B

TECHNISCHE UNIVERSITÄT DARMSTADT

CODI - Test

Name:

Dear student,

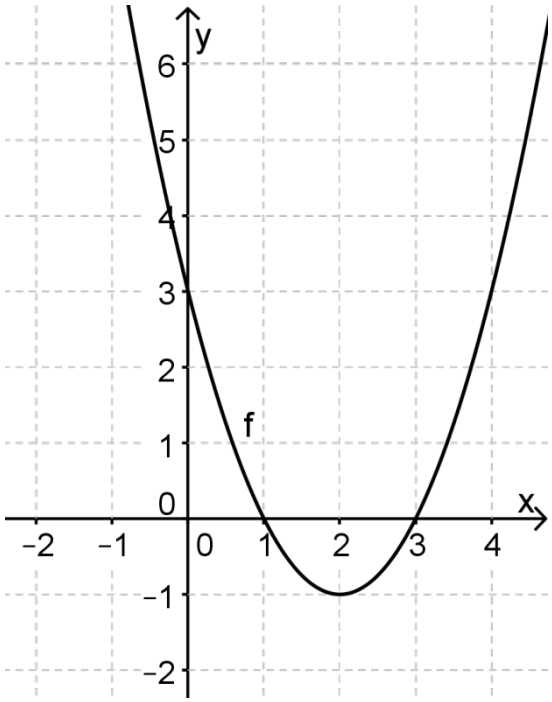
In the following, you receive 30 mathematical tasks about functions. You have 45 minutes to work on the tasks. Please try to solve all of them. In the multiple choice tasks, only *one* answer is correct.

This is not a test and you will not be marked.

B

Task 1 (GA-Q-R-7-2)

Consider the following graph of the function f:

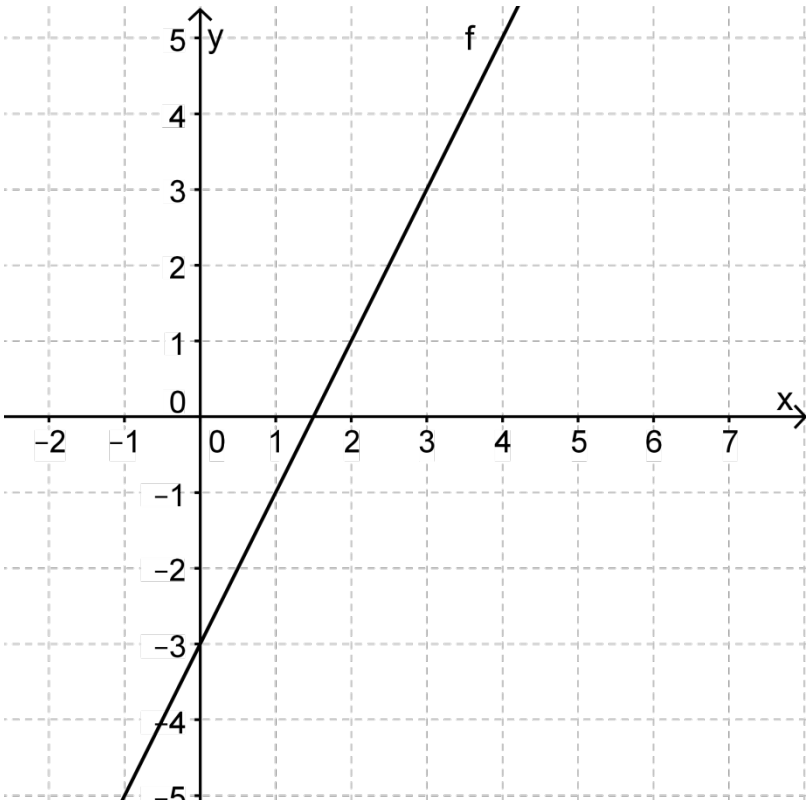


Please set up an equation of the function f corresponding to the graph.

Answer: My equation is _____.

Task 2 (GA-L-R-5-2)

Consider the following graph of the function f:



Please set up an equation of the function f corresponding to the graph.

Answer: My equation is _____.

Task 3 (SA-L-R-4-2)

Consider the following situation:

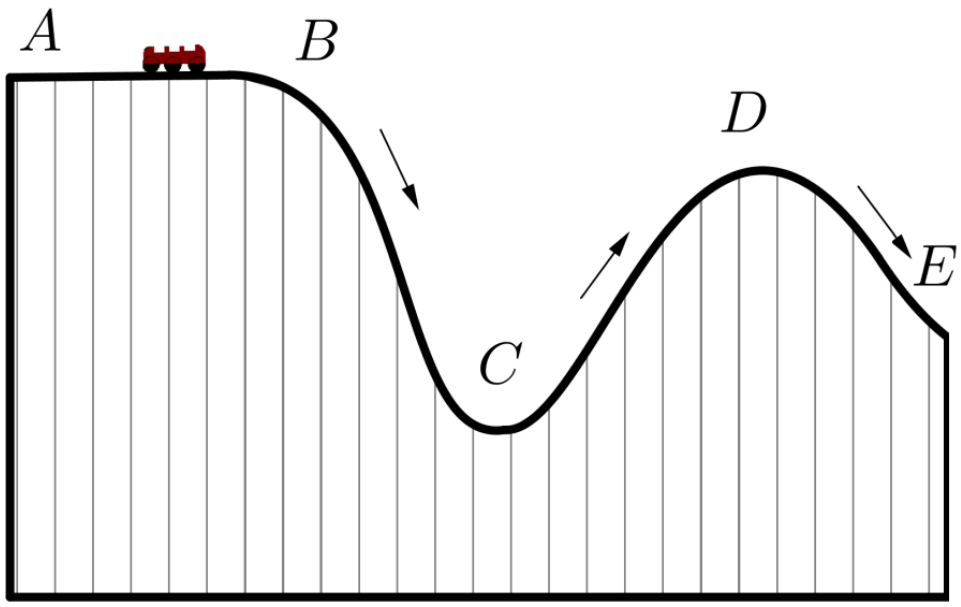
“A plant with a height of 30 cm is growing 18 cm each year.“

Please set up an equation of the function f for the height of the plant for an arbitrary age.

