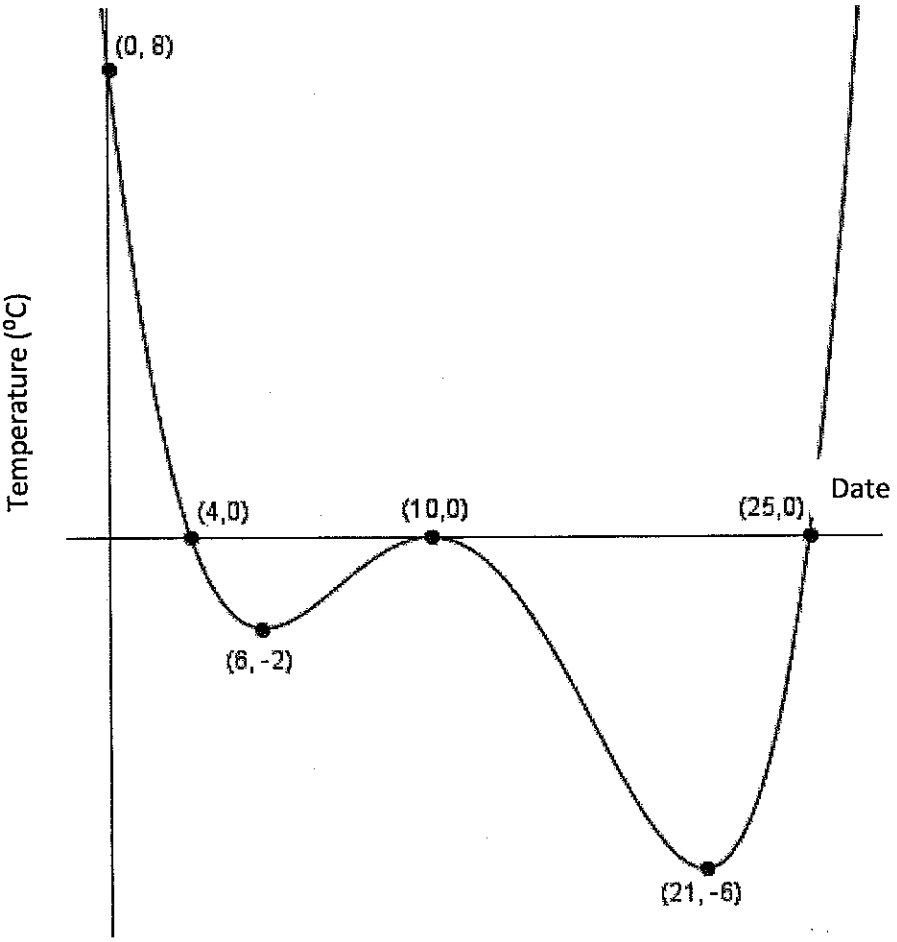
STUDENT A

A

The town of Frostburg experienced a bit of a heat wave during January of this year. The graph below shows the curve of best fit that represents the low temperature for every day in January.



A newspaper journalist is writing a story on the weather and needs to report some information. He needs a bit of guidance with interpreting the graph.

1. Write a few sentences describing the key characteristics of the graph as it relates to the context of the problem. Be sure to include domain, range, intervals where the function increases and decreases, x- and y-intercepts, and any other important information.

Domain = (0, 4, 6, 10, 21, 25) - represents the day of the month in January

Range = (8, 0, -2, 0, -6, 0) - represents the temperature (C°)

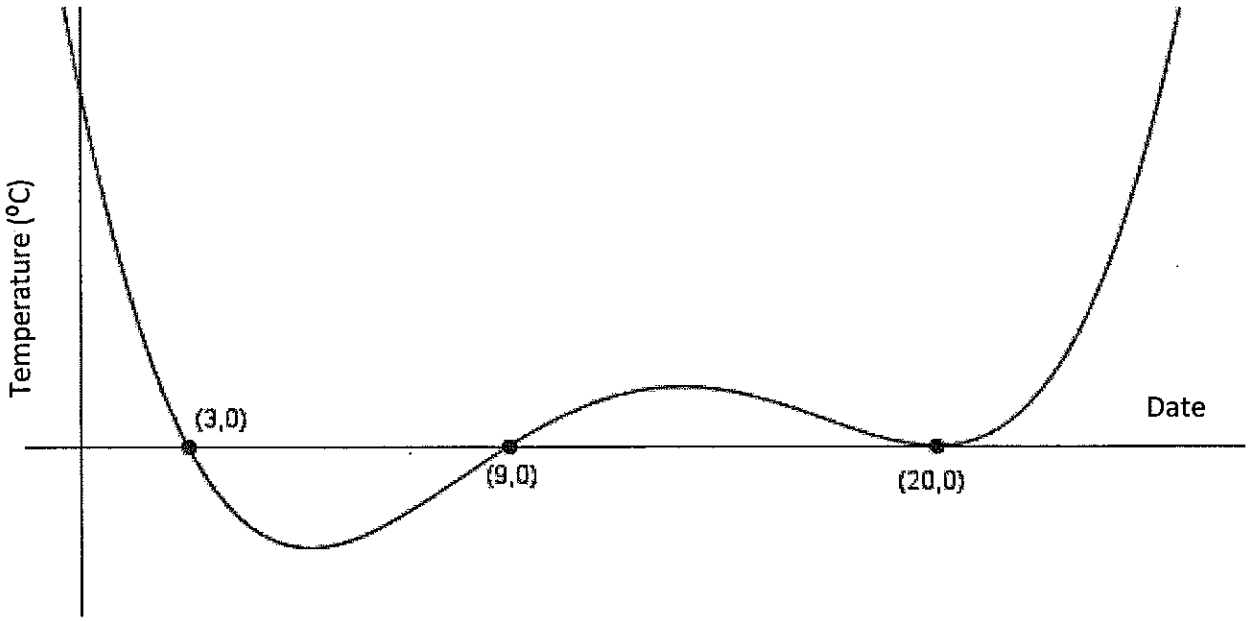
The intervals decrease from (0, 8) to (6, -2) and from (10, 0) to (21, -6)

The intervals increase from (6, -2) to (10, 0) and from (21, -6) to (25, 0)

When on the y-axis, the temperature is represented as 0°C

STUDENT A

The graph below shows the curve of best fit that represents the low temperature for every day in February.



2. Three different models have been proposed that could be used to determine the temperature for a particular date in February. The models are given below:

Model 1: $y = ax^2 + bx + c$ - quadratic term is not large enough, needs to be doubled

Model 2: $y = a(x+3)(x+9)(x+20)$ - variable needs to have higher exponent

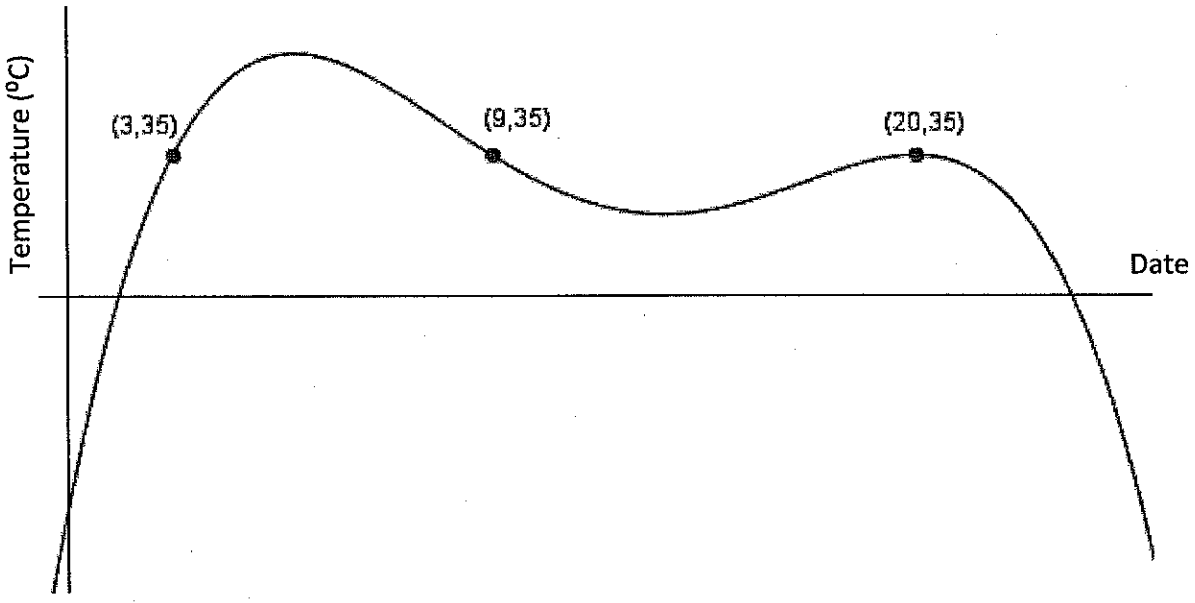
Model 3: $y = \frac{a}{(x-3)(x-9)^2(x-20)}$ - no exponent in the denominator

None of these models are completely appropriate for the graph. Explain what is incorrect with each of the models and then suggest and justify a better model.

