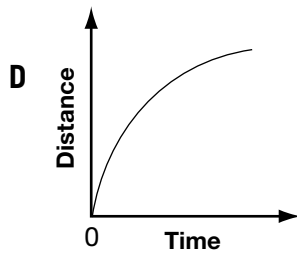
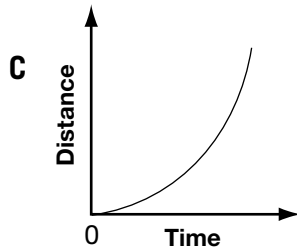
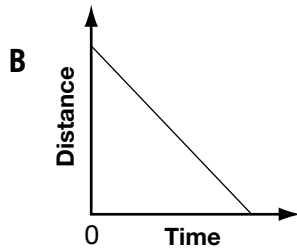
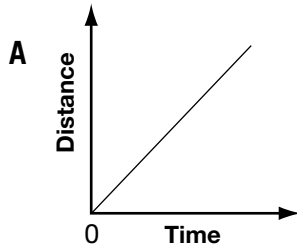


Academic Booklet 1

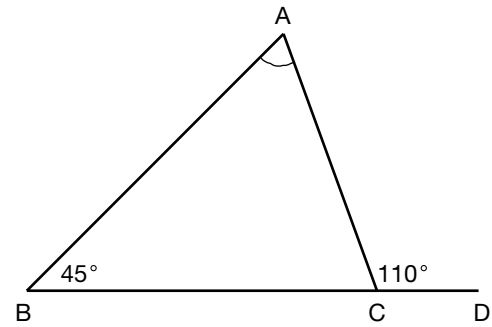


Education
Quality and
Accountability
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1. Which distance-time graph below **best** illustrates a car that **gradually** increases its speed?



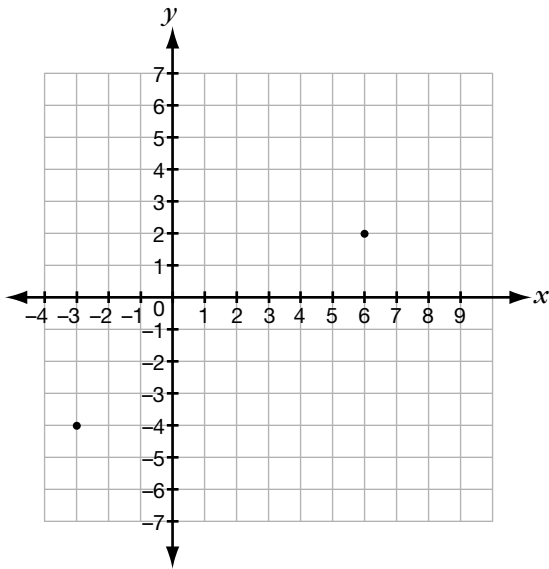
2. In the figure, $\angle B = 45^\circ$ and BC is produced to D .



If $\angle ACD = 110^\circ$, what is the measure of $\angle A$?

- F** 45°
- G** 55°
- H** 65°
- J** 75°

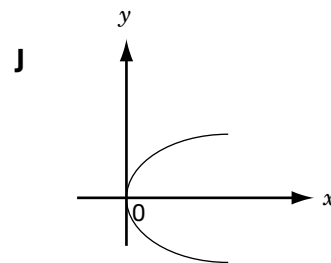
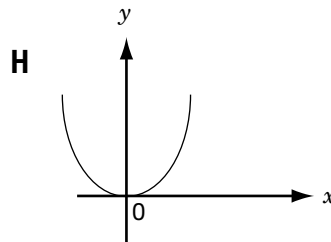
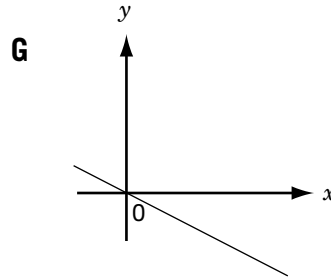
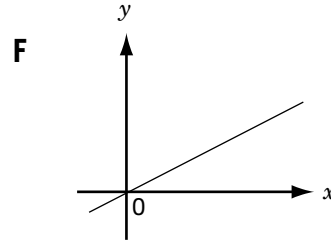
3. The points $(-3, -4)$ and $(6, 2)$ are marked on an xy -plane.