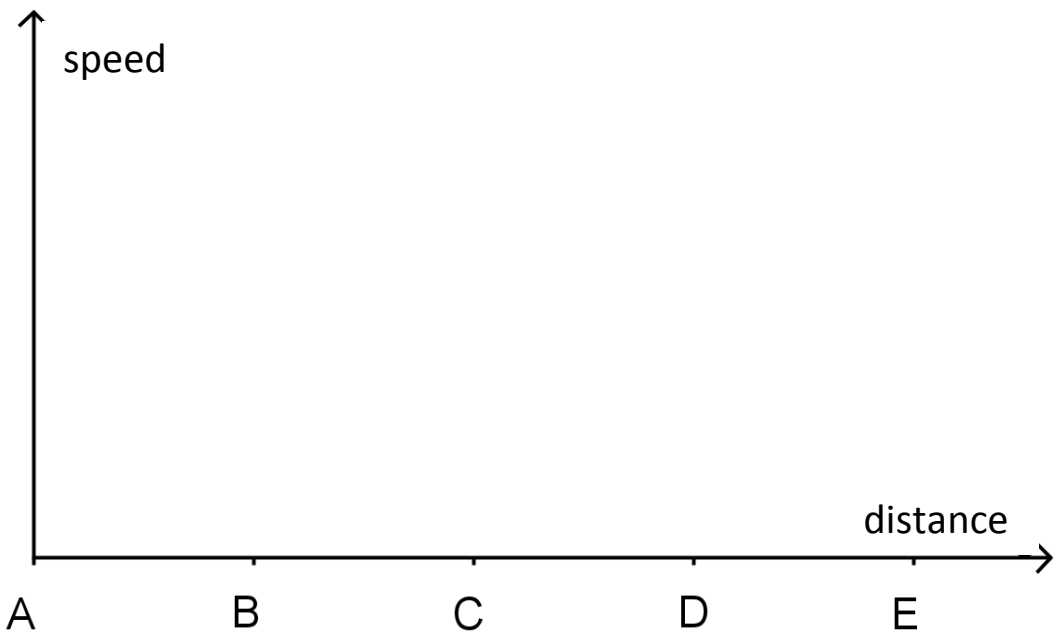
Answer: My equation is _____.

Task 4 (GAP-R-4-2)

The picture shows a car which is moving between point A and B with slow constant velocity.



How will the velocity of the car change when it moves from point A to E? Draw the graph of the velocity of the car in the coordinate system.



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Task 5 (AG-L-I-2-2)

Consider the following equation of the function $y = -6x + 4$.

a) Which slope does the function f have?

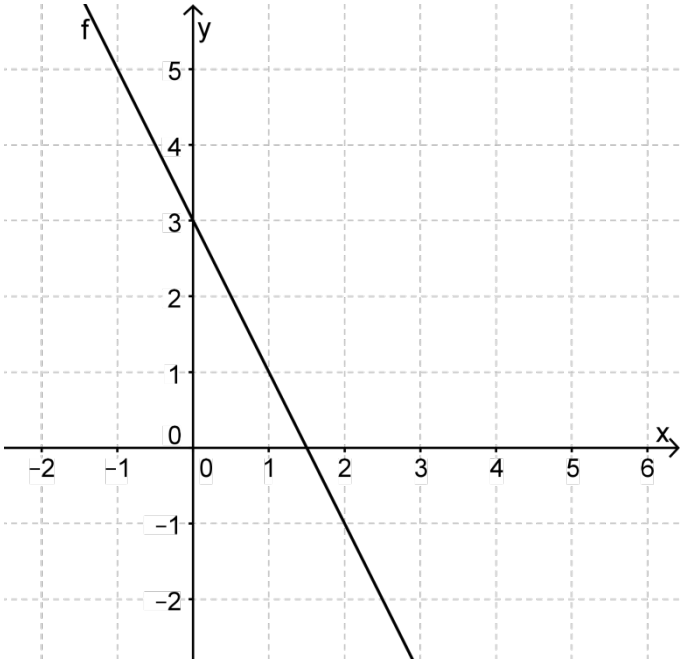
Answer: ☐

b.) What is the y-intercept of the function f?

Answer: ☐

Task 6 (GA-L-I-1-2)

What values do the slope and the y-intercept of the function f have?

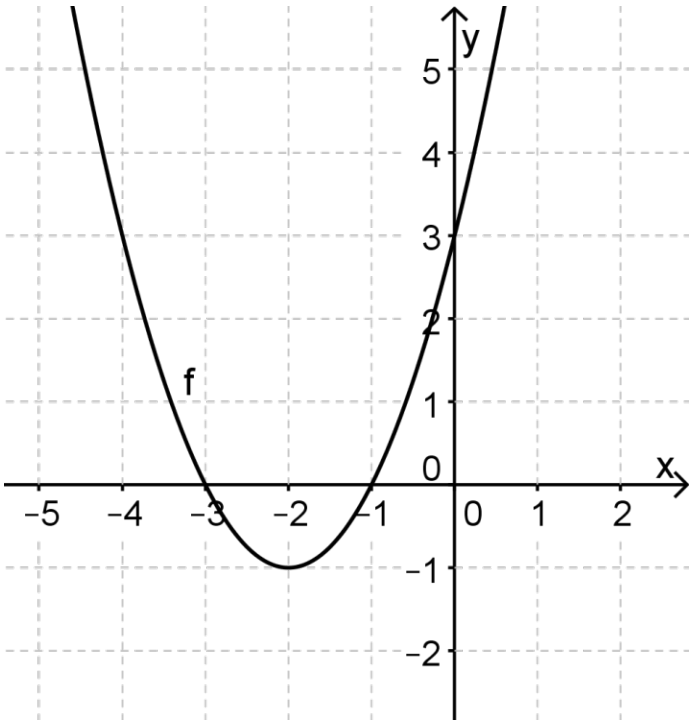


slope = ☐

y-intercept = ☐

Task 7 (GA-Q-I-1-2)

Consider the following graph of the function f:



Please insert the coordinates of the vertex.