$y = ax^4 + bx^3 + cx^2 + dx + e$; where a, b, c, d & e are all integers, and $a \neq 0$.

STUDENT A

The weather in July showed a related pattern to the weather in February. The curve of best fit for July is shown below:



3. Explain the relationship between the graph for February and the graph for July. Use that relationship to create an equation for the temperatures in July.

The same days temperature are recorded on the same days for both months (3, 9, 20) as represented by the domain. February's temperature is decreasing at the same rate as July's temperature is increasing.

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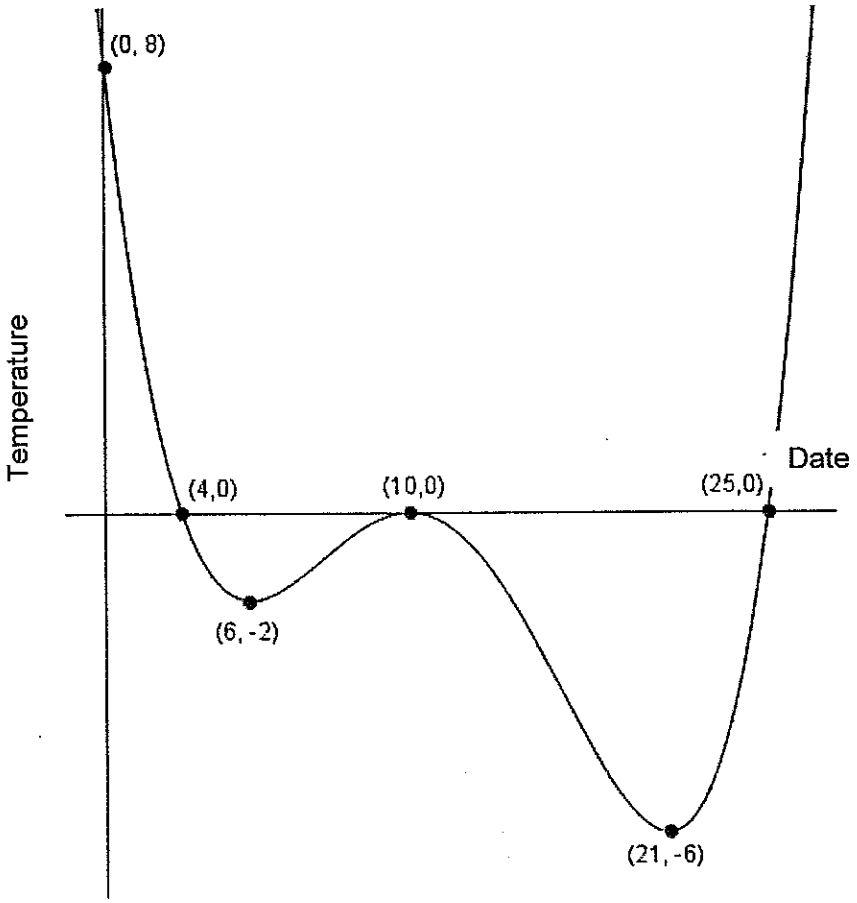
STUDENT B B

The town of Frostburg experienced a bit of a heat wave during January of this year. The graph below shows the curve of best fit that represents the low temperature for every day in January.



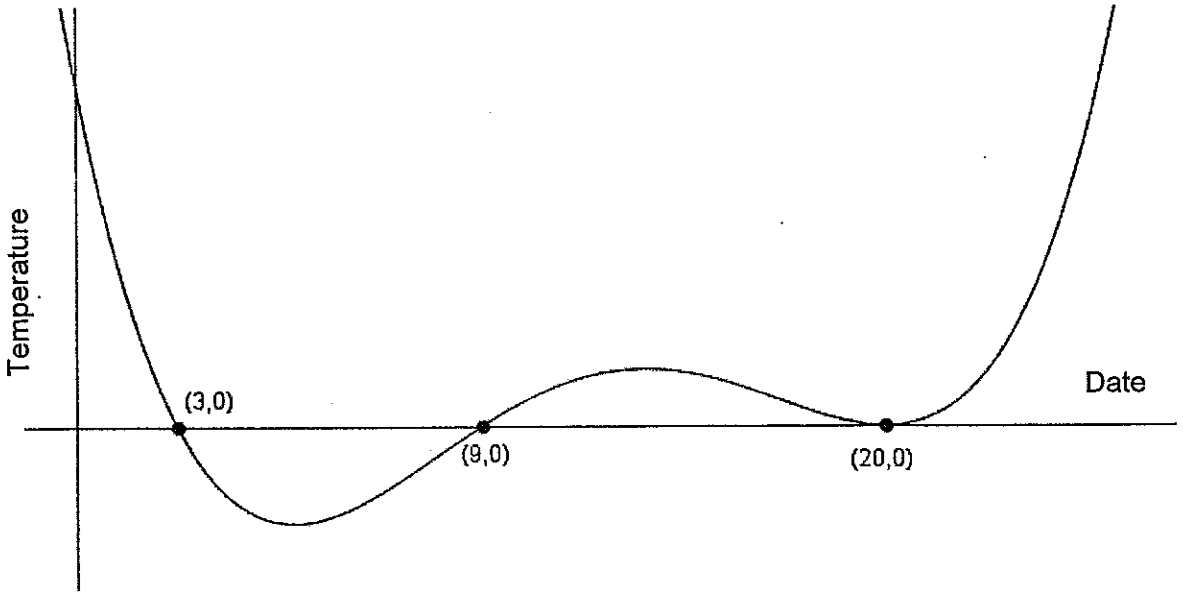
A newspaper journalist is writing a story on the weather and needs to report some information. He needs a bit of guidance with interpreting the graph.

1. Write a few sentences describing the key characteristics of the graph as it relates to the context of the problem. Be sure to include domain, range, intervals where the function increases and decreases, x- and y-intercepts, and any other important information.

In the graph the domain is all reals & the range is $y \geq -6$. The graph increases between the points $(6, -2)$ to $(10, 0)$ & also between $(21, -6)$ to $(25, 0)$ & so on. The x-intercepts are 4, 10, & 25 & the y-intercept is 8.

STUDENT B

The graph below shows the curve of best fit that represents the low temperature for every day in February.



2. Three different models have been proposed that could be used to determine the temperature for a particular date in February. The models are given below:

Model 1: $y = ax^2 + bx + c$ quadratic

Model 2: $y = a(x+3)(x+9)(x+20)$

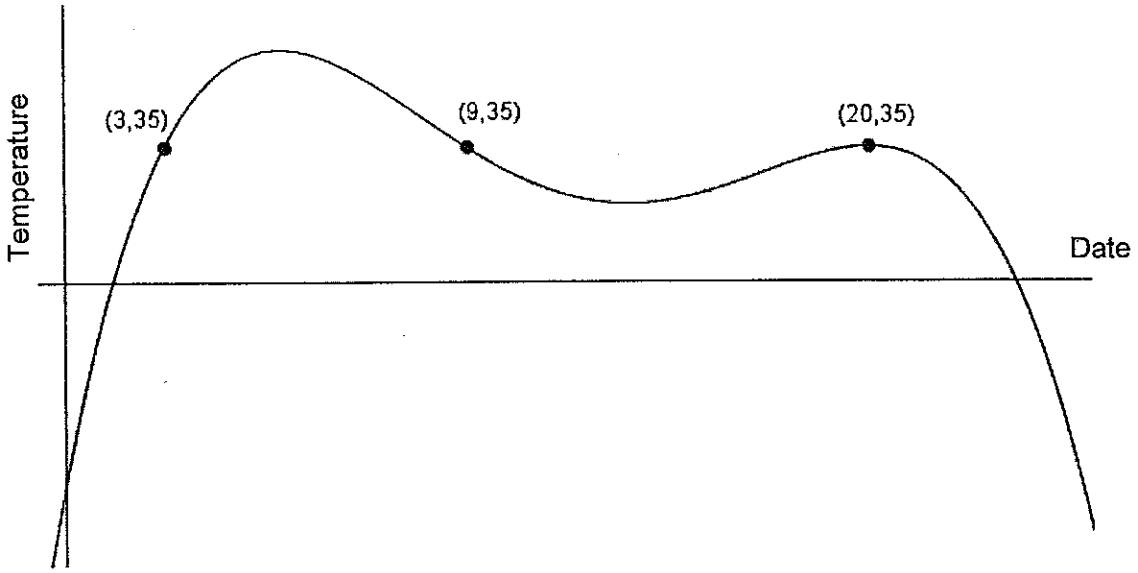
Model 3: $y = \dfrac{a}{(x-3)(x-9)^2(x-20)}$

None of these models are completely appropriate for the graph. Explain what is incorrect with each of the models and then suggest and justify a better model.

