

## 12. CARS

Cynthia and Roxanne each bought a car on the same day 7 years ago. The value of each woman's car has decreased since then.

### CYNTHIA'S CAR

Cynthia's car was worth \$20 000 on the day she bought it.

Since then, her car has lost 18% of its value each year in relation to the previous year.

### ROXANNE'S CAR

Function  $f$  described below is used to determine the value of Roxanne's car in relation to the time elapsed since she bought it.

$$f(x) = 18\,000(0.8)^x$$

where  $x$ : time elapsed, in years, since Roxanne bought her car

$f(x)$ : value of Roxanne's car, in dollars

Which of the two cars has lost the most value, in dollars, since it was purchased 7 years ago?

## SECTION C

### 11. AN EPIDEMIC

An epidemic has reached a village of 2000 inhabitants. Initially, there are 100 people infected. Each month, the population of infected people grows by 20% compared to the previous month.

The epidemic ceases to spread after 6 months. The number of infected people then decreases by 15% every month.

How many people are still infected 18 months after the start of this epidemic? Round your answer to the nearest unit.

## 15. INVESTMENTS

Some years ago, Eve and Samuel each made an investment on the same day.

### EVE'S INVESTMENT

Eve invested \$2100.

Every year, the value of Eve's investment has increased by 2% in relation to its value the previous year.

### SAMUEL'S INVESTMENT

Function  $f$  described below represents the value of Samuel's investment.

$$f(x) = 1325(1.03)^x$$

where  $x$ : time elapsed, in years, since the day the investment was made

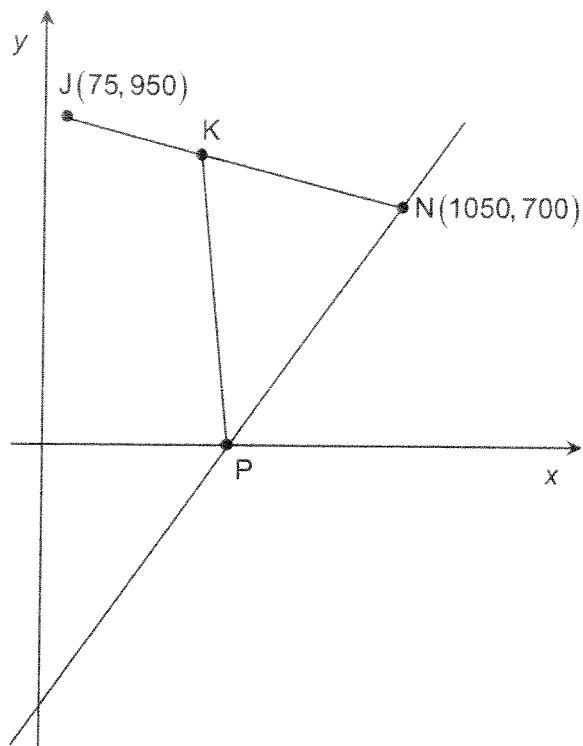
$f(x)$ : value of Samuel's investment, in dollars

Today, to the nearest cent, Samuel's investment is worth \$1728.82.

From the day the investments were made, which of the two investments has gained the most value, in dollars?

## 12. LINE SEGMENT KP

Line PN and line segments JN and KP are represented below in the Cartesian plane.

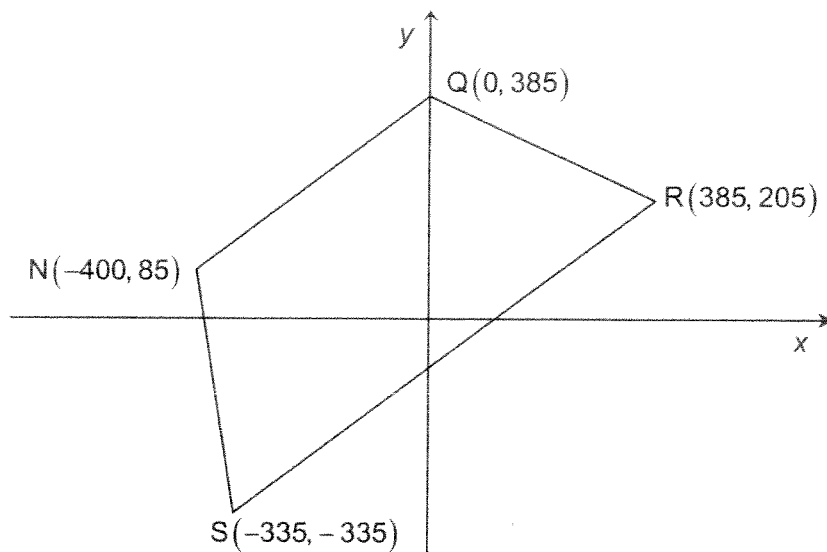


- ♦ From point J, point K is located  $\frac{2}{5}$  of the way along line segment JN.
- ♦ Point P is on the x-axis.
- ♦ The equation of line PN is  $y = 1.4x - 770$ .