S (□ / □)

Task 8 (SA-L-3-2)

Consider the following situation:

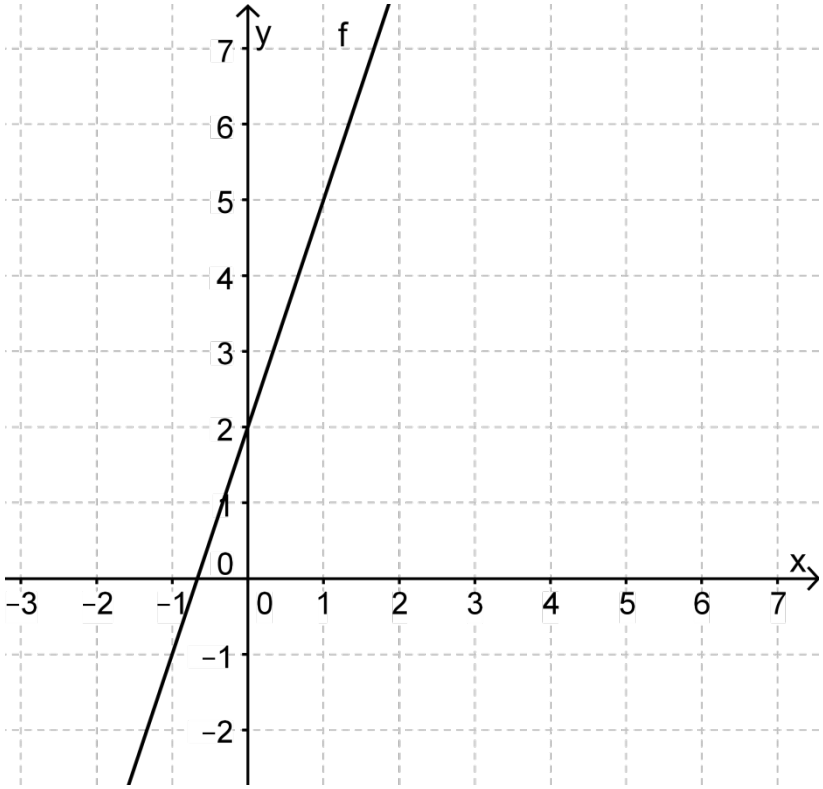
“A car rental requests a basic fee of 55 € and 0.10 € per kilometer driven.”

Which of the following equations gives a correct description of the situation?

- ☐ $y = 55x + 0.1$
- ☐ $y = 55x - 0.1$
- ☐ $y = 0.1x + 55$
- ☐ $y = -0.1x + 55$

Task 9 (GA-L-3-2)

Consider the following graph of the function f and the four given equations. Which of the equations matches the given graph?



- ☐ $y = -0.75x + 2$
- ☐ $y = 2x - 0.75$
- ☐ $y = 2x + 3$
- ☐ $y = 3x + 2$

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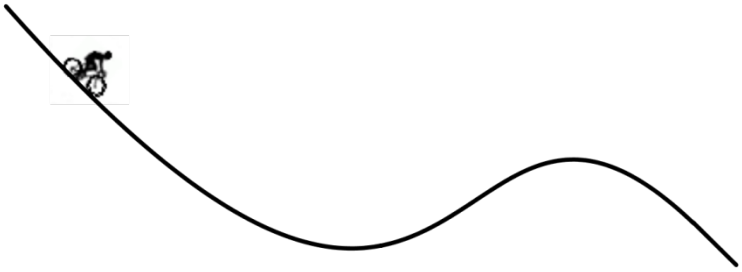
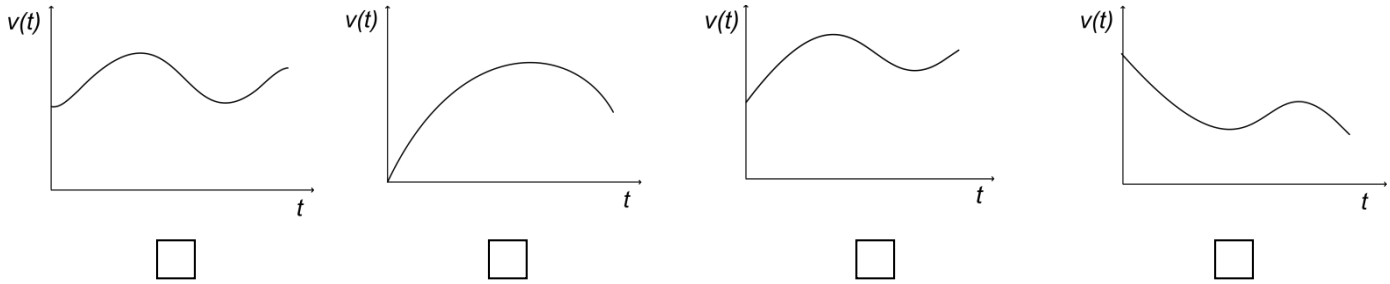
Task 10 (GAP-1-2)

In the following picture a skier is skiing down the hill. Decide which of the given graphs describes the situation best. The function value v(t) gives the velocity at the time t.



Which of the graphs describes the given situation best?



☐ Graph A

☐ Graph B

☐ Graph C

☐ Graph D

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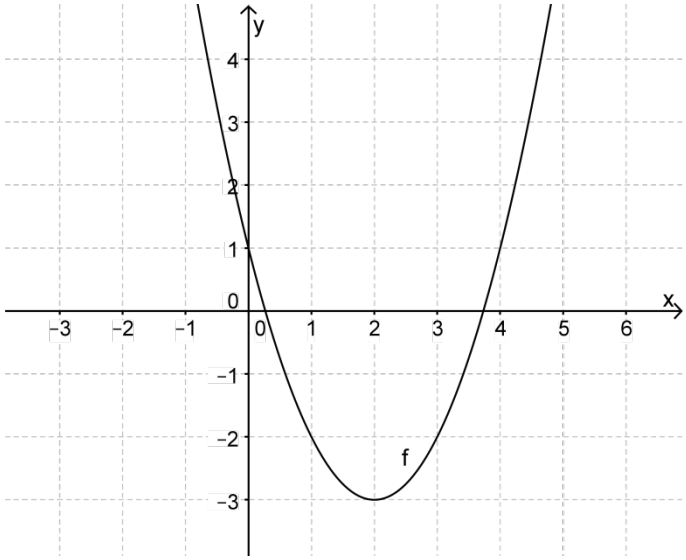
Task 11 (SH-1-2)

Which of the four runners is the fastest at time point t = 12?