Model #1 is a quadratic which isn't this graph, Model #2 is a cubic equation & Model #3 is a quadratic that contains asymptotes. IDK but $ax^4 + bx^3 + cx^2$

STUDENT B

The weather in July showed a related pattern to the weather in February. The curve of best fit for July is shown below:



3. Explain the relationship between the graph for February and the graph for July. Use that relationship to create an equation for the temperatures in July.

The February and the July graph have the same shape to them except the July graph is just flipped down from the position of the February graph. The July graph only has 2 real zeros compared to the February graph which has 3 real zeros. $y = ax^3 + bx^2 + cx$

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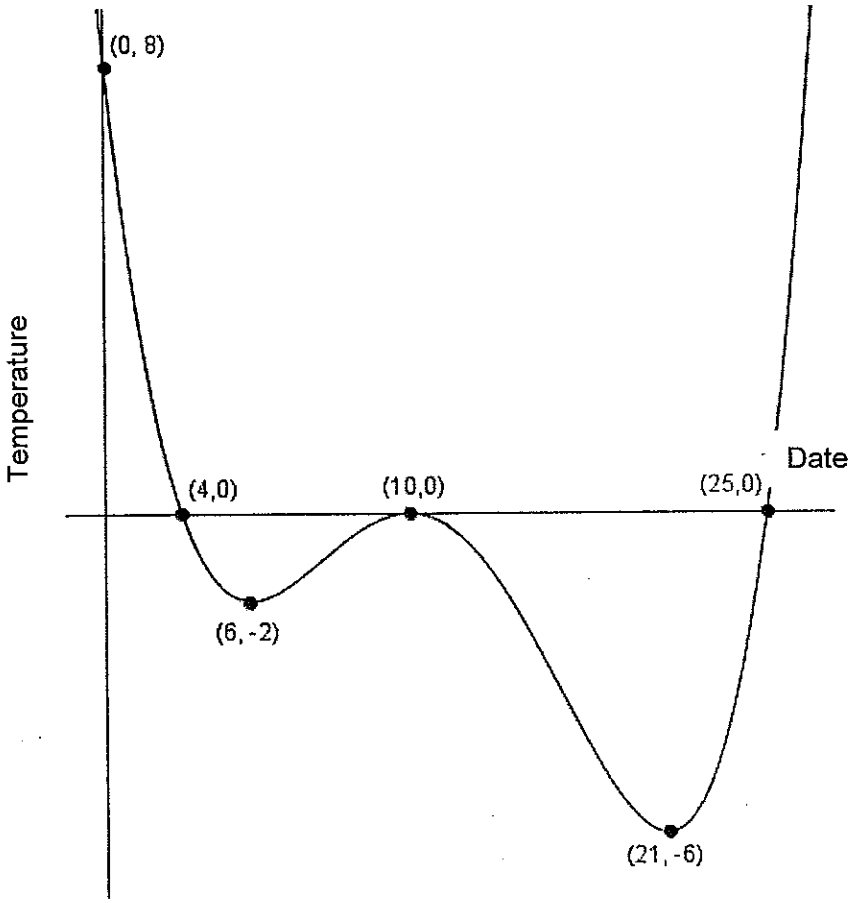
STUDENT C C

The town of Frostburg experienced a bit of a heat wave during January of this year. The graph below shows the curve of best fit that represents the low temperature for every day in January.

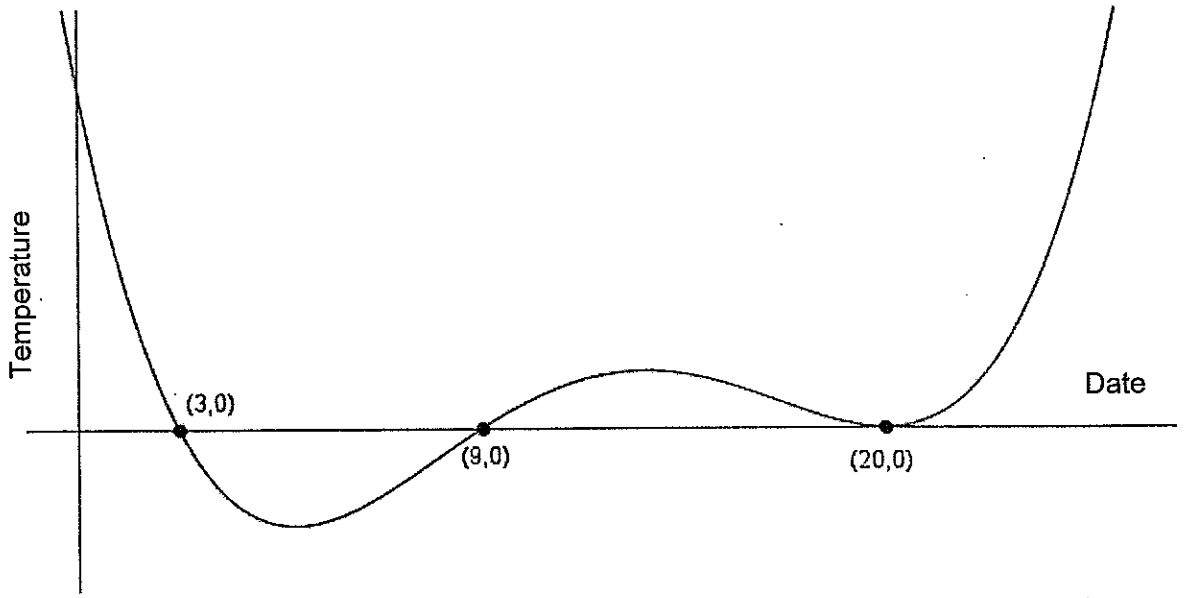


A newspaper journalist is writing a story on the weather and needs to report some information. He needs a bit of guidance with interpreting the graph.

1. Write a few sentences describing the key characteristics of the graph as it relates to the context of the problem. Be sure to include domain, range, intervals where the function increases and decreases, x- and y-intercepts, and any other important information. The domain is all reals, and the range is reals greater than -6. X axis is date, Y axis is temperature. Temperature is decreasing from $-\infty$ to 6 and from 10 to 21 and increasing from 6 to 10 and 21 to $+\infty$. x-int are 4, 10, 25, and the y-int is 8. The minimum is (21, -6) and the relative maximums are (4,0) and (10, 0).

STUDENT C

The graph below shows the curve of best fit that represents the low temperature for every day in February.



2. Three different models have been proposed that could be used to determine the temperature for a particular date in February. The models are given below:

Model 1: $y = ax^2 + bx + c$

Model 2: $y = a(x+3)(x+9)(x+20)$

Model 3: $y = \dfrac{a}{(x-3)(x-9)^2(x-20)}$

None of these models are completely appropriate for the graph. Explain what is incorrect with each of the models and then suggest and justify a better model.

1. The graph is a forth degree polynomial, not 2nd.

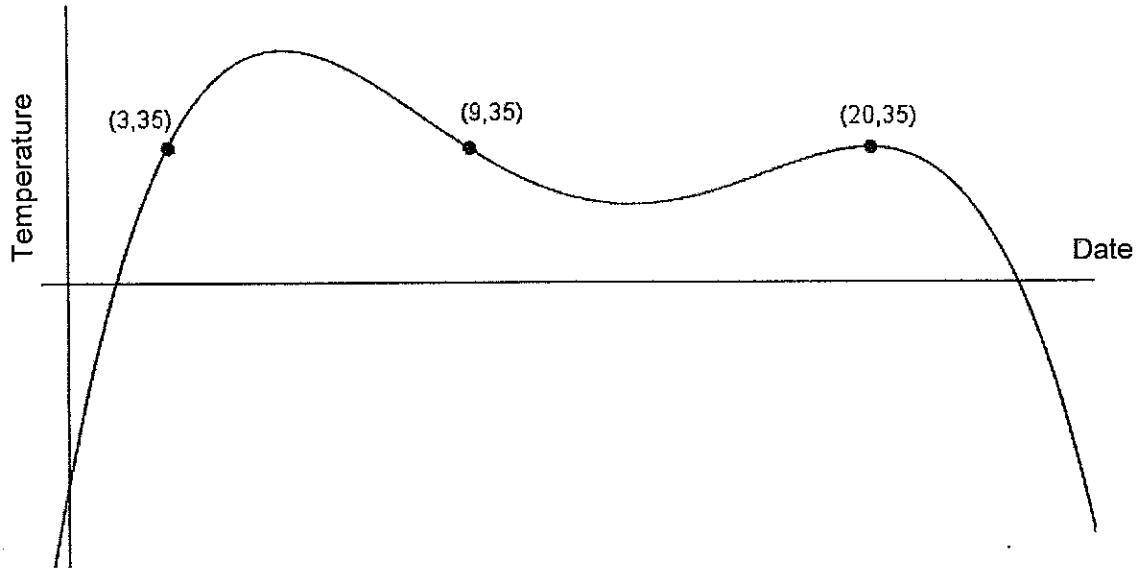
2. This is a third degree equation, not 4th like the graph.