What is the equation associated with line segment KP?

#### 14. QUADRILATERAL NQRS

Consider quadrilateral NQRS represented below in the Cartesian plan.

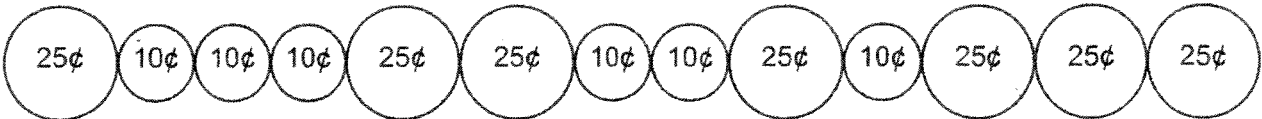


Show that quadrilateral NQRS is a trapezoid and that it is isosceles.

## 12. A LINE OF COINS

The students in a secondary school challenged one another to form the longest possible line of dimes (10¢) and quarters (25¢). The coins collected during this activity will be donated to a childhood disease foundation.

Below is an example of a line of coins.



The following table provides information about the coins collected by the school's Cycle Two students during this activity.

	Secondary III	Secondary IV	Secondary V
Number of dimes (10¢)	125	100	129
Number of quarters (25¢)	200	250	221
Length of the line of coins formed	7 029.75 mm	7 773 mm	?

What is the length of the line of coins formed by the Secondary V students?

## 15. TWO INVESTMENTS

Nathalie and Tom each invested some money today.

### NATHALIE'S INVESTMENT

Nathalie invested \$3000.

Each year, the value of Nathalie's investment will increase by 3% in relation to the previous year.

### TOM'S INVESTMENT

Function  $f$  described below represents the value of Tom's investment.

$$f(x) = 2000(1.05)^x$$

where  $x$ : time elapsed starting from today, in years

$f(x)$ : value of Tom's investment, in dollars

In 10 years, whose investment will have made the most profit?

## 11. JAM JARS

Last Monday, Tuesday and Wednesday, Matthew made jam that he poured into jars of two different sizes. He filled each jar that he used.

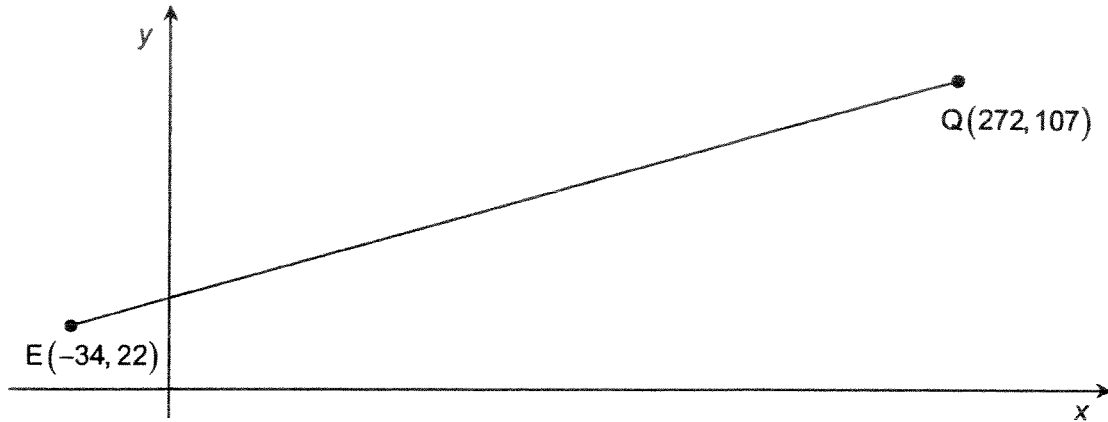
The following table provides information on some of the jars that were filled.

	Number of small jars filled	Number of big jars filled	Total amount of jam poured into the jars
Monday	24	6	7650 mL
Tuesday	8	20	9300 mL
Wednesday	20	?	9000 mL

How many big jars did Matthew fill with jam on Wednesday?



3. Point R is on line segment EQ represented below in the Cartesian plane.



From point E, point R is located  $\frac{5}{17}$  of the way along line segment EQ.

What is the x-coordinate of point R?

- |       |       |
|-------|-------|
| A) 36 | C) 70 |
| B) 56 | D) 90 |

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The following table provides information on some of the jars that were filled.

	Number of small jars filled	Number of big jars filled	Total amount of jam poured into the jars
Monday	18	9	8 145 mL
Tuesday	12	15	9 255 mL
Wednesday	11	?	5 615 mL

How many big jars did Matthew fill with jam on Wednesday?

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