- ☐ Runner 1
- ☐ Runner 2
- ☐ Runner 3
- ☐ Runner 4

Task 12 (GA-Q-3-2)

Consider the following graph of the function f and the four given equations. Which of the equations matches the given graph?



- ☐ $y = (x + 2)^2 - 3$
- ☐ $y = 2x^2 - 3$
- ☐ $y = (x - 2)^2 - 3$
- ☐ $y = 0.25x^2 + 1$

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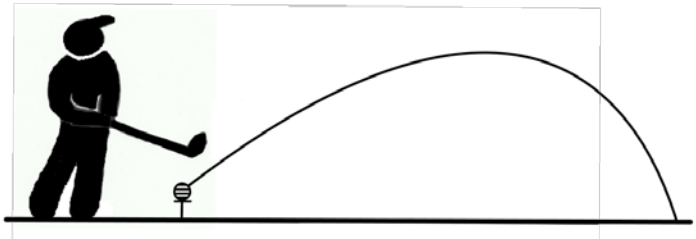
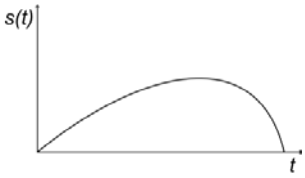
Task 13 (GAP-2-2)

A golfer hits the ball. The functional value s(t) gives the horizontal distance of the golf ball from the tee at the time point t.



Which of the graphs describes the given situation best?



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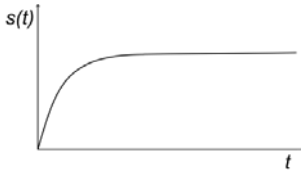

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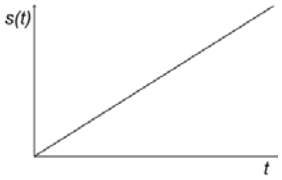

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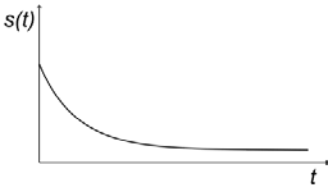

☐

Give an explanation of your answer:

_____

_____

_____

_____

_____

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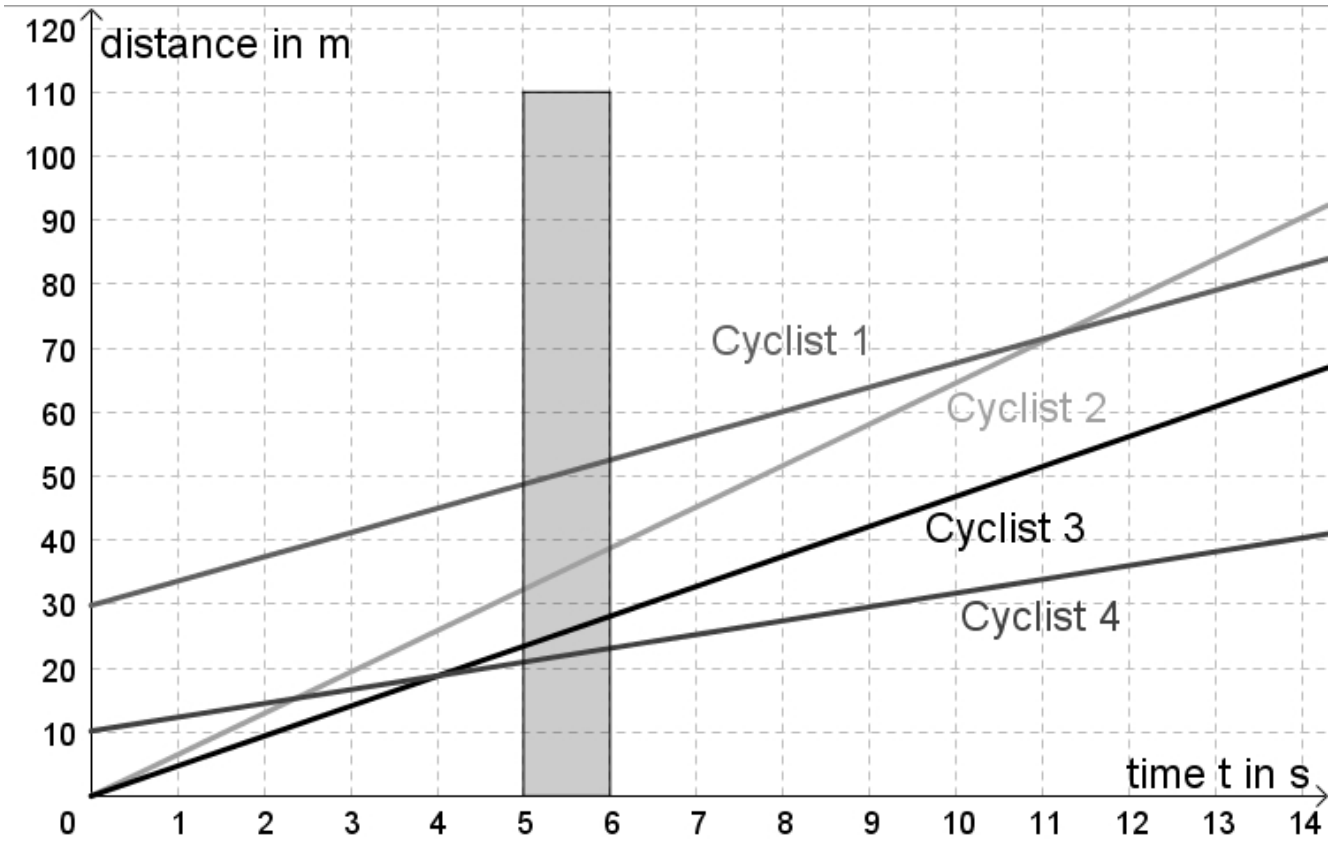
Task 14 (SH-2-2)

Which cyclist is the fastest at the time interval t = 5 till t = 6 seconds?