3. This has a double root at (9, 0) instead of (20, 0) like the graph.

4 $\dfrac{a}{(x-3)(x-9)(x-20)^2}$ - The double root is at (20, 0)

STUDENT C

The weather in July showed a related pattern to the weather in February. The curve of best fit for July is shown below:



3. Explain the relationship between the graph for February and the graph for July. Use that relationship to create an equation for the temperatures in July.

Both graphs are 4th degree equations, but this graph is flipped.

$$y = -\frac{a}{35 + [(x-3)(x-9)(x-20)^2]}$$

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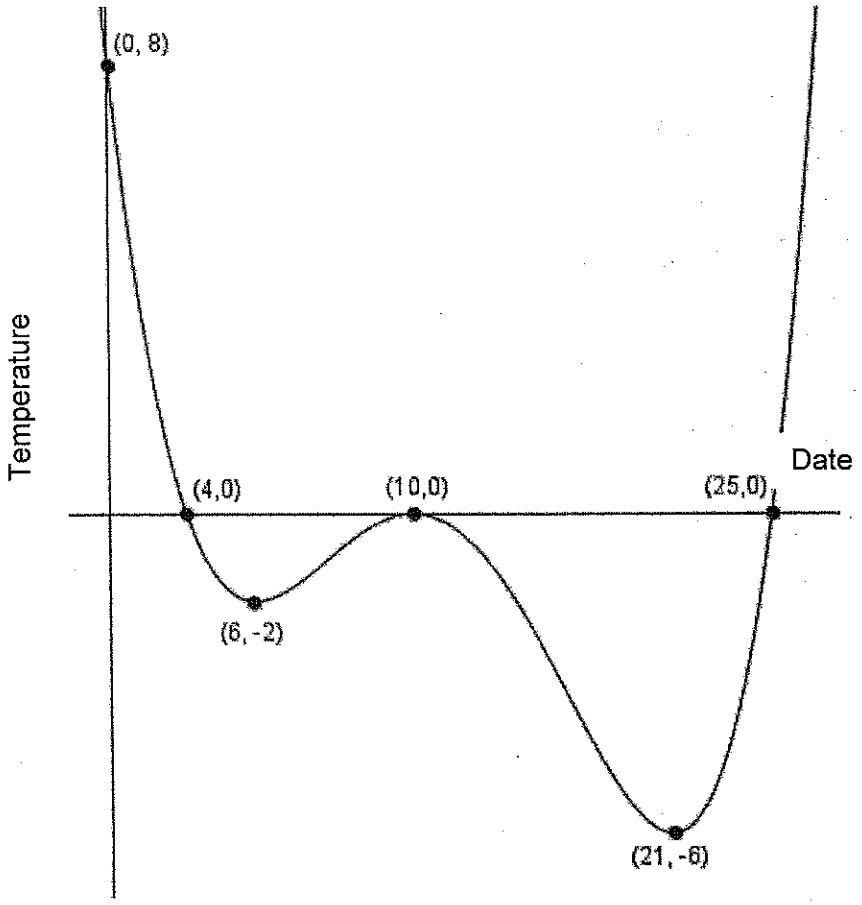
STUDENT D

The town of Frostburg experienced a bit of a heat wave during January of this year. The graph below shows the curve of best fit that represents the low temperature for every day in January.



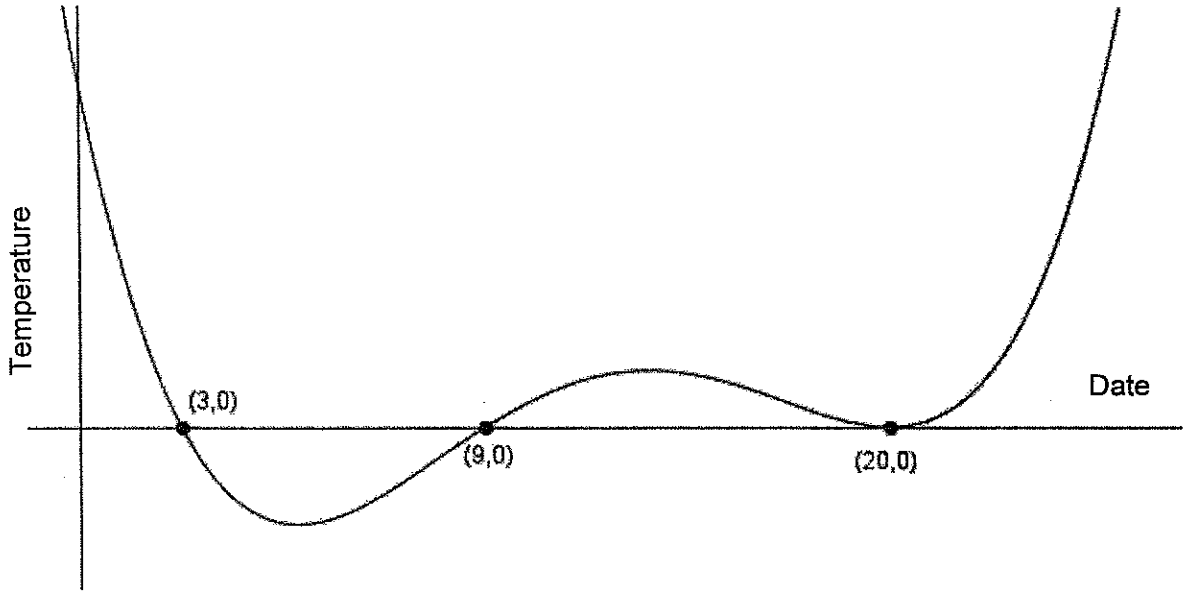
A newspaper journalist is writing a story on the weather and needs to report some information. He needs a bit of guidance with interpreting the graph.

1. Write a few sentences describing the key characteristics of the graph as it relates to the context of the problem. Be sure to include domain, range, intervals where the function increases and decreases, x- and y-intercepts, and any other important information.

The graph decreases $(8, -2)$, $(0, -6)$. The graph increases from $(-2, 0)$, $(-6, 0)$. The range of this graph is $[-6, 0)$. The domain is 31 days. The x-intercepts are 4, 10 and 25 while the y-intercepts are $-6, -2, 0$ and 8. There is no symmetry in this graph.

STUDENT D

The graph below shows the curve of best fit that represents the low temperature for every day in February.



2. Three different models have been proposed that could be used to determine the temperature for a particular date in February. The models are given below:

Model 1: $y = ax^2 + bx + c$

Model 2: $y = a(x+3)(x+9)(x+20)$

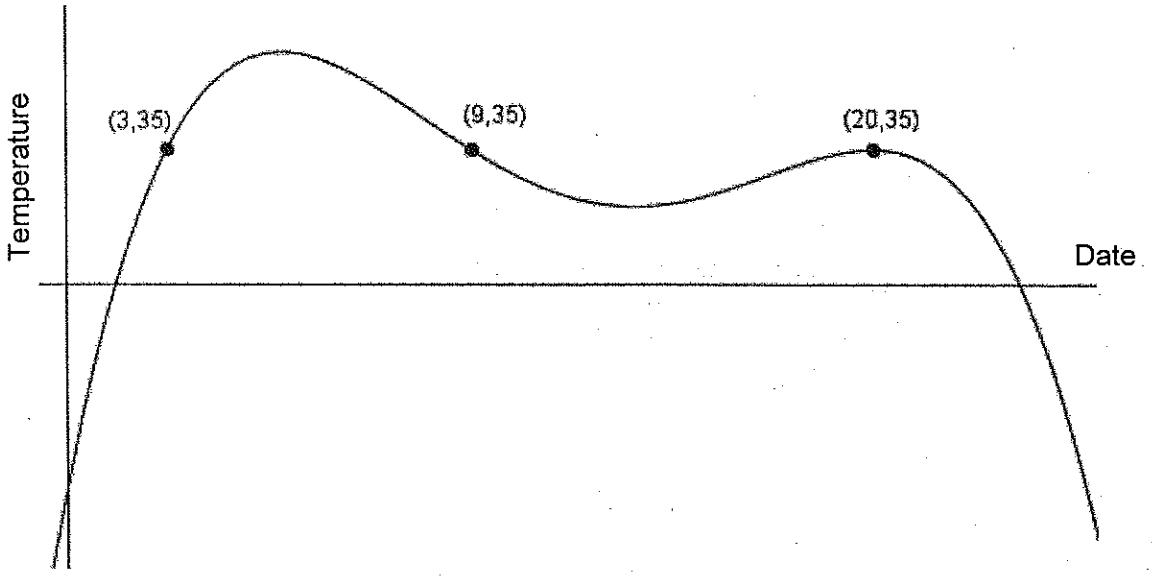
Model 3: $y = \dfrac{a}{(x-3)(x-9)^2(x-20)}$

None of these models are completely appropriate for the graph. Explain what is incorrect with each of the models and then suggest and justify a better model.