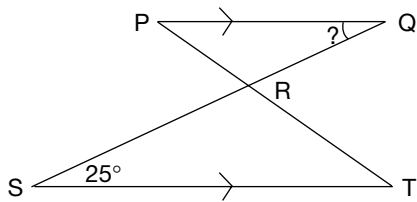
Which statement about the line through $(-3, -4)$ and $(6, 2)$ is **not** true?

- A Its x -intercept is 3.
- B Its slope is positive.
- C Its y -intercept is -2 .
- D It passes through $(4, 9)$.

4. Which graph below is likely the graph for $y = 2x$?



5. If PQ is parallel to ST , what is the measure of $\angle PQR$?



- A 25°
B 35°
C 60°
D 120°
6. Pierre and his friends order from a hot dog stand.



Based on the price list given, how many hot dogs and colas do they buy with \$17.80?

- F 3 hot dogs and 5 colas
G 5 hot dogs and 3 colas
H 6 hot dogs and 4 colas
J 5 hot dogs and 5 colas

7. The area of a square is between 5000 cm^2 and 7500 cm^2 .

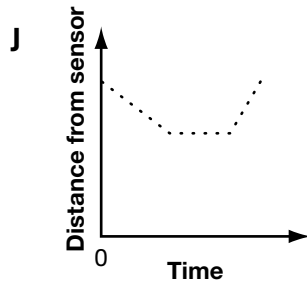
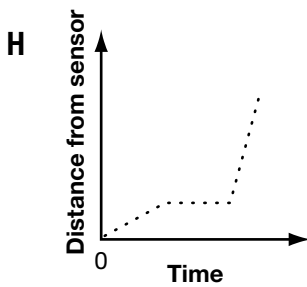
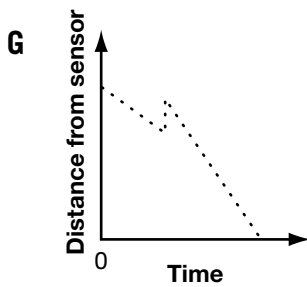
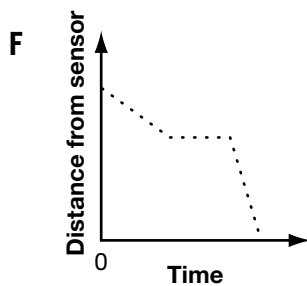
Which value could be the length, in centimetres, of one side of the square?

- A 50
B 60
C 70
D 80

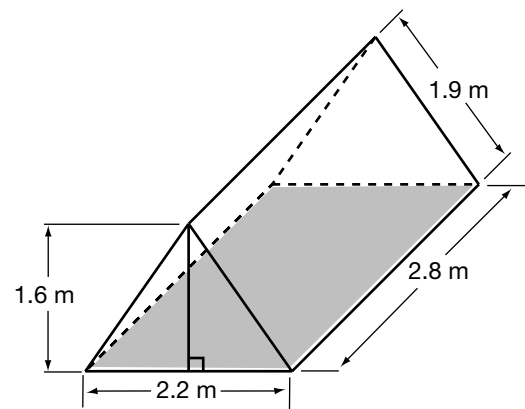
8. Mark places a motion sensor on a table. He walks slowly toward the sensor, waits a moment, then walks quickly backward away from the sensor.



Which graph below best represents his motion?



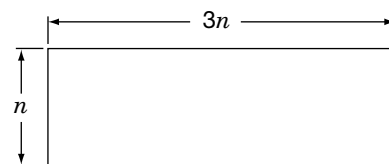
9. The figure below shows the dimensions of a tent.