☐ Cyclist 1

☐ Cyclist 2

☐ Cyclist 3

☐ Cyclist 4

Give an explanation of your answer:

_____

_____

_____

_____

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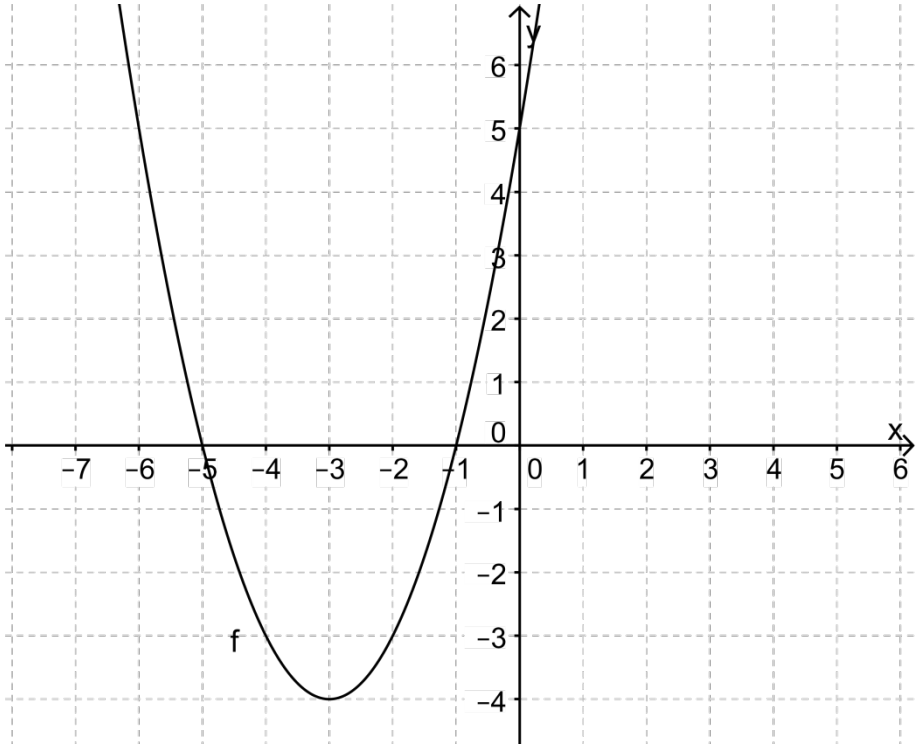
Task 15 (GA-Q-4-2)

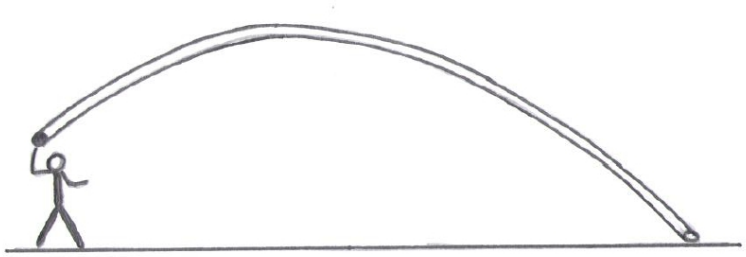
Consider the following graph of the function f and the four given equations. Which of the equations matches the given graph?



- ☐ $y = x^2 - 1x - 5$
- ☐ $y = x^2 - 3x - 4$
- ☐ $y = -3x^2 - 4$
- ☐ $y = x^2 + 6x + 5$

Task 16 (SA-Q-1-2)

In a plain landscape, a snowball is thrown upwards from 2 m height. 3 m away from the dropping point (measured horizontally), the snowball reaches its highest point, namely 6 m.



Which of the following equations gives a correct description of the situation when y stands for the height and x stands for the horizontal distance to the dropping point, each in meters?

- ☐ $y = -(x-6)^2 + 2$
- ☐ $y = -(x-2)^2 + 6$
- ☐ $y = -(x+2)^2 + 6$
- ☐ $y = 2x^2 + 6$

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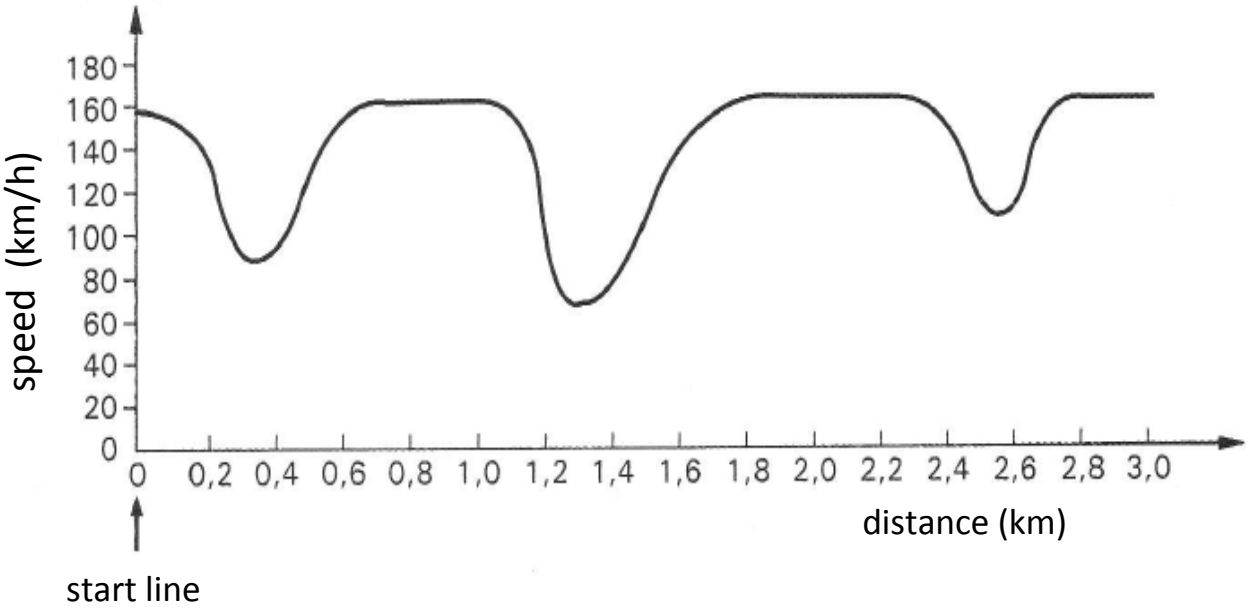
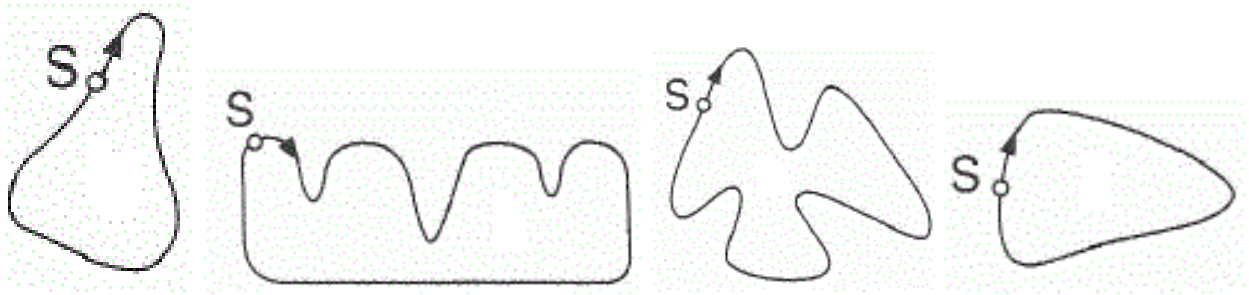
Task 17 (GAP-3-2)