Model one shows a line. Model 2 is in the negatives which cannot happen with dates. Model 3 looks like a square root and doesn't show everything. $ax^3 + bx^2 + cx + d$

STUDENT D

The weather in July showed a related pattern to the weather in February. The curve of best fit for July is shown below:



3. Explain the relationship between the graph for February and the graph for July. Use that relationship to create an equation for the temperatures in July.

The curves are pretty much the same but upside down, a $-x^3$. $-ax^3+bx^2+cx+d$ Both graphs have 3 curves and both increase and decrease.

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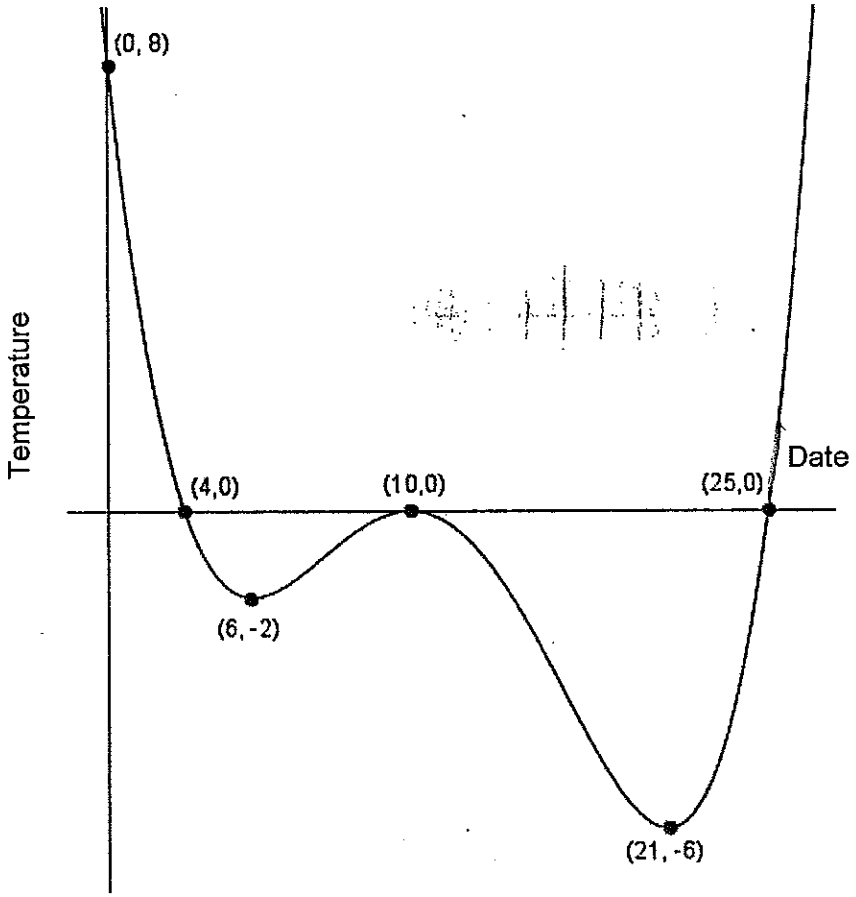
STUDENT E

The town of Frostburg experienced a bit of a heat wave during January of this year. The graph below shows the curve of best fit that represents the low temperature for every day in January.



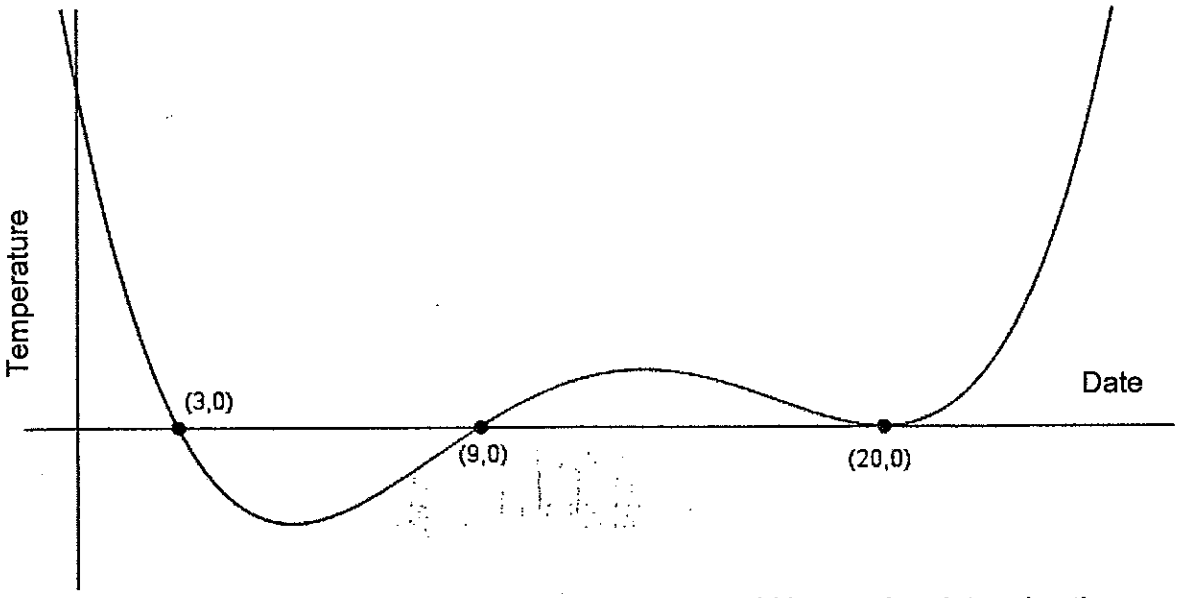
A newspaper journalist is writing a story on the weather and needs to report some information. He needs a bit of guidance with interpreting the graph.

1. Write a few sentences describing the key characteristics of the graph as it relates to the context of the problem. Be sure to include domain, range, intervals where the function increases and decreases, x- and y-intercepts, and any other important information.

The range of heat with a domain of 25 in January fluxuated from $R \geq -6°$. The function increased from 6-10 as well as 21-25. The function decreased from 0-6 and from 10-21. The days where the temperature was 0 was on the 4th, 10th, and 25th of January. The y-intercept was 8 at 0 days. The temperature seems to increase exponentially after the 21st.

STUDENT E

The graph below shows the curve of best fit that represents the low temperature for every day in February.



2. Three different models have been proposed that could be used to determine the temperature for a particular date in February. The models are given below:

Model 1: $y = ax^2 + bx + c$

Model 2: $y = a(x+3)(x+9)(x+20)$

Model 3: $y = \dfrac{a}{(x-3)(x-9)^2(x-20)}$

None of these models are completely appropriate for the graph. Explain what is incorrect with each of the models and then suggest and justify a better model.

