

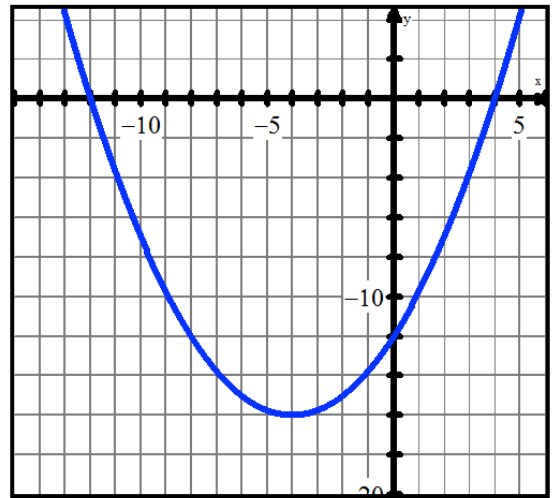
1. Change the following quadratic equations from standard form to factored form. Show the key steps of your solution and communicate your solution using proper mathematical formatting.

(K5/C1)

a. $y = x^2 - 3x - 18$ **(K2)**

b. $y = 6x^2 - x - 15$ **(K3)**

2. A quadratic function has been graphed for you. Determine the equation of the function in standard form. **(A4)**



3. Change the following quadratic equations from factored form to standard form. Show the key steps of your solution and communicate your solution using proper mathematical formatting.

(K4/C1)

a. $y = (2x - 5)(1 - 4x)$ **(K2)**

b. $y = (3x - 2)^2$ **(K2)**

4. A quadratic function is written in standard form as $f(x) = 3x^2 - 6x - 24$.

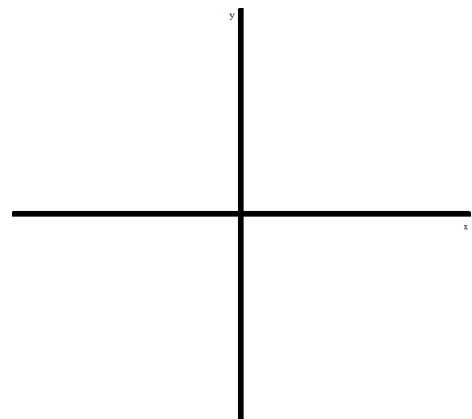
a. Write the quadratic function in factored form. **(K2)**

b. Determine the zeroes of this quadratic function.

(K2)

c. **ALGEBRAICALLY**, determine the optimum value of the function. **(K2)**

d. Sketch a properly labeled graph on the grid provided, labeling the following key features: zeroes, vertex, y-intercept, label function as well). **(C3)**



5. The country of MathLandia has been measuring the population growth rate for the last 20 years (given that the country imposed a 1 child per family policy in 1992). A quadratic model is used to show the relationship between the population growth rate (% growth per year) and the number of years since 1992 as

$P(y) = 0.02y^2 - 0.47y + 2.15$. To answer this question, use your TI-84 to help you to determine the following:

- a. The population growth rate at the beginning, when the policy was first introduced. **(K1)**
- b. When was the population not growing? **(T1)**

c. Write the equation in factored form.

d. State the domain and range IN WORDS.

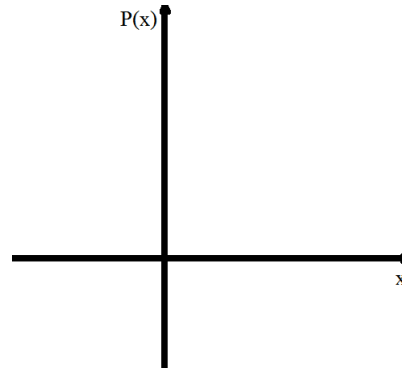
(T1)

(T2)

6. A quadratic function, $P(x)$, is used to model the profits (in millions of \$) of a motorcycle company as a function of the number of motorcycles they produce (x , measured in thousands). The initial profit was \$2,000,000.

- a. The zeroes of the profit function are at $x = -4$ and $x = 10$. Determine the equation of the function that models the company's profits. **(A3)**
- b. Interpret the meaning of each of the zeroes in the context of the question. **(C2)**

- c. What maximum profit does the company make? Show/explain the analysis that leads to your answer. **(A2)**
- d. Sketch the parabola on the grid provided. Label key points and as well as the function. **(A3)**



- e. Evaluate and interpret $P(8.5)$. **(A1/C1)**
- f. Solve the equation $1.65 = P(x)$. Interpret your solution. Show/explain the analysis that leads to your solution. **(A2/C1)**

6. CONTINUED. A quadratic function, $P(x)$, is used to model the profits (in millions of \$) of a motorcycle company as a function of the number of motorcycles they produce (x , measured in thousands of motorcycles). The initial profit was \$2,000,000.
- g. The owner of the company (who is NOT a math student!!!) wants to increase the number of motorcycles produced from 6000 to 7000. The owner wants your advice (since you ARE a math student!!!):
- i. How much profit does the company make if they make 6000 motorcycles? **(A1)**
- ii. Will the company still make a profit if the production level is increased from 6000 to 7000? Show/explain the analysis that leads to your conclusion. **(T2)**
- iii. From a FINANCIAL perspective, would you think this is a good FINANCIAL decision? Explain/show your reasoning. **(T1)**
- iv. What NON-financial reasons would the owner have in making this business decision? Give one reason. **(T1)**

TEST SCORES:

Application (A)	Communication (C)	Knowledge (K)	Thinking/PS (T)	Overall Score
<u>/16</u>	<u>/9</u>	<u>/16</u>	<u>/8</u>	