The following graph shows how the velocity of a racing car varies during a lap of a long flat racing track.



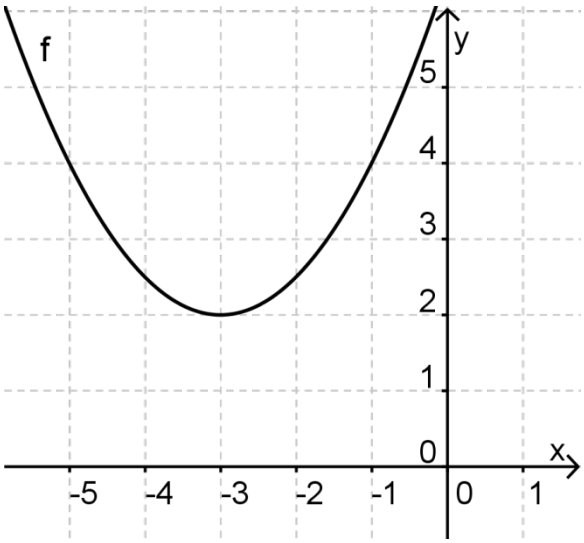
On which of the following racing tracks the racing car drove so that the above velocity graph arose?



☐ ☐ ☐ ☐

Task 18 (GA-Q-5-2)

Consider the following graph of the function f and the four given equations. Which of the equations matches the given graph?



- ☐ $y = 0.5(x+3)^2 + 2$
- ☐ $y = -3x^2 + 2$
- ☐ $y = (x+3)^2 + 2$
- ☐ $y = 0.5(x-3)^2 + 2$

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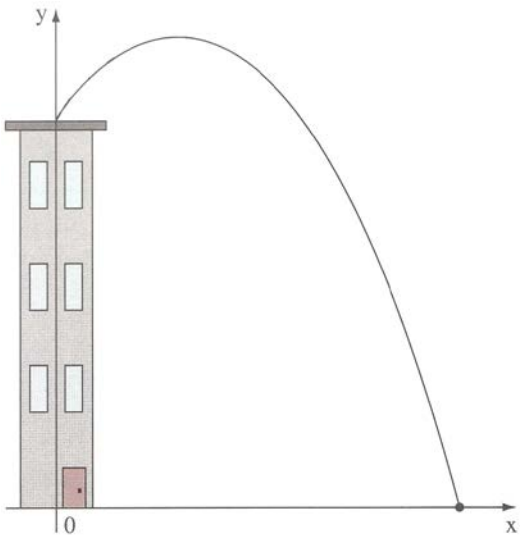
Task 19 (SA-Q-2-2)

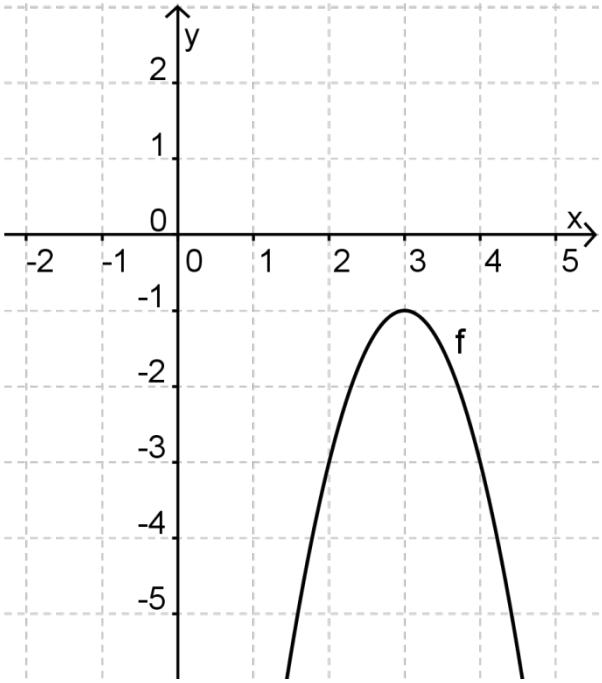
From a tower which is 23 m high, a stone is thrown into the air. At its highest point, 4 m away from the dropping point (measured horizontally), the stone is 39 m above the ground. Which of the following equations gives a correct description of the situation if y stands for the height and x gives the horizontal distance from the dropping point, each in meters?



- ☐ $y = 4x^2 + 39$
- ☐ $y = -(x-4)^2 + 39$
- ☐ $y = -(x+4)^2 + 39$
- ☐ $y = (x-39)^2 + 4$

Task 20 (GA-Q-6-2)

Consider the following graph of the function f and the four given equations. Which of the equations matches the given graph?