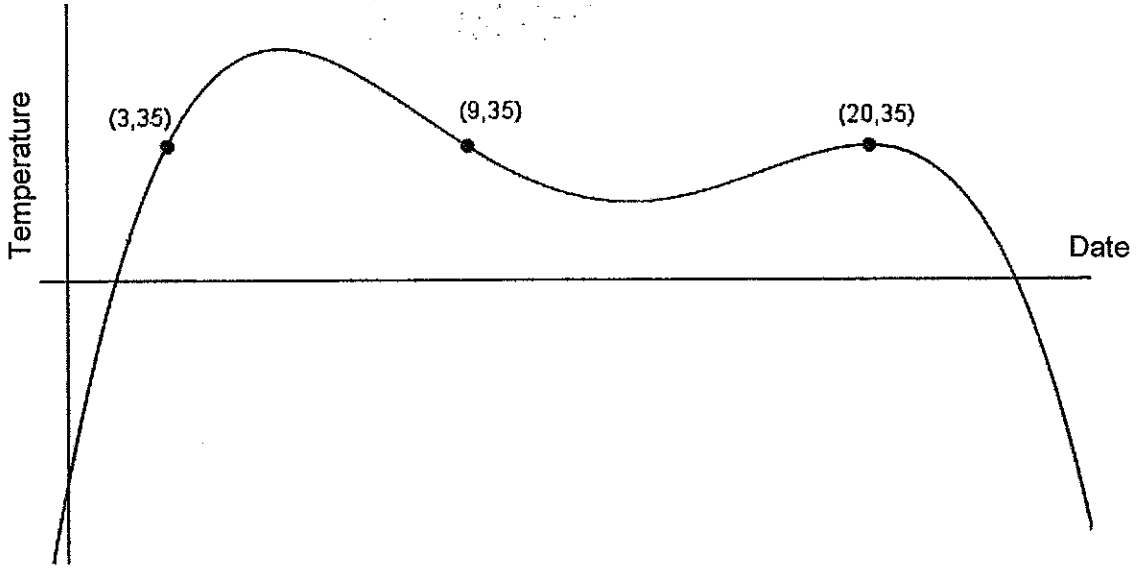
Model 1: The graph is not a parabola

Model 2: This model suggests that the x-intercepts are at -3, -9, and -20.

Model 3: Doesn't work because that puts asymptotes at 3, 9, and 20.

STUDENT E

The weather in July showed a related pattern to the weather in February. The curve of best fit for July is shown below:



3. Explain the relationship between the graph for February and the graph for July. Use that relationship to create an equation for the temperatures in July.

The graph for July is the inverse of the February graph.

f(February) = − F(July)

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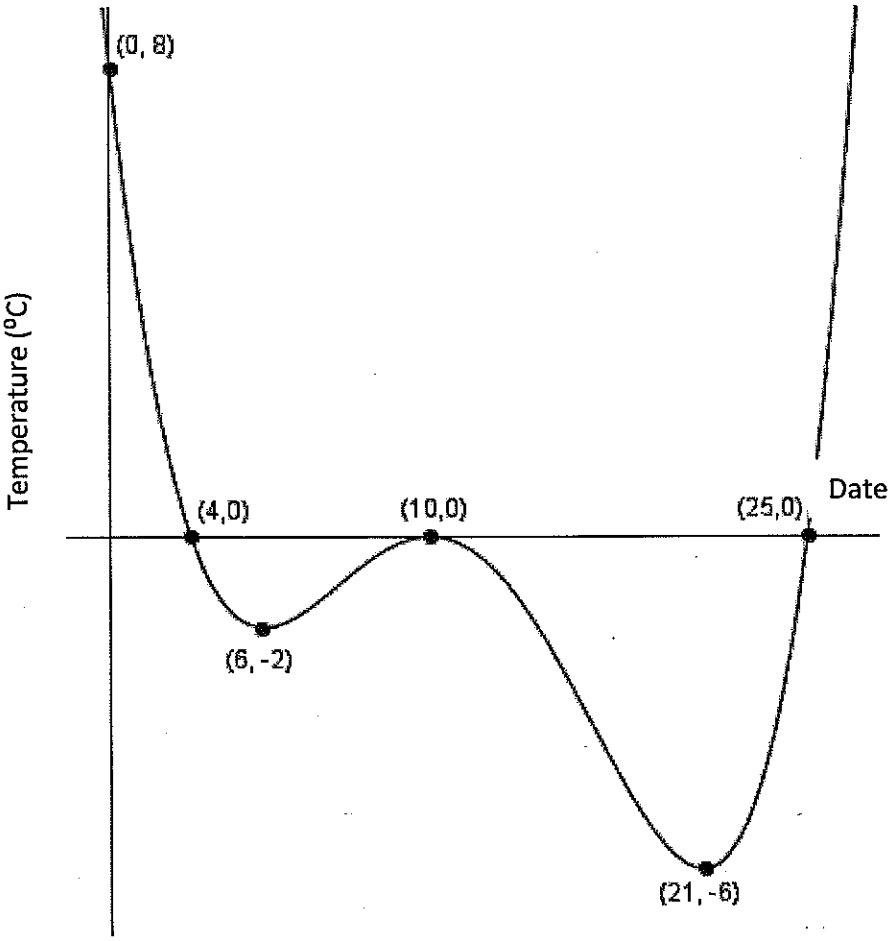
STUDENT F

The town of Frostburg experienced a bit of a heat wave during January of this year. The graph below shows the curve of best fit that represents the low temperature for every day in January.



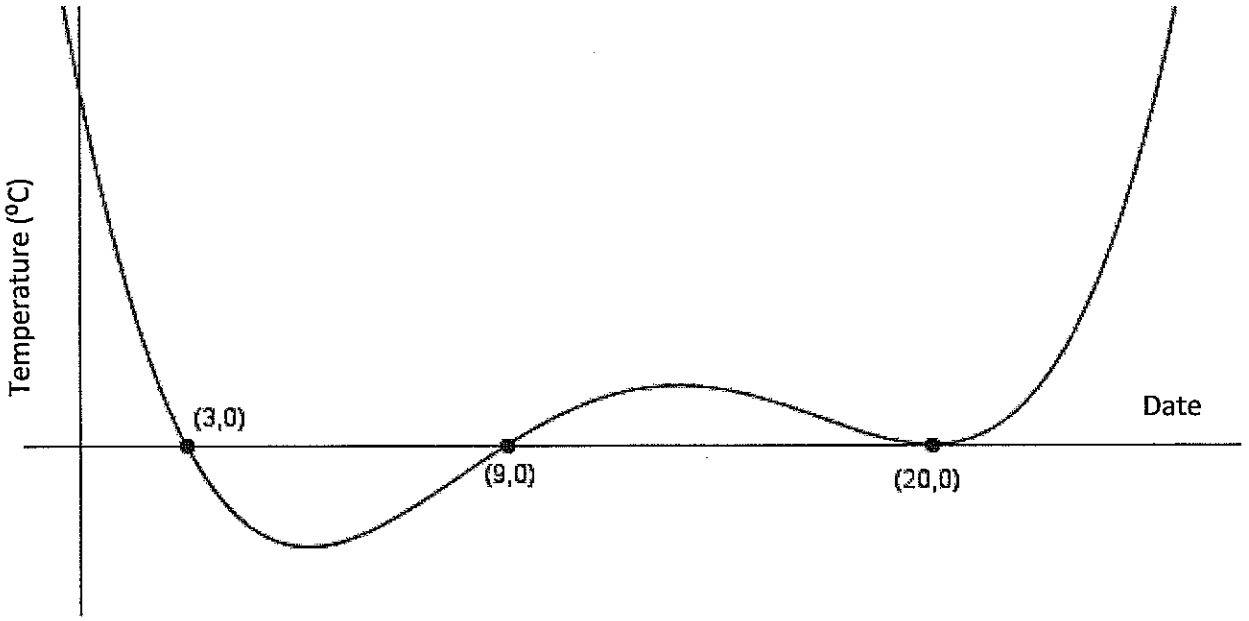
A newspaper journalist is writing a story on the weather and needs to report some information. He needs a bit of guidance with interpreting the graph.

1. Write a few sentences describing the key characteristics of the graph as it relates to the context of the problem. Be sure to include domain, range, intervals where the function increases and decreases, x- and y-intercepts, and any other important information.

The domain of the graph is all real numbers, while the range is any number greater than, or equal to, -6. The line intercepts the y-axis at 8 only, and the x-axis at 4, 10, and 25. The function decreases dramatically from (0,8) to (6,-2) + from (10,0) to (21,-6). It then makes a very sharp increase at (21,-6). Based on the graph, it looks like the temperature remained on a steady decrease in temperature, with only one rise towards the middle of the month, then an even lower drop. It sharply increases by the end of the month.

STUDENT F

The graph below shows the curve of best fit that represents the low temperature for every day in February.