What is the total area of the walls on the **two sides** and the **two ends**, correct to the nearest square metre?

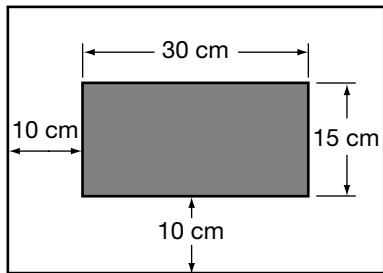
- A 12 m²
- B 14 m²
- C 16 m²
- D 20 m²

10. If the perimeter of this rectangle is 120 units, what is its area in square units?



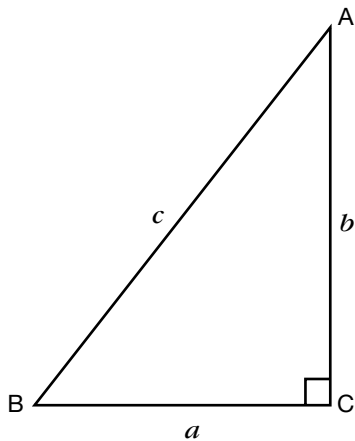
- F 675
- G 900
- H 1225
- J 2700

11. A picture measures 30 cm by 15 cm. The mat around the picture is 10 cm wide as shown.



Find the **area** of the mat.

- A 450 cm²
B 1000 cm²
C 1200 cm²
D 1300 cm²
12. $\triangle ABC$ is a right-angled triangle with $BC = a$, $AC = b$ and $AB = c$.



Which statement is **not** true?

- F $c > a + b$
G $c^2 = a^2 + b^2$
H $\angle C = 90^\circ$
J $\angle A + \angle B = 90^\circ$

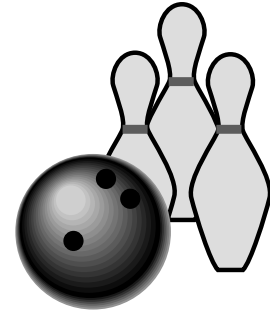


Task 1: Bowling!

A group of 4 friends is going bowling at **Bowling Bonanza**.

Bowling Bonanza charges

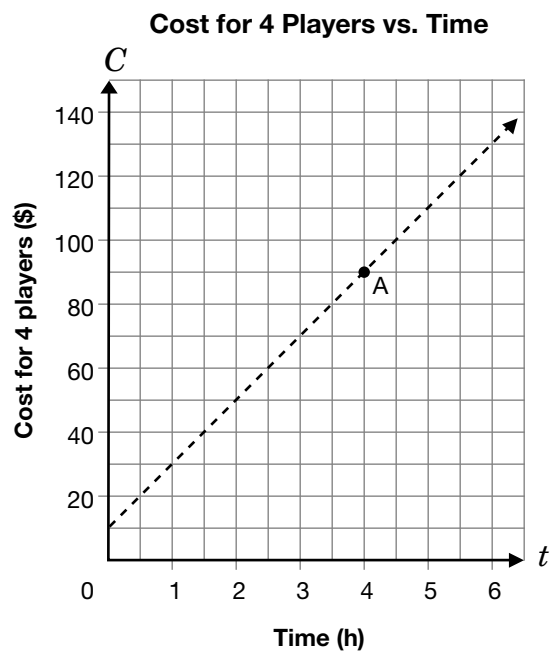
- \$2.50 for each player to rent shoes
plus
- \$20/h for a group of 4 to bowl.



a) The graph below represents the relationship between cost, C , in dollars, and time, t , in hours, for 4 players to bowl.

i) **Write the coordinates** of point A.

ii) **Explain** what the coordinates of point A tell you about the cost of bowling.



b) **Explain** how this graph would change if the cost for renting the shoes increased.

Hint:
Refer to slope and y-intercept.

c) Circle the equation that represents the graph in question **a**).

$$C = 20t + 10$$

$$C = 20t^2 + 10$$

$$C = \frac{20}{t} + 10$$

Give reasons for your answer.

d) This group of friends wants to spend \$80.

