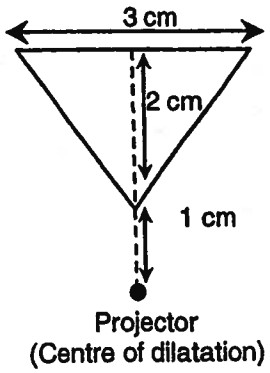
14 A triangle is projected on a game board screen. The triangle has a base of 3 cm and a height of 2 cm.

Liane says that if a dilatation scale factor of 5 is applied to the initial triangle, the area of the triangle projected on the screen will be 5 times greater.

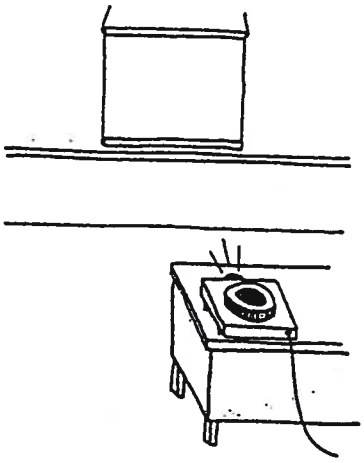
Is she right or wrong?

Show your work.

Initial triangle

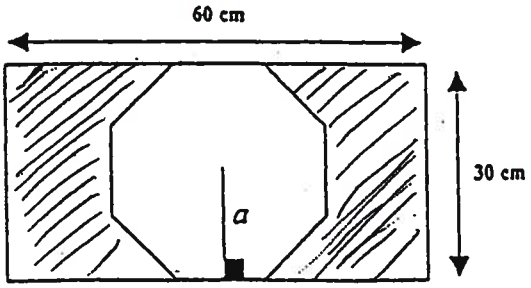


(15) The base of a rectangular film slide is 1 cm longer than its height. The image that appears on the screen as a result of a dilatation of scale factor 8 (ratio of similarity) has a perimeter of 144 cm.



What are the dimensions of the original rectangular film slide?

(16) A regular octagon with a perimeter of 100 cm is enclosed by a rectangle of length 60 cm and width 30 cm. The apothem of the regular octagon is represented by the variable a.



Calculate the area of the shaded region.

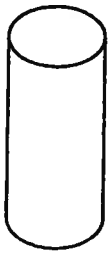
Stage Decorations

(22) The band, *Limits to Infinity*, requests two cylindrical towers as stage decorations. Both cylindrical towers have the same total surface area but different heights.

- Total surface of each tower is 120 m^2.
- The area of the base of the cylindrical tower A is 16.6 m^2.
- The radius of cylindrical tower B is 3 less than triple the radius of cylindrical tower A.

Diagrams are not drawn to scale

Cylindrical tower A



Tower A

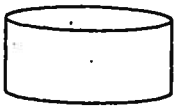
Height = ?

Radius = ?

Area of base = 16.6 m^2

Total surface area = 120 m^2

Cylindrical tower B



Tower B

Height = ?

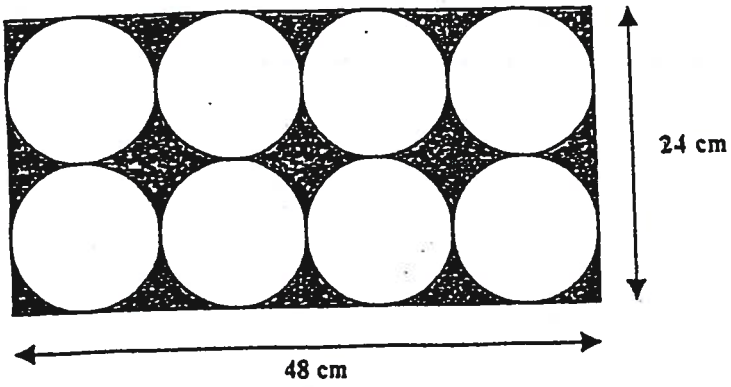
Radius = ?

Area of base = ?

Total surface area = 120 m^2

What is the height of each cylindrical tower?

(23) Discs can be stamp-cut from sheets of aluminium measuring 48 cm by 24 cm. The diagram shows that eight discs of equal size are produced from each sheet.



What is the area, <u>to the nearest unit</u>, of the unused aluminium sheet?

(24) A picture frame is in the shape of a regular octagon with side 8.3 cm.

The artist who designed the frame would like to design another one in the shape of a regular pentagon, but with the same perimeter as the original.

What is the length of one side of this new frame?

A) 5.19 cm

B) 9.96 cm

C) 13.28 cm

D) 41.50 cm

25

In Computer Science class, students determine how fast they can accurately type. Jordan is able to type 35 words in 60 seconds

Of the following, which student can type faster than Jordan can?

A) Sami types 32 words in 60 seconds.

B) Rachel types 35 words in 80 seconds.

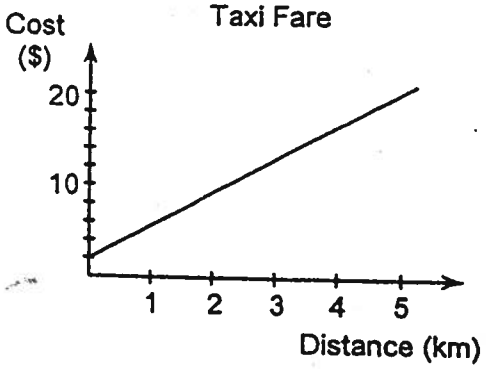
C) Marty types 37 words in 55 seconds.

D) Liam types 70 words in 120 seconds.

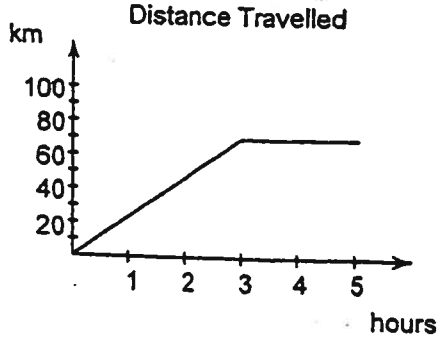
26

Which of the following situations represents a proportional situation?