- ☐ $y = -2(x+3)^2 - 1$
- ☐ $y = -(x-3)^2 - 1$
- ☐ $y = -2(x-3)^2 - 1$
- ☐ $y = 3x^2 - 1$

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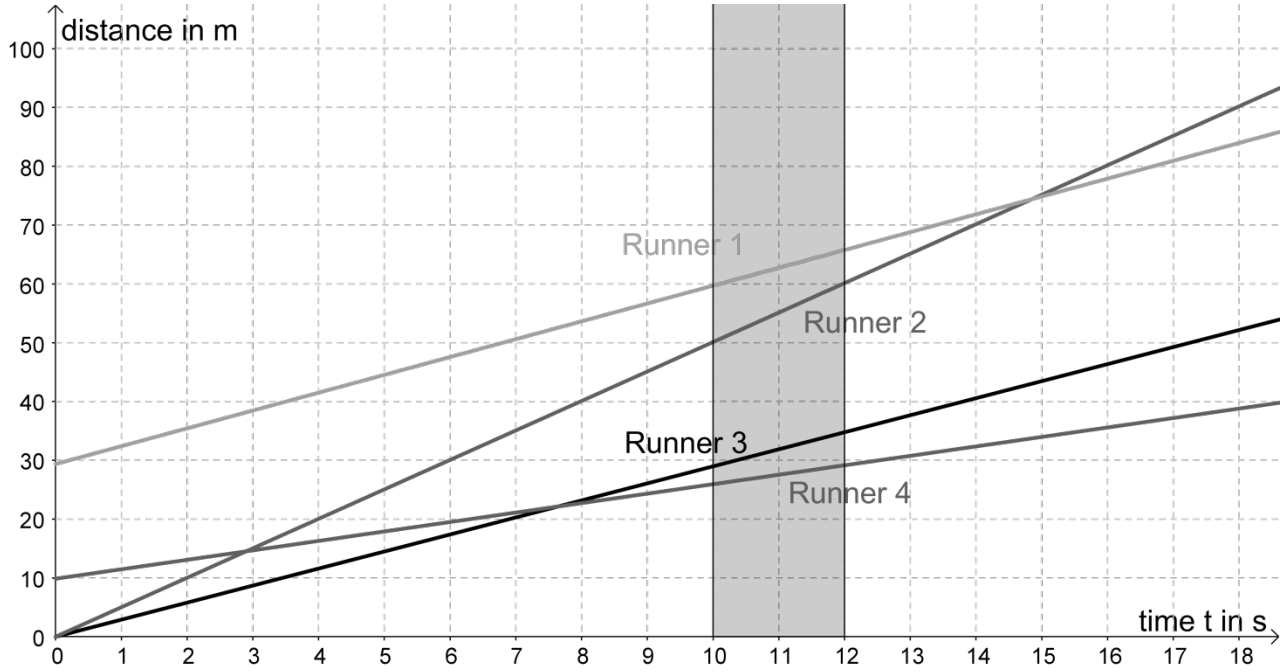
Task 21 (SH-3-2)

How much meters Runner 2 runs at the time interval t = 10 till t = 12 seconds?



Answer: _____

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Task 22 (SA-L-1-2)

Consider the following situation:

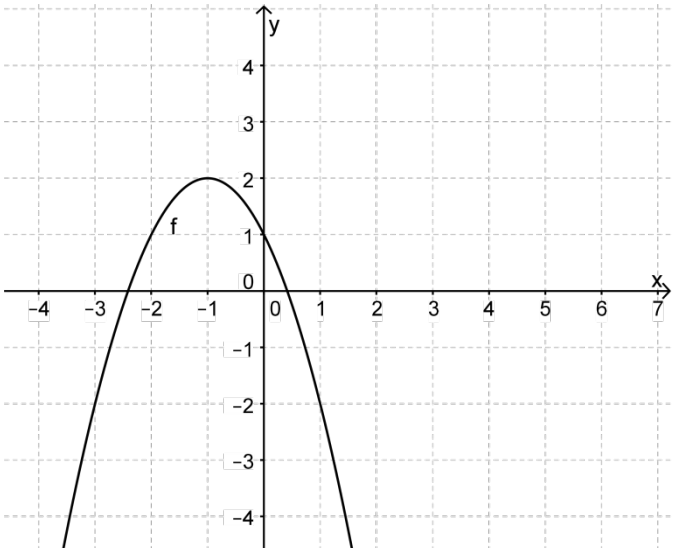
"In a milk bottle with 1.5 liters of milk, there is a small hole through which 0.2 liters of water drop down per hour."

Which of the following equations gives a correct description of the situation?

- ☐ $y = 1.5x - 0.2$
- ☐ $y = -1.5x + 0.2$
- ☐ $y = -0.2x + 1.5$
- ☐ $y = 0.2x + 1.5$

Task 23 (GA-Q-2-2)

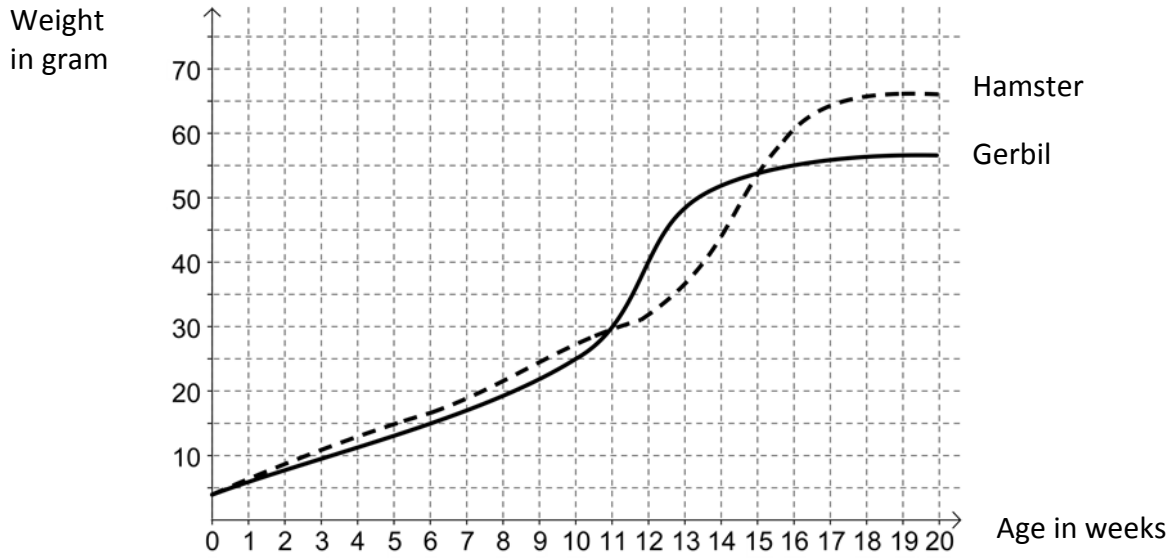
Consider the following graph of the function f and the four given equations. Which of the equations matches the given graph?