How many hours can they bowl at **Bowling Bonanza**?

Give reasons for your answer or show your work.

e) William **and** his 3 friends are going bowling.

He finds an advertisement in the newspaper for a new bowling alley, **Super Bowl**.

William and his friends will play 6 games in 3 hours.

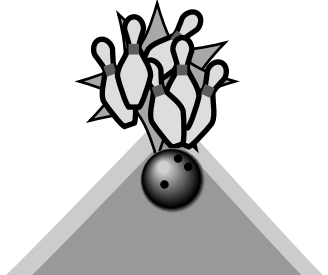
Determine whether William and his friends should go bowling at **Bowling Bonanza** or **Super Bowl**. Use the information given in the advertisement and in the hint box.

Give reasons for your answer.

Super Bowl

- Free bowling shoes
- Each player pays \$3.00 per game

Call 555-BOWL and book your lane today.



Hint:

Bowling Bonanza charges

- \$2.50 for each player to rent shoes and
- \$20/h for a group of 4 to bowl.

Task 2: BC Bound



Students at Jayson's school are planning a school trip to Vancouver. Jayson is working with the organizers. They have gathered the following information about costs.

- The price of airfare for each person is \$600.
- The cost of the hotel room is \$60 **per night per student** and twice that **per night per adult**.

The organizers want to calculate the total cost of different combinations of numbers of nights and numbers of students and teachers.

- a) Calculate the total cost of the trip, including airfare, for **one** student staying **six** nights in the hotel. **Show your work.**

- b) Calculate the total cost of the trip, including airfare, for **one** adult staying **four** nights in the hotel. **Show your work.**

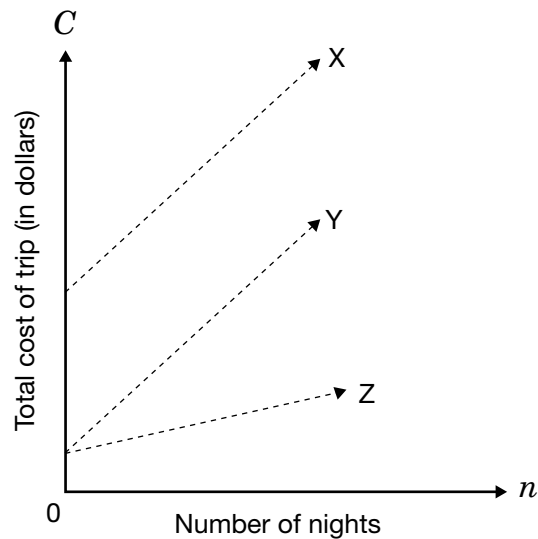
- c) Let n represent the number of nights the students and adults will stay in the hotel and let C represent the total cost including airfare for the Vancouver trip.
- i) Write an **equation** to represent the total cost of a trip for Jayson (a student) if he stays n nights.

- ii) Write an **equation** to represent the total cost of a trip for **five** students if each stays n nights. Expand and simplify if possible.

- iii) Write an **equation** to represent the total cost of a trip for **five** students and **one** adult if each stays n nights.
Simplify if possible.

d) There are three lines on the graph below.

One line represents the total cost of a trip for **one** student if he or she stays n nights. Another line represents the total cost of a trip for a group of **five** students if they stay n nights.



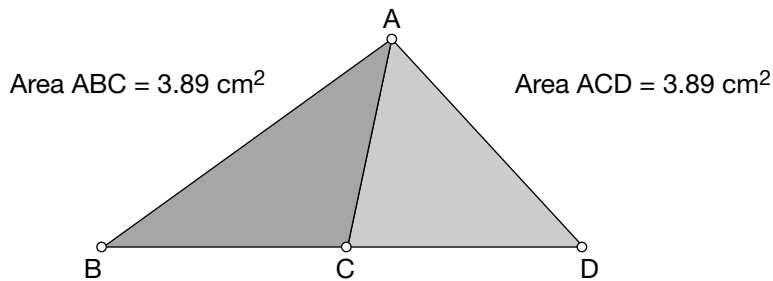
i) Which line represents the total cost of a trip for one student who stays n nights?
Give reasons for your answer.

ii) Which line represents the total cost of a trip for **five** students who stay n nights?
Give reasons for your answer.