2. Three different models have been proposed that could be used to determine the temperature for a particular date in February. The models are given below:

Model 1: $y = ax^2 + bx + c$

Model 2: $y = a(x+3)(x+9)(x+20)$

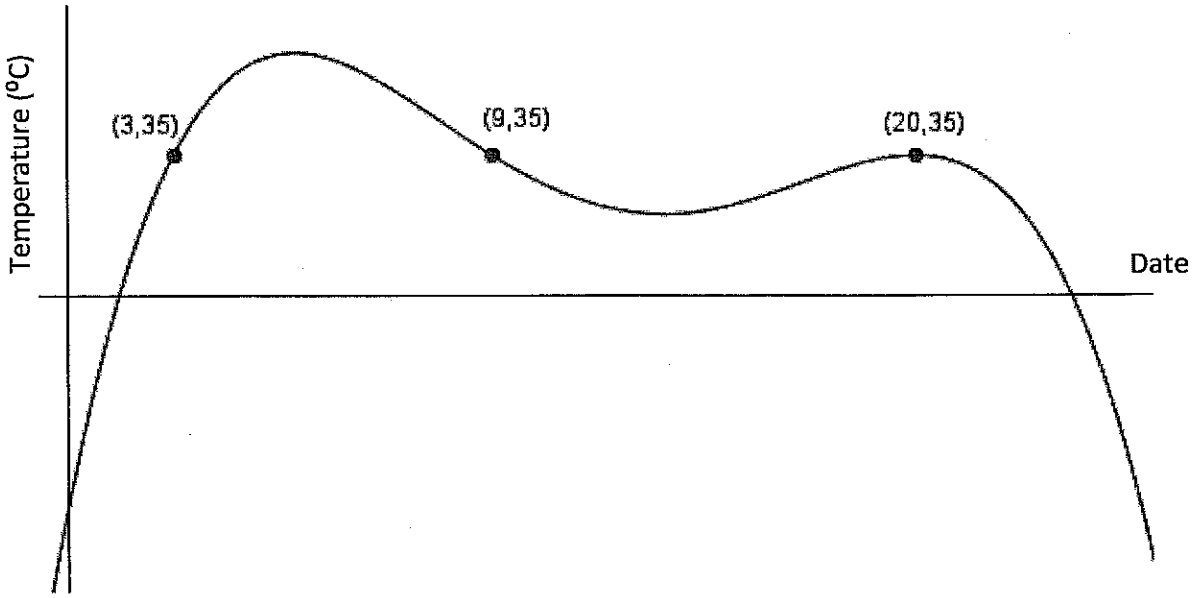
Model 3: $y = \frac{a}{(x-3)(x-9)^2(x-20)}$

None of these models are completely appropriate for the graph. Explain what is incorrect with each of the models and then suggest and justify a better model.

Model one is a quadratic function, and when graphed forms a parabola. Model two only had two points where it changed direction, whereas the function above has three (I can't quite remember the correct terminology). Model three would be the closest to the original, it opens up, both ends point up, and it has three changes in direction. You would need a fourth degree function in order for it to have the same shape as the original.

STUDENT F

The weather in July showed a related pattern to the weather in February. The curve of best fit for July is shown below:



3. Explain the relationship between the graph for February and the graph for July. Use that relationship to create an equation for the temperatures in July.

The graph of July looks flipped upside down. From the one of February. It is still a 4 degree function, with 3 changes of direction, except the function of this graph would be negated since it opens down.

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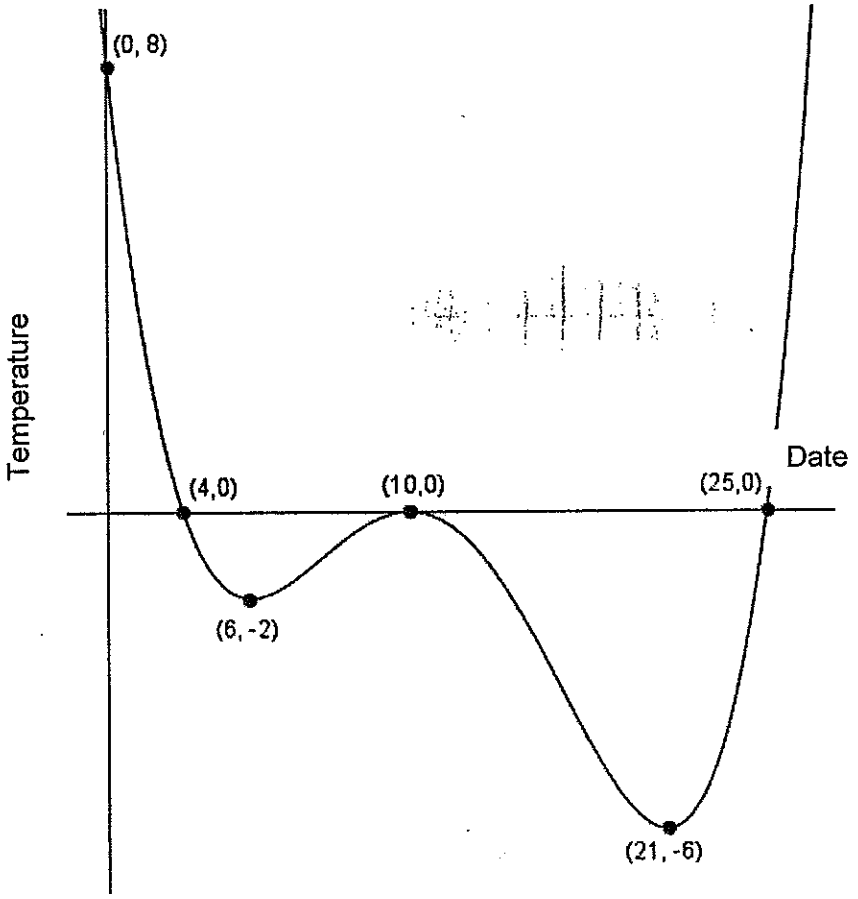
STUDENT G

The town of Frostburg experienced a bit of a heat wave during January of this year. The graph below shows the curve of best fit that represents the low temperature for every day in January.



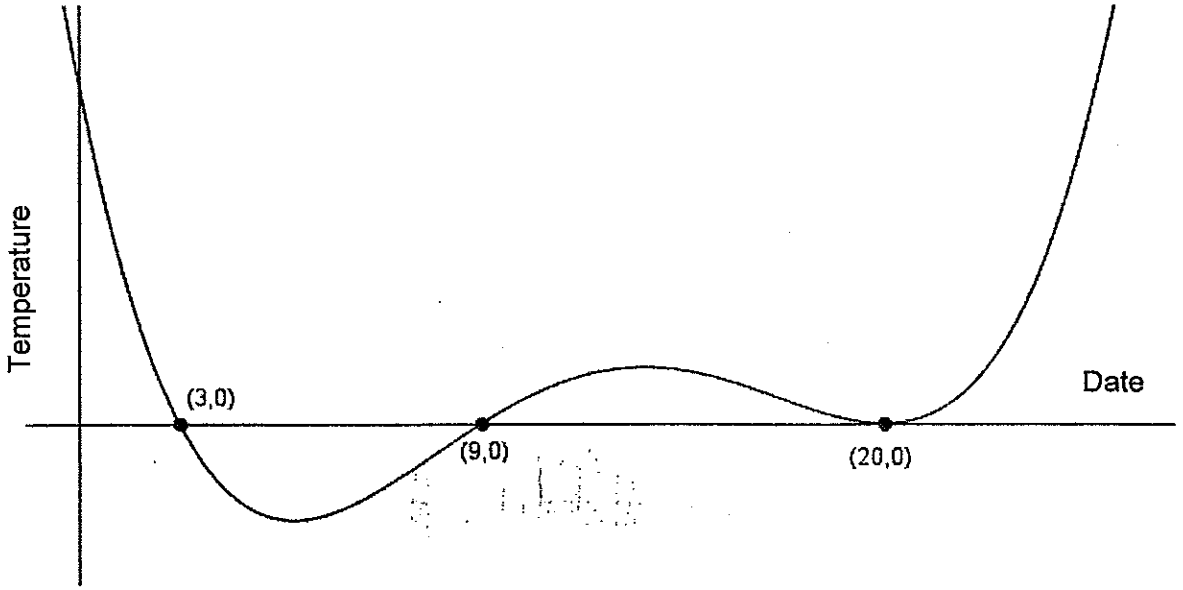
A newspaper journalist is writing a story on the weather and needs to report some information. He needs a bit of guidance with interpreting the graph.

1. Write a few sentences describing the key characteristics of the graph as it relates to the context of the problem. Be sure to include domain, range, intervals where the function increases and decreases, x- and y-intercepts, and any other important information. ↳ (6,10), (21,25) ↳ (0,6), (10,21)

The domain of $f(x)$ is 0 to 25 shown and the range of temperatures is 8° to -6°. This function increase from (6,10) and (21,25), but decreases from (0,6), and (10,21). There is a y-intercept at 8° and x-intercepts on the 4th, 10th, and 25th.

STUDENT G

The graph below shows the curve of best fit that represents the low temperature for every day in February.



2. Three different models have been proposed that could be used to determine the temperature for a particular date in February. The models are given below:

Model 1: $y = ax^2 + bx + c$

Model 2: $y = a(x+3)(x+9)(x+20)$

Model 3: $y = \dfrac{a}{(x-3)(x-9)^2(x-20)}$

None of these models are completely appropriate for the graph. Explain what is incorrect with each of the models and then suggest and justify a better model.