- ☐ $y = -(x+1)^2 + 2$
- ☐ $y = -1x^2 + 2$
- ☐ $y = -(x-1)^2 + 2$
- ☐ $y = 0.5x^2 + 1$

Task 24 (SH-4-2)

How much weight gained the gerbil at the age of 10 to 12 weeks?



Answer: _____

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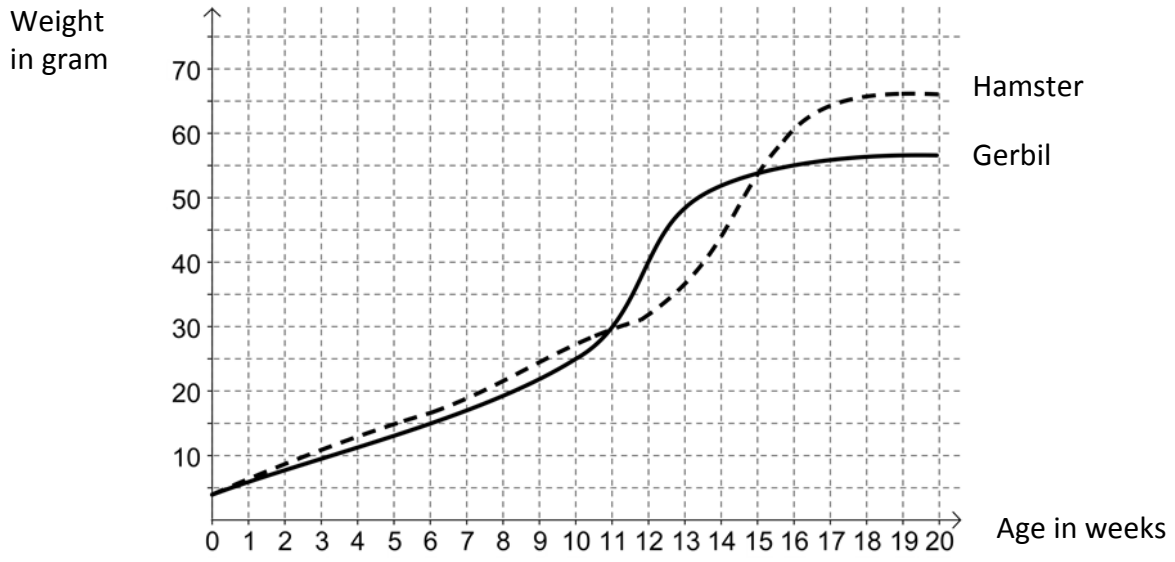
Task 25 (SH-5-2)

At what age the hamster gained the most weight?

Answer: _____

Task 26 (SH-6-2)

When the gerbil weighed more than the hamster?



Answer: _____

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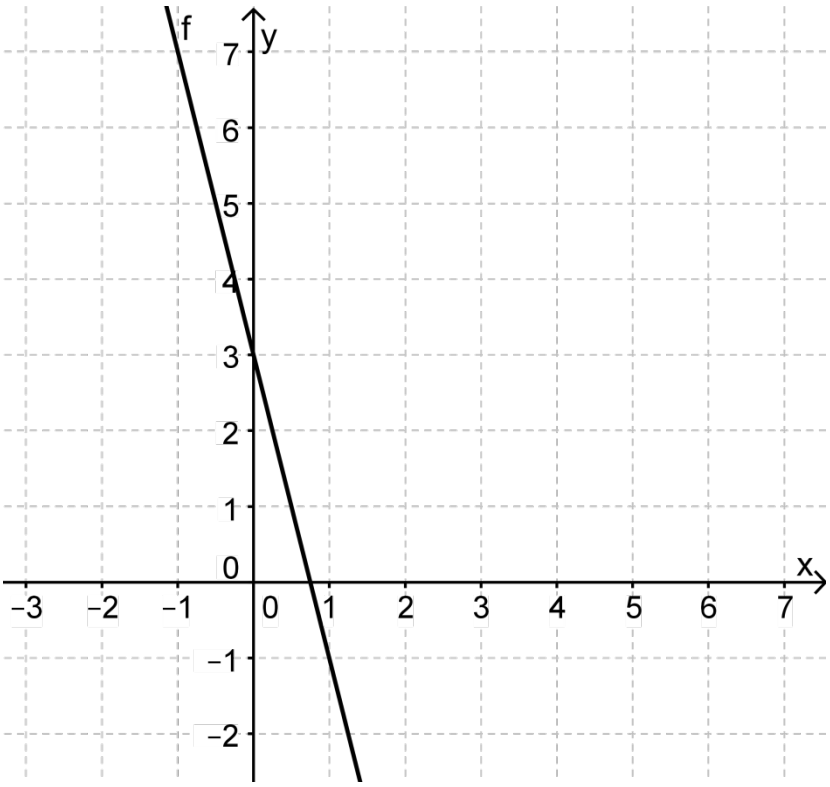
Task 27 (GA-L-4-2)

Consider the following graph of the function f and the four given equations. Which of the equations matches the given graph?



- ☐ $y = -4x + 3$
- ☐ $y = 3x + 0.75$
- ☐ $y = 0.75x + 3$
- ☐ $y = 3x - 4$

Task 28 (SA-L-2-2)

Consider the following situation:

“At the beginning, a snow cover is 130 cm high and it melts 3 cm per hour.”

Which of the following equations gives a correct description of the situation?

- ☐ $y = 130x - 3$
- ☐ $y = 3x + 130$
- ☐ $y = -130x + 3$
- ☐ $y = -3x + 130$