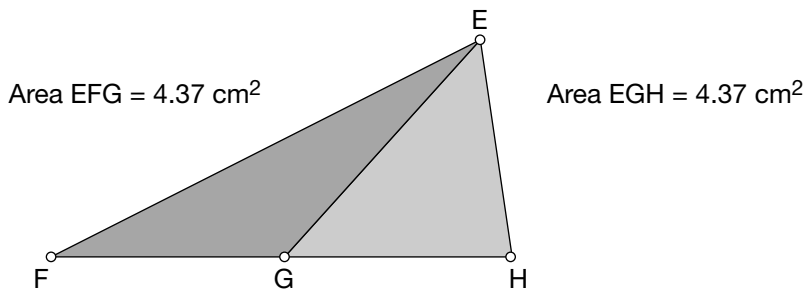
- e) **Five teachers** travel to Vancouver and stay **seven** nights. How many **students** could travel to Vancouver and stay for **seven** nights for the same total cost?
Show your work.

Task 3: Mission Improbable

Case 1: AC is the median of $\triangle ABD$.



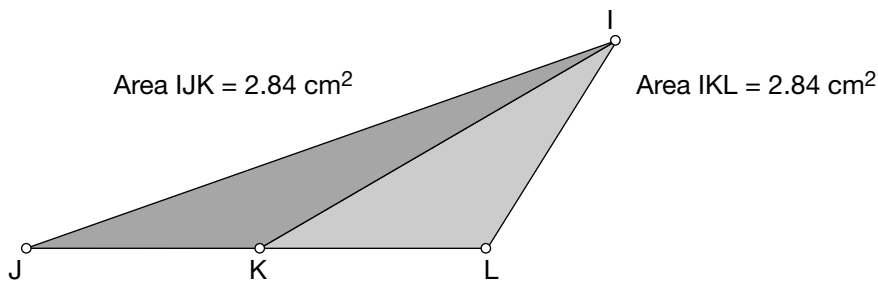
Case 2: EG is the median of $\triangle EFH$.



Hint:

A median is a line segment joining a vertex of a triangle to the midpoint on the opposite side.

Case 3: IK is the median of $\triangle IJL$.



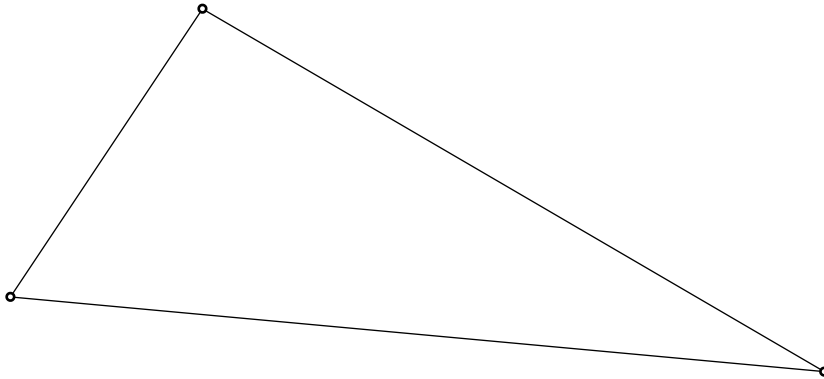
- a) Each median cuts a triangle into two smaller triangles.
Examine the information about the two smaller triangles within each triangle.

Write a hypothesis about the relationship between a **median** and the **areas** of the smaller triangles.

b) A compact disc containing top secret information has been lost in a triangular field. Agent 008 and three members of her crew are preparing to search for the missing disc. The triangle below represents the field.