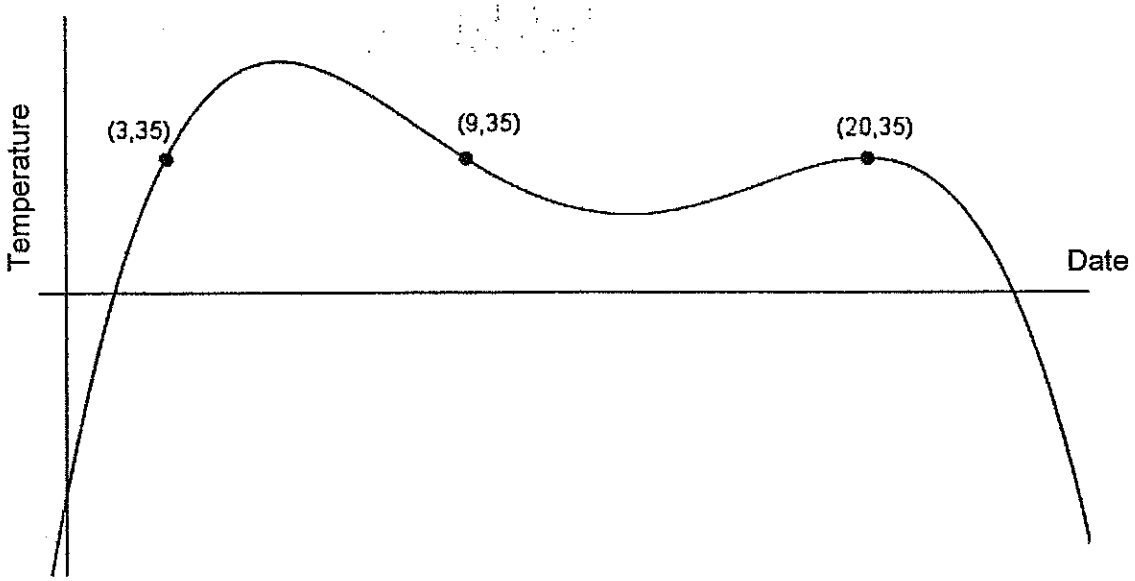
model 1 is incorrect because this is not a parabola. model 2 is incorrect because you don't want to multiply them by a. And model 3 is incorrect because that would put asssymtopes at the intercepts.

$$y = (x-3)(x-9)^2(x-20)$$

because there is a double root, it's an even function, and that gives correct intercepts.

STUDENT G

The weather in July showed a related pattern to the weather in February. The curve of best fit for July is shown below:



3. Explain the relationship between the graph for February and the graph for July. Use that relationship to create an equation for the temperatures in July.

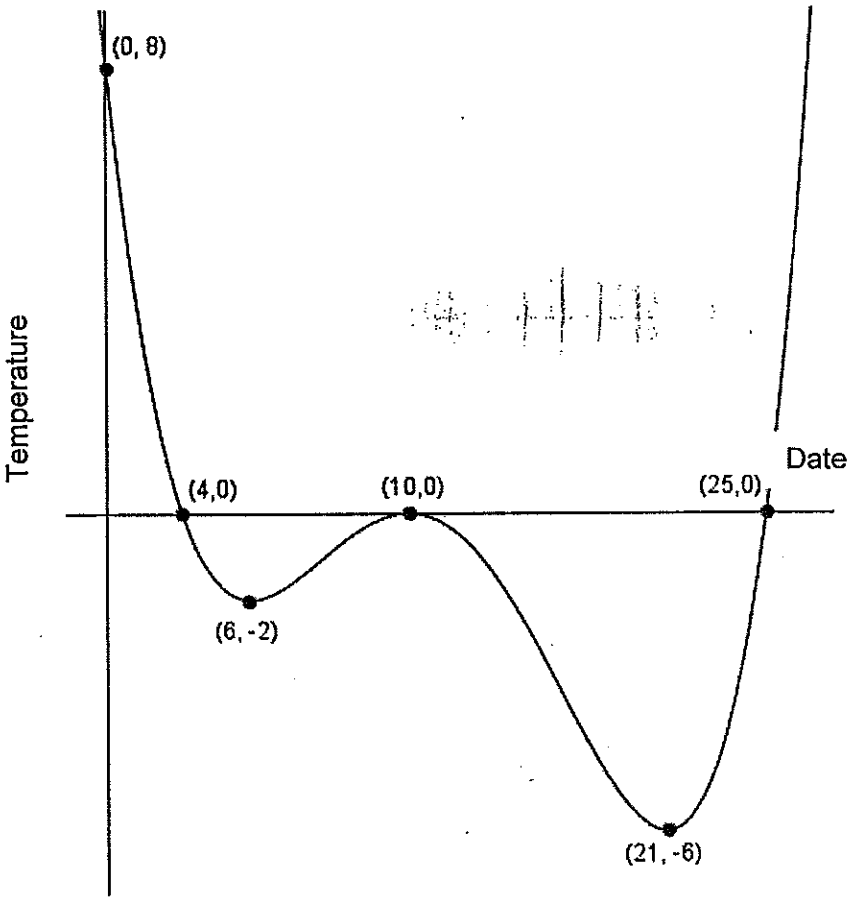
The same equation except flipped on the x-axis and translated 35 units up.

$y = -(x-3)(x-9)^2(x-20)+35$

Intentionally left blank.

STUDENT H H

The town of Frostburg experienced a bit of a heat wave during January of this year. The graph below shows the curve of best fit that represents the low temperature for every day in January.



A newspaper journalist is writing a story on the weather and needs to report some information. He needs a bit of guidance with interpreting the graph.

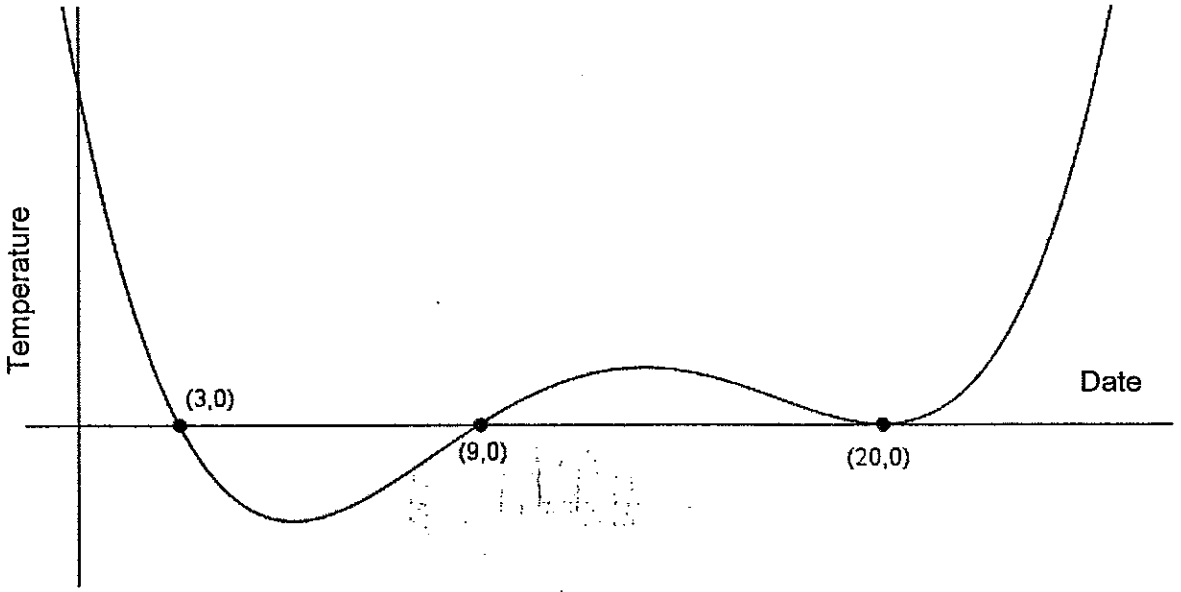
1. Write a few sentences describing the key characteristics of the graph as it relates to the context of the problem. Be sure to include domain, range, intervals where the function increases and decreases, x- and y-intercepts, and any other important information.

At the beginning of January, or the y-axis, there were relatively high temperatures to the rest of the month, the y-intercept is at (0,8). At 3 points in the month, the temperature was 0, which created 3 x-intercepts at (4,0) (10,0) (25,0). The minimum temperature fell at the point (21,-6), then began to rise again. The temperature fell between intervals (0,8) & (6,-2) and (10,0) & (21,-6)

The temperature rose between points (6,-2) & (10,0) and (21,-6) & (25,0)

STUDENT H