A)



B)



C) Laurie works 15 hours and earns $105; she works 35 hours and earns $280.

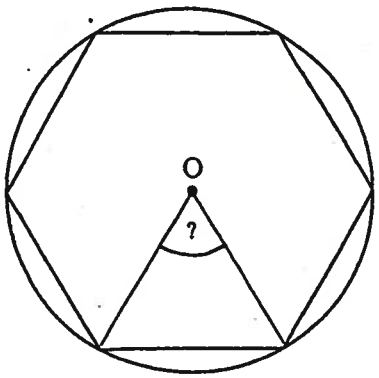
D)

Store

Packs of gum	Price ($)
4	3.20
10	8.00
15	12.00

27 A regular hexagon is inscribed in the circle below.

a) What is the measure of one of its central angles?

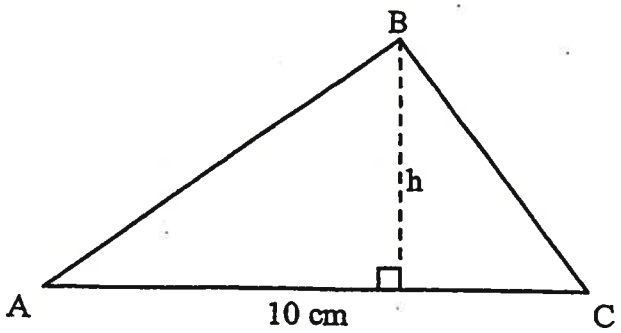


27 b) Which of the following has the larger area?

A) a circle with a diameter of 12 cm

B) a circle with a radius of 8 cm

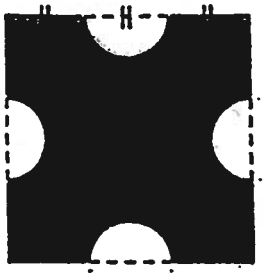
28 The area of triangle ABC in the figure below is 30 cm^2. What is the height of the triangle?



29

To make a placemat, Ken bought a square piece of material whose perimeter is 72 cm.

From each side, he cut out a semicircle whose diameter is $\frac{1}{3}$ of the length of the side, as shown in the diagram.



How much material was left after he removed the semicircular pieces?

Show all your work.

Answer: Ken had _____ cm^2 of material left for the placemat.

30

Last weekend, 2400 teenagers visited the Skate Dome.

On Saturday, 340 of the teenage visitors were rollerbladers, and the remaining $\frac{3}{5}$ were skateboarders.

On Sunday, 30% of the visitors were skateboarders.

How many skateboarders visited the Skate Dome on Sunday?

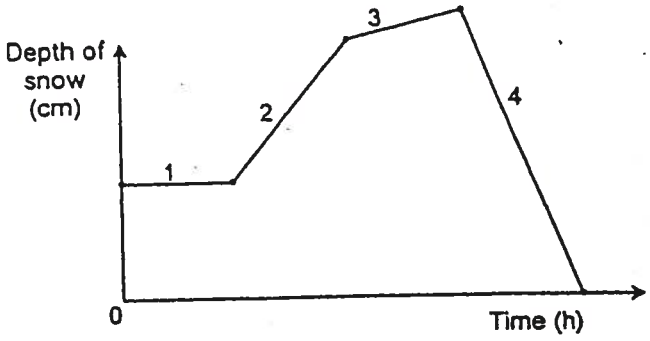
Show all your work.

Answer: On Sunday, _____ skateboarders visited the Skate Dome.

31

The sections of the graph below can be described by some of the following statements.

Depth of Snow in a Park



Statements

A There is no snow on the ground.
B The snow melts until it is gone.
C No snow is falling.
D Light snow is falling.
E Heavy snow is falling.

Match each section in the graph with the appropriate statement. You may use a statement only once.

Section of Graph	Statement (use letter)
1	
2	
3	
4	

32

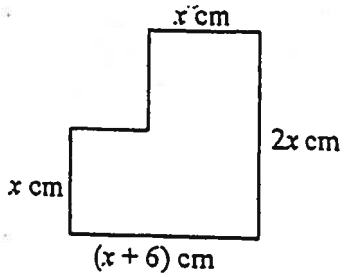
Peter wants to rent a bicycle while at the beach.

The rental cost is $3.00 plus $2.00 for each hour that he keeps the bike.

Complete the table of values that represents this situation.

Number of hours	2	5	6	
Rental costs ($)				19.00

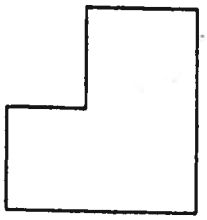
33 The two figures on the right are identical. The perimeter of each figure is 60 cm.



a) **Determine the value of x.**

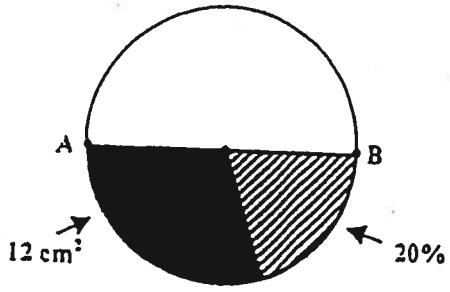
_____ **cm**

b) **Find the length of each side of the figure in cm. Write the lengths on the unmarked diagram below.**



34

In the disc below, $\overline{AB}$ is the diameter.

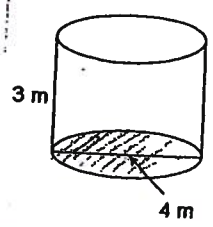


The striped portion represents 20% of the total surface area of the disc.
The shaded portion measures 12 cm^2.

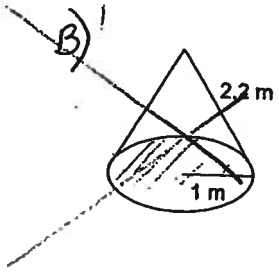
What is the total surface area of the disc?

Calculate the Total Surface area of each shape. (35)

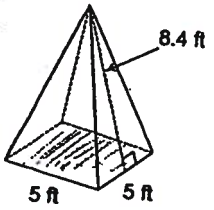
A)



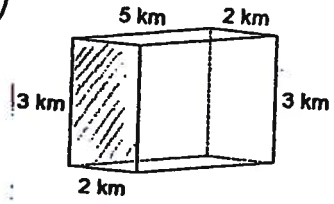
B)



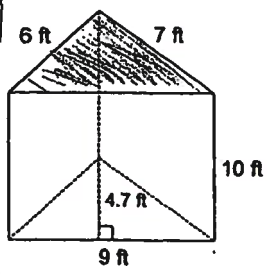
C)



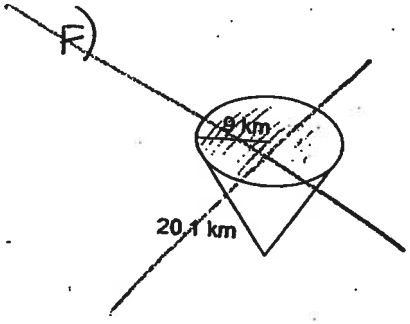
D)



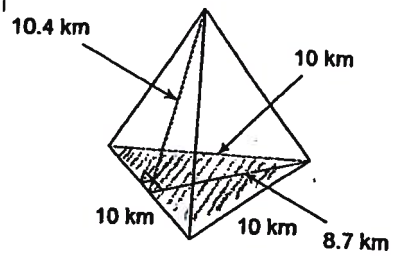
E)



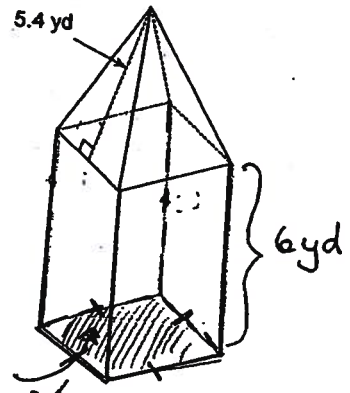
F)



G)



H)



area of base = 16yd^2

36

A teacher has a class of 26 students: 14 girls and 12 boys.

The teacher has two prizes to give away and decides to put all the students' names into a bowl.

The teacher will then draw 2 names.

(Note: The name of the first winner is not put back into the bowl for the second draw.)

What is the probability that both prizes will be won by boys?

37

Jane ate a very large slice of pizza.

The central angle of the slice was 80°

The diameter of the pizza was 60 cm.

What was the area of the slice of pizza that Jane ate?

(Use $\pi = 3.14$). Show your work.

38

Amy, Barbara and Carly are Girl Guides.

They went door to door asking people in their neighbourhood to support their organization by donating empty soft drink bottles.

Barbara collected 5 less than 3 times the number of bottles that Amy collected.

Carly collected 4 more than two times the number of bottles that Amy collected.

They collected a total of 245 bottles.

How many bottles did each person collect?

Show your work.

39

The perimeter of a regular hexagon is $(30x + 6)$ units.

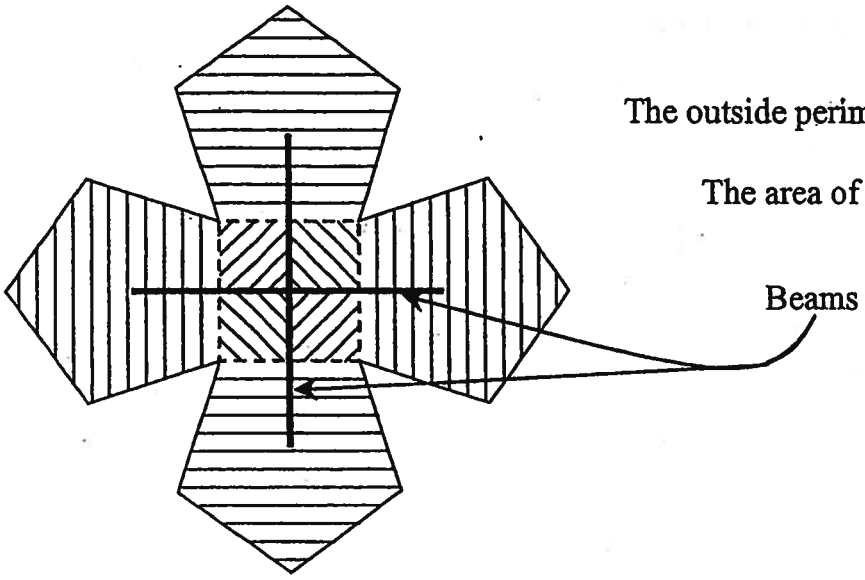
What is the simplified algebraic expression that corresponds to the length of one of its sides?

The algebraic expression for the length of one of its sides is (_____) units.

(40)

A hotel has a deck on its property.

The deck was formed by constructing 4 regular pentagons around a square area, as shown in the diagram below.



The outside perimeter of the deck is 139.2 m.

The area of the deck is 597.69 m^2.

A building inspector told the hotel owners that 2 beams must be installed under the deck for more support.

These beams are to run from the centre of one regular pentagon to the centre of the opposite regular pentagon.

How long is each beam?

41

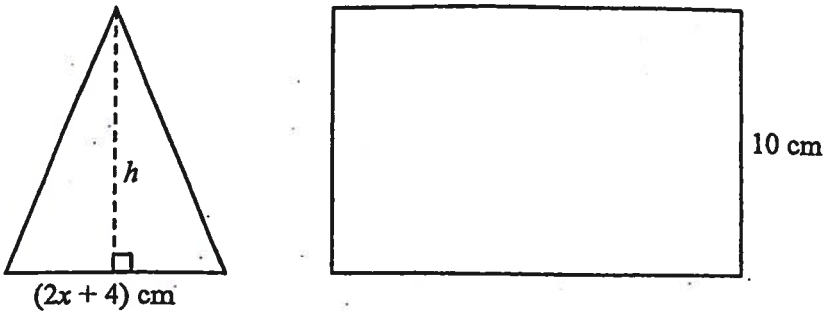
The height of the rectangle below is 10 cm.

The height of the triangle is equal to the height of the rectangle.

The measure of the base of the triangle is $(2x + 4)$ cm.

The base of the rectangle is twice the length of the base of the triangle.

The combined area of the triangle and rectangle is 300 cm^2.



What is the perimeter of the rectangle?

Show your work.

42

Yuri is a construction worker.

Faisal wants him to lay a brick walkway.

Yuri tells him that he will need the following materials to lay a brick walkway 5 metres long and 1 metre wide.

400 bricks
16 bags of sand
6 bags of cement

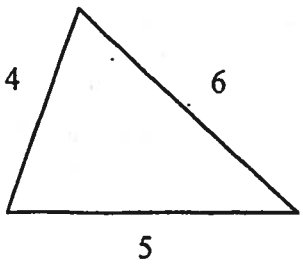
Faisal wants Yuri to lay a walkway 12.5 metres long and 1 metre wide.

How many bags of sand will Faisal need?

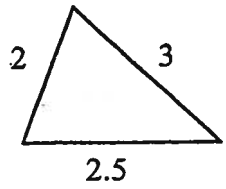
(43)

Which of the triangles below is NOT similar to the triangle at the right?

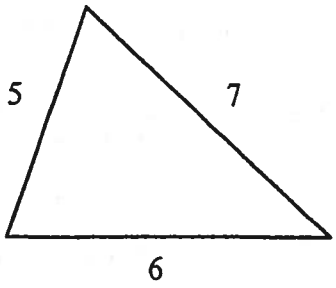
(Note: The figures are not drawn to scale)



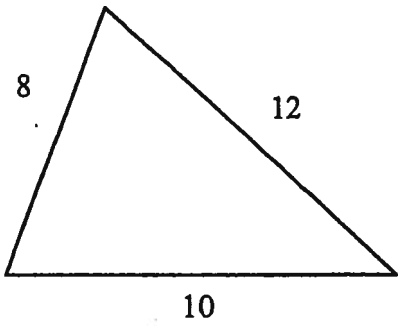
A)



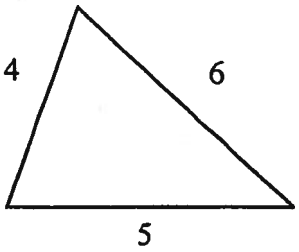
C)



B)



D)



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(44)

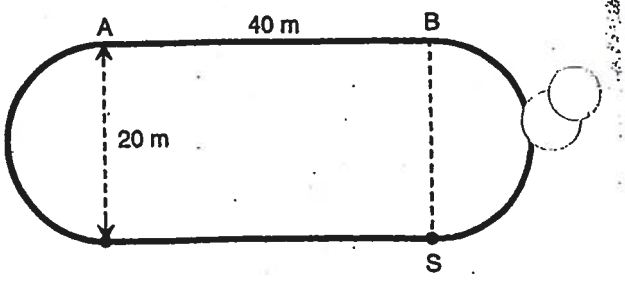
Pat would like to buy some fertilizer for her circular garden.
The salesperson tells her she needs to know the area of her garden.

All that Pat remembers is that she needed 22 metres of fencing to go completely around her circular garden.

Rounded to the nearest tenth of a square metre, what is the area of Pat's garden?

45

A sports field is in the shape of a rectangle with 2 semicircles.



A running track, shown in bold on the diagram, surrounds this field.

The diameter of each semicircle is 20 m.

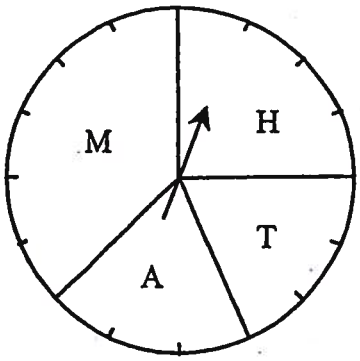
The distance from A to B is 40 m.

Two runners simultaneously start from point S and run in opposite directions at the same speed along the track. Each runner completes 80% of the track.

What is the shortest distance along the track between the two runners?
Show your work. (Use $\pi = 3.14$) metres.

46

The circumference of the wheel in the diagram on the right is divided into 16 equal arcs.



The pointer is spun twice.

What is the probability that the pointer will land in the M sector on the first spin and in the H sector on the second spin?

A $\frac{1}{16}$

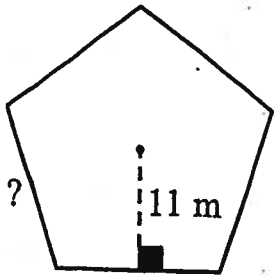
B) $\frac{3}{32}$

C) $\frac{1}{2}$

D) $\frac{5}{8}$

(47) a)

The floor area of a room has the shape of a regular pentagon, as shown below.
Its area is 440 m^2 and its apothem is 11 m.



Area : 440 m^2

What is the length of one side of the floor?

Show your work.

b)

A cook, Henri, is making salad dressing for a large wedding party.

He uses a 1 : 4 ratio of vinegar to oil.

Henri pours 2 cups of vinegar and 8 cups of oil into a large bowl.

Henri's assistant, Jessica, knows that more salad dressing is needed. Jessica pours 3 cups of vinegar into the large bowl.

Exactly how much oil must Jessica pour into the mixture to keep the ratio of vinegar to oil at 1 : 4?

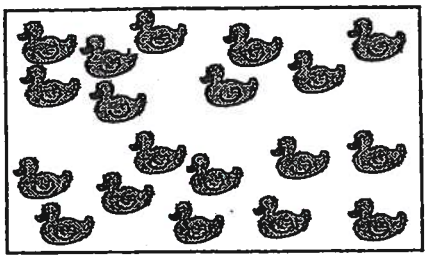
Show your work.

Floating Ducks

Sandra is planning the "Floating Ducks" game booth. She found instructions to create a 3 m^2 rectangular pond which holds 75 rubber ducks. Unfortunately, she only has enough material to build a similar 20 000 cm^2 rectangular pond.

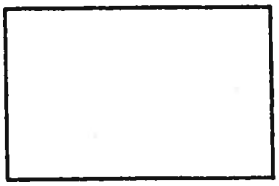
Rectangular pond from instructions

Area = 3 m^2
Holds 75 ducks



Sandra's Rectangular pond

Area = 20 000 cm^2
Holds ? ducks



Diagrams are not drawn to scale

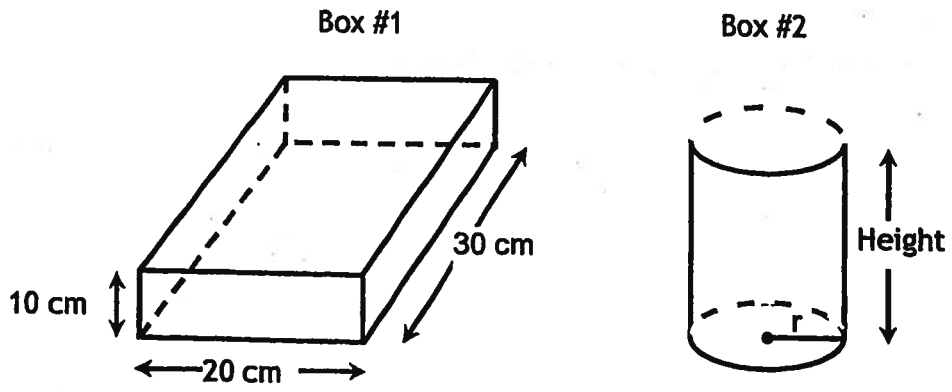
In keeping with proportionality requirements, how many ducks are needed to fill Sandra's rectangular pond?

(51)

The Gifts

Sylvain has two boxes. Box #1 is in the form of a prism with a rectangular base and a height of 10 cm. Box #2 is cylindrical in shape. The radius of Box #2 measures $\frac{3}{5}$ of the height of Box #1.

Sylvain wants to use the same amount of paper to wrap both boxes.



What should be the height of Box #2 be in order to ensure that the same amount of paper is used for each box?

52 For your birthday party, you organize 3 games of chance to entertain your guests.

Game 1: You flip a coin that has "Heads" on one side and "Tails" on the other. The guest wins if he/she manages to get "tails" twice in two flips of the coin.

Game 2: A bag contains 5 red marbles, 3 blue marbles and 2 green marbles. The guest wins if he/she manages to pick 2 red marbles in 2 draws (each draw is done with replacement.)

Game 3: The guest rolls two die, each numbered 1 to 6. The guest wins if the product of the two resulting numbers is an odd number.

Which of the three games are equiprobable?

A) 1 and 2

B) 2 and 3

C) 1 and 3

D) 1, 2 and 3

53

Jack ran a 15 000 meter race in 1.8 hours. His next challenge is a 20 km race.

If he runs at the same speed, how many extra minutes will it take to complete the 20 km race?

54

At J-Mart, a shirt costs $32 less than a pair of pants. For $292, you are able to purchase three pairs of pants and four shirts.

Express this situation using an algebraic equation.

55

Simplify each of the following expressions:

a) $-2(3a - 5)$

b) $\frac{8a - 6}{2}$

c) $\frac{3(14y + 12)}{6}$

d) $7(x+2) - 3(x+4)$

56

Solve the following equations:

a) $3y + 2(4y - 13) = -2y$

b) $5y + 18 = 3 - y$

c) $\frac{2n+1}{8} = \frac{12n-4}{64}$

d) $2(4x-1) = 3(3x-1)+4$

57 A bag contains 5 red marbles, 3 green marbles and two yellow marbles. Two consecutive draws are performed without replacement.

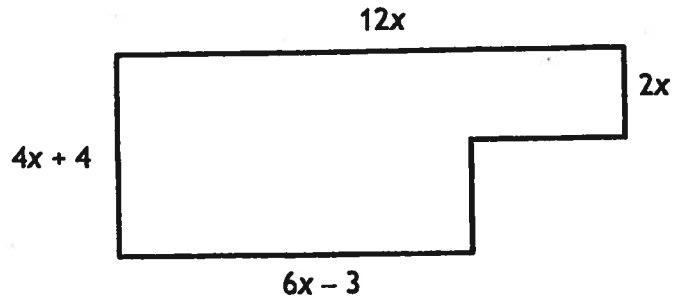
Nadia claims that the probability of drawing a green marble in the first draw is higher than the probability of drawing at least one yellow marble during both draws.

Marianne disagrees.

Who is right?

Show your work.

58 The parking lot of a bakery is shaped like the figure below:



The owner of the bakery wants to redo the asphalt that covers the parking lot and is curious to see how much it would cost.

The following information is important in assessing the total cost:

- The cost of asphalt is \$15 per m^2;
- The perimeter of the parking lot is 360 m;
- The owner's budget is \$80 000.

Is the owner's budget large enough to cover the cost of paving the parking lot?

MATH. II (June Review)

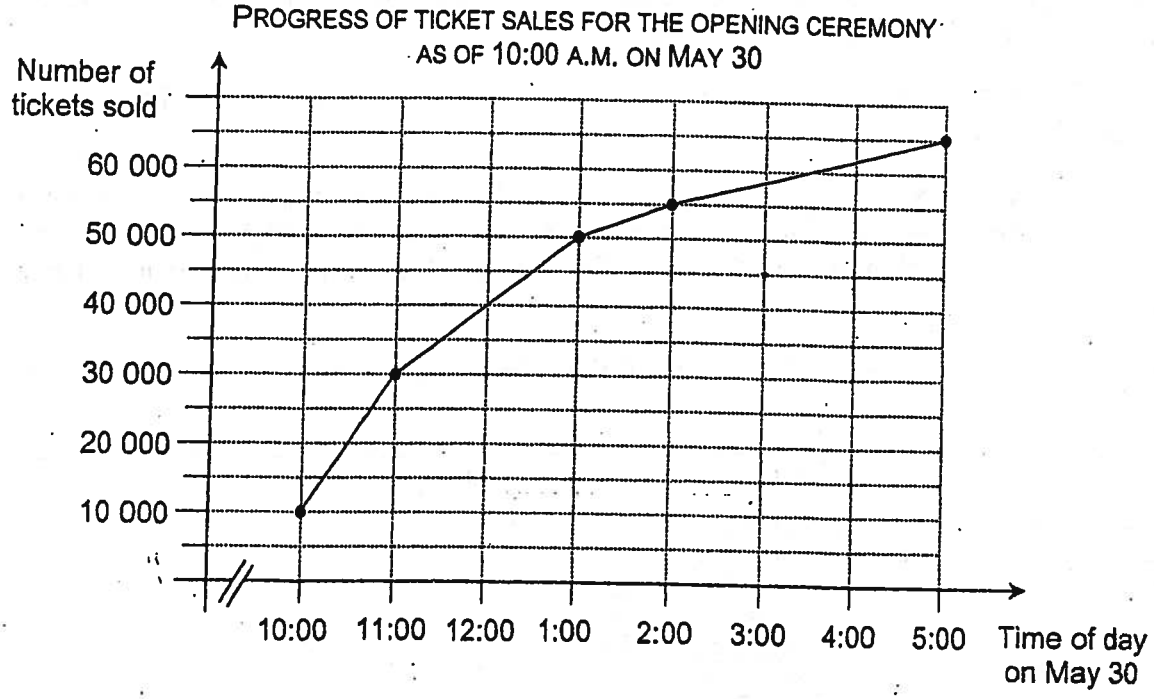
POPULAR SHOWS

The opening and closing ceremonies of the Olympic Games are highly popular. During the last Games, 65 000 tickets were made available for each of these shows.

Before May 30 at 10:00 a.m., presale tickets were available to the main sponsors. As of 10:00 a.m. on May 30, the remaining tickets were put on sale for the general public. All the tickets were sold by the end of the day.

OPENING CEREMONY

The following diagram shows the progress of ticket sales for the opening ceremony, as of 10:00 a.m. on May 30.



CLOSING CEREMONY

Below is a description of the progress of ticket sales for the closing ceremony.

- The number of tickets sold during the presale is equal to half the number of tickets sold during the presale for the opening ceremony.
- The number of tickets sold between 10:00 a.m. and 11:00 a.m. is equal to the number of tickets sold for the opening ceremony during the same period.
- Between 11:00 a.m. and 1:00 p.m., 10 000 tickets were sold.
- Between 1:00 p.m. and 2:00 p.m., the number of tickets sold is equal to triple the number of tickets sold for the opening ceremony during the same period.
- By 4:00 p.m., all the tickets had been sold.

Prepare a graph showing the progress of ticket sales for the closing ceremony as of 10:00 a.m. on May 30.

60

HAMMER THROW

The hammer throw is a track and field event that consists in throwing a heavy metal ball attached to a wire and handle.

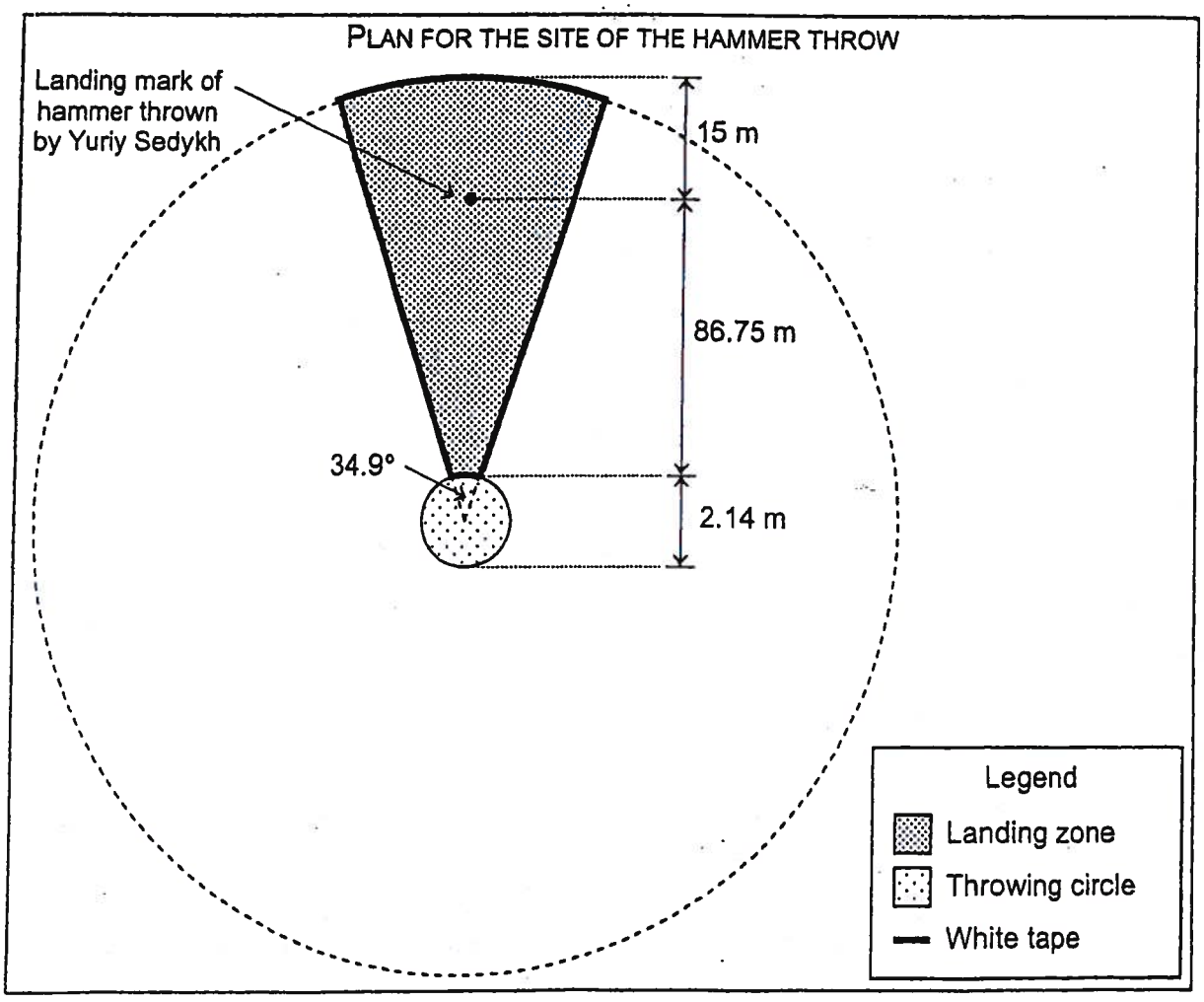
The athlete must throw the hammer as far as possible after completing a certain number of turns inside the *throwing circle*. The diameter of the throwing circle is 2.14 m.

The hammer must be released from the throwing circle and it must land in a zone outlined on the field. This zone is a section of a circle, whose central angle is 34.9°. The length of a throw is the distance between the outside limit of the throwing circle and the place where the hammer lands.

Yuriy Sedykh, a Ukrainian athlete, holds the current world record for the hammer throw: 86.75 m.

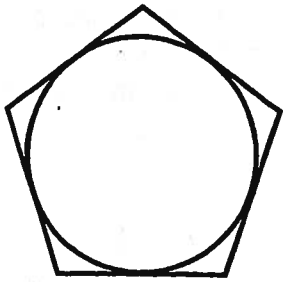
The committee organizing the next games would like to outline the landing zone with four strips of white tape. They have decided to set the wide arc of the landing zone at 15 m past the point of the world record. The diagram below shows an outline of their plan.

To the closest hundredth of a metre, what will be the total length of the four strips of white tape?



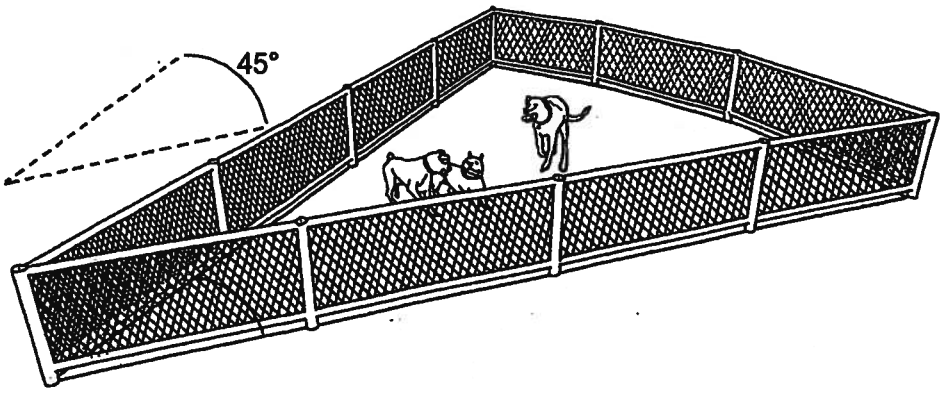
61

a) A circle whose area is 50.27 cm^2 is placed inside a regular pentagon. The area of the regular pentagon is 59.14 cm^2.



What is the perimeter of the pentagon?

b) Bernard would like to build a fenced-in enclosure for his dogs to play. This enclosure will be a circular sector whose central angle is 45° and will have an area of 40 m^2. Fencing is only sold in metres and he already has 20 m of fence.



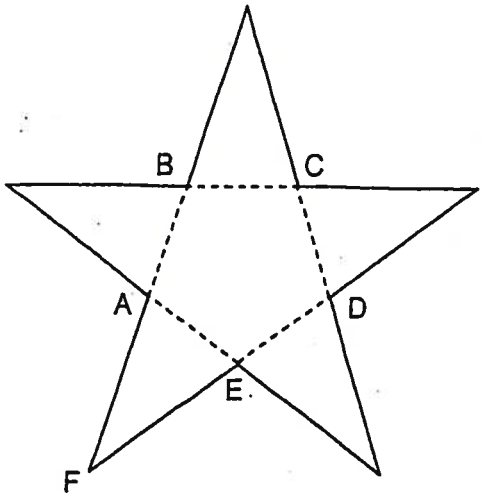
How many metres of fencing does he need to buy in order to construct this enclosure?

62

SOUVENIR PIN

A city hosting the Olympic Games gives each athlete a souvenir pin in the shape of a five-pointed star.

The star is made up of a regular pentagon whose sides have been extended to the point of intersection. All the extensions are the same length.



Jonathan believes that angle AFE measures 36°.

Justify the steps in your reasoning to show that Jonathan is right.

63

DELEGATIONS

In the Olympic Village, Canadian athletes share a pavilion with athletes from three other countries: Germany, Mexico and the United States.

- The Canadian delegation has 20 athletes more than four times the Mexican delegation.
- The German delegation has 388 athletes more than the Mexican delegation.
- The delegation from the United States has twice as many athletes as the Canadian delegation.
- In this pavilion, the number of athletes is 1568.

The Canadian athletes are housed two per room. The cost of one room for the duration of the Games is $625.

A budget of $100 000 has been provided to house the Canadian athletes.

Is the budget adequate to cover the cost of accommodations? Explain why.

THE 800-METRE RACE

The 800-metre race is a middle distance track event that involves completing two laps of the track.

Below is a report on the boys' final 800-metre race in the school track-and-field competition, which will be published in the school newspaper.

The Final 800-Metre Race

Three athletes, Joel, Mathew and Patrick, competed in the boys' final 800-metre race in the school track-and-field competition.

Joel had an excellent start. He completed his first lap of the track in 60 seconds. However, he dropped out of the competition 80 seconds into the race. He had run 600 m.

Mathew completed the first lap of the track in 70 seconds. He crossed the finish line 80 seconds later.

Patrick completed his first lap in 100 seconds. He increased his speed during the second lap and caught up to Mathew at the 700-m line, exactly 130 seconds into the race. Patrick won the race, crossing the finish line 10 seconds before Mathew.

The school's newspaper editor has asked you to provide a graph that will appear next to the report on the race.

Draw a graph showing the overall distance covered by each athlete and the time elapsed. The race lasted 150 seconds in total.

65

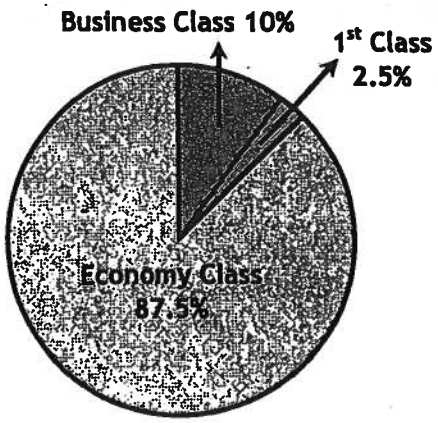
The New York to Hong Kong Flight

A new high-end aircraft is about to make a flight from New York to Hong Kong. This new aircraft can carry 480 passengers in three different classes (1st class, business class, and economy class). For a flight to be financially profitable, the amount generated by the sale of seats must be greater than $635 000.

Cost of the tickets

Class	Cost of ticket
Economy	$1 000
Business	$4 775
1st class	$16 400

Distribution of the seats aboard the aircraft



The flight attendant notices that:

- $\frac{3}{20}$ of economy class seats are unoccupied;
- $\frac{3}{4}$ of business class tickets have been sold;
- Half of the 1st class seats are occupied

The flight attendant states before takeoff that today's flight will be profitable.

Is the statement made by the flight attendant accurate or inaccurate?

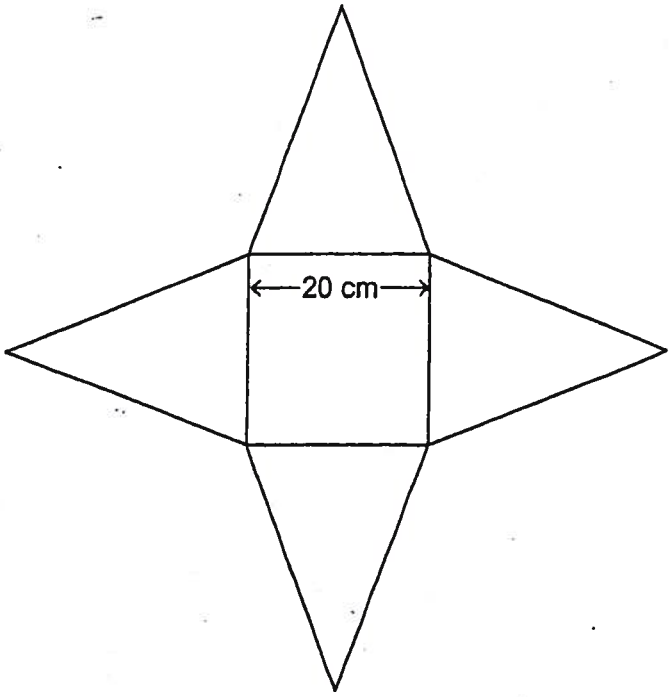
66

A PYRAMID IN ONE PIECE

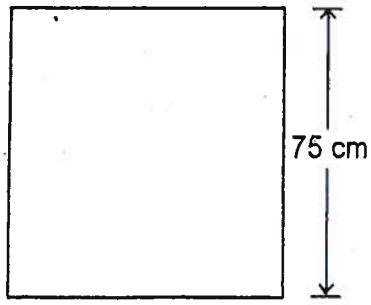
A class of math students has been assigned the task of representing the net of certain solids using large pieces of cardboard that can be folded to create three-dimensional models.

Your team must represent the net of a square-based pyramid. Each side of the base measures 20 cm. The total area of the pyramid is 1440 cm^2.

Your team has chosen the net shown below.



The teacher has given you a square piece of cardboard for your net. Each side of the cardboard measures 75 cm.

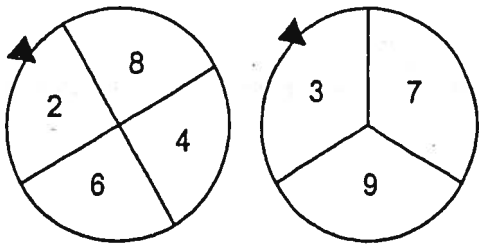


Is it possible to cut out this net in one piece from the cardboard provided? Explain why.

67

GAME OF CHANCE?

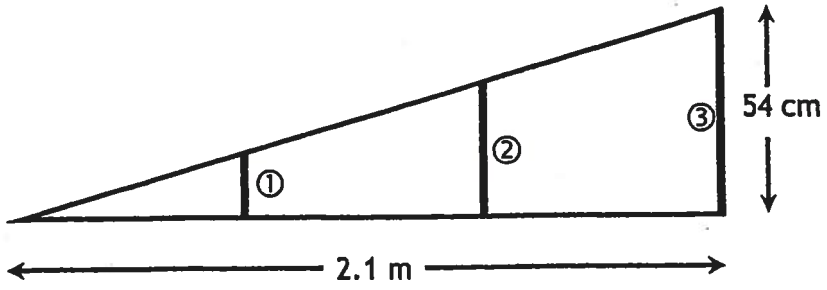
A game consists in spinning the wheels illustrated below one after the other. One wheel is divided into four congruent sections; the other is divided into three congruent sections.



When the wheels come to a stop, the values obtained are added together. If the sum is less than 10, the player wins.

What is the probability of winning this game?

68. Jeremy built a skateboarding ramp. The ramp has a height of 54 cm and a length of 2.1 m. There are three equally spaced beams that support the structure.



What is the total length of the three supporting beams?