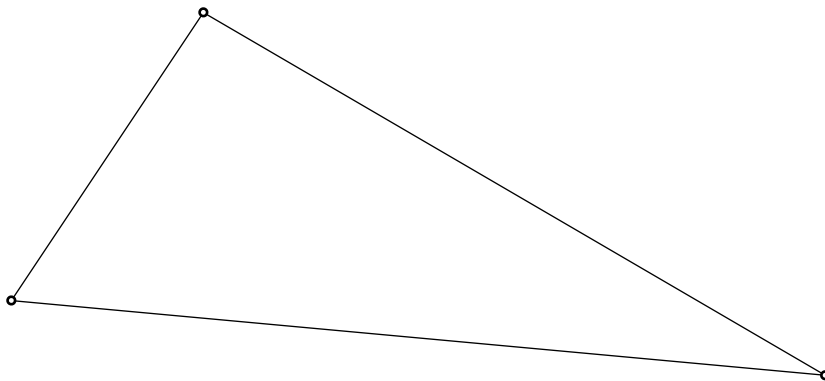
- i) Divide the triangle into four equal search areas.
List the steps you used to construct the equal parts.
Explain how you know you are right.

Hint:
Refer to question **a**).

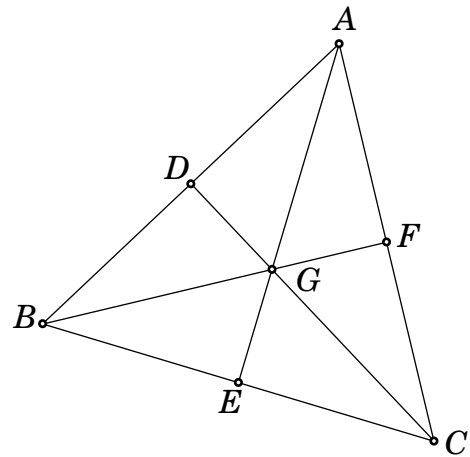


Steps:

- ii) **Sketch** a possible construction for dividing the triangle into four equal areas that is different from the one you drew above.



- c) Agent 008 has just found out that the field is in the shape of an equilateral triangle. She has also found out that there will now be a total of six agents searching for the lost disc.



The diagram on the right above shows how Agent 008 divided the field into six sections, using the medians of the triangle.

Describe in detail how you would use geometry tools to determine whether the field has been divided into six sections of equal area. Your geometry tools could include rulers, protractors, compasses and dynamic geometry software such as The Geometer's Sketchpad.



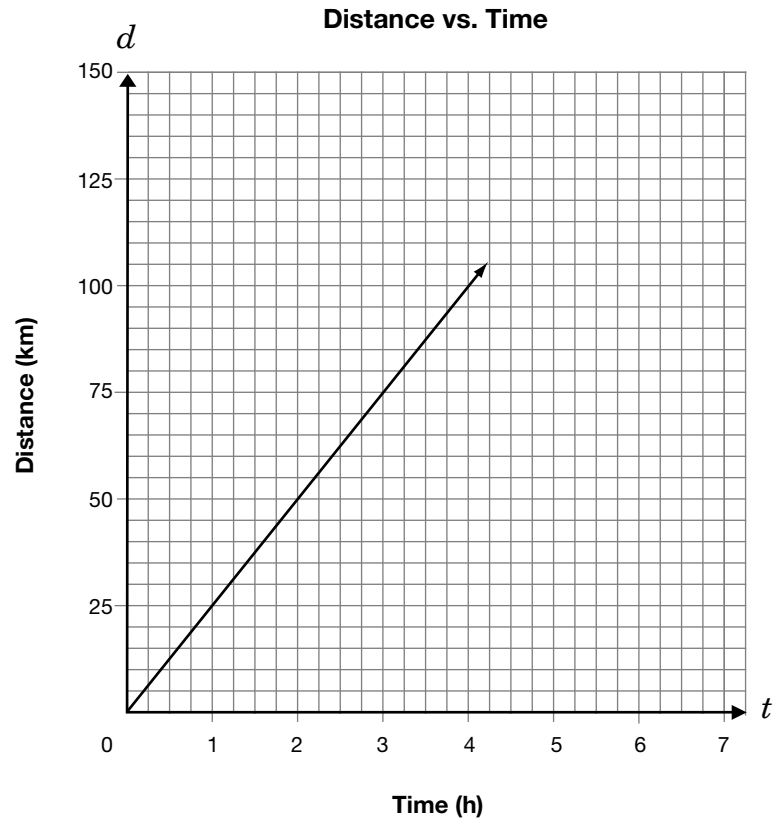
1. The relationship between the distance, d , in kilometres, travelled by a person on a bicycle and the time, t , in hours, is described in two ways:

- The equation is $d = 25t$.
- The graph is shown below.



Determine the time it will take to travel 140 km.

Show your work.



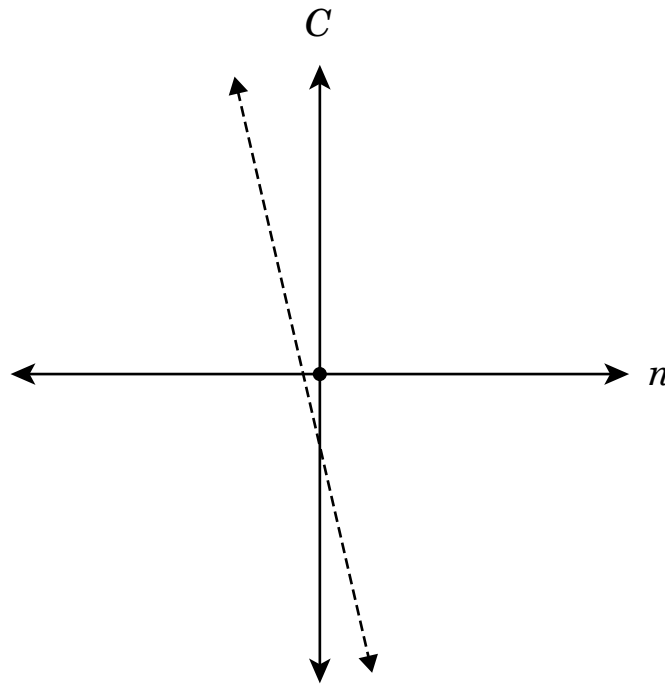
2. Veza uses the equation $C = 43n + 50$ to model the cost of soccer shirts for the team, where C represents the total cost in dollars, and n represents the number of soccer shirts.



Veza sketches the graph of this relationship.

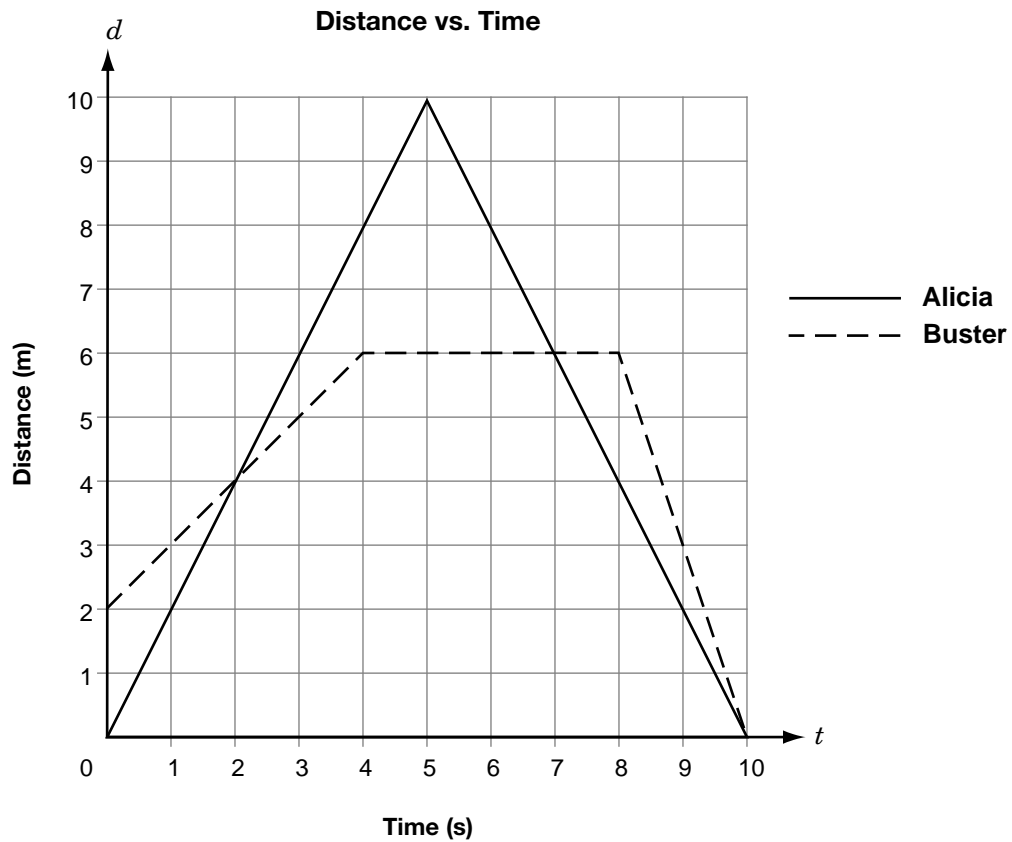
Explain why the graph shown **cannot** represent the total cost of soccer shirts.

List at least two reasons.

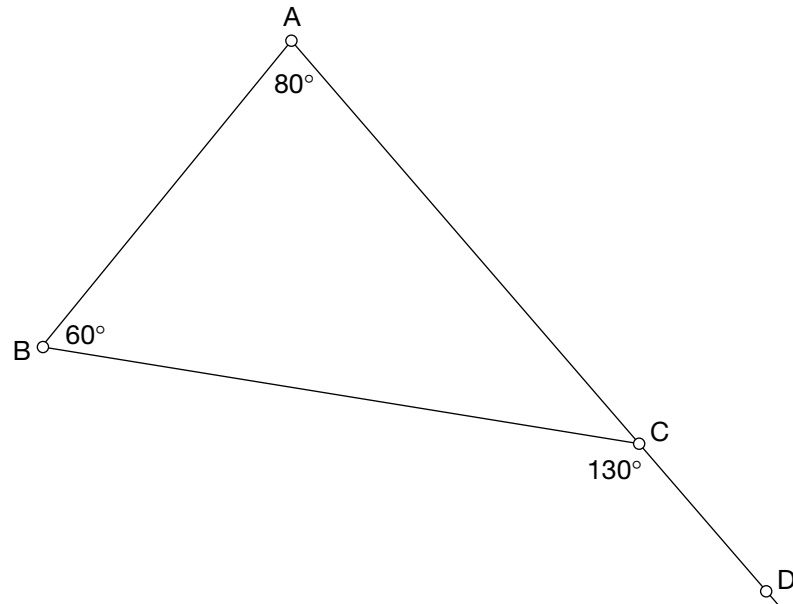


3. Alicia and Buster walked in front of a motion detector. The graph below shows the relationship between the distance from the detector, d , in metres, and time, t , in seconds.

When was Buster moving faster than Alicia? Give reasons for your answer.



4. There is an error in this diagram. **Describe** the error and give **reasons for your answer.**



5. Sergio hits a golf ball.
As the ball is **falling**, it gets caught in a tree.
After a few seconds, the ball falls out of the tree.

Circle the height vs. time graph that models the path of Sergio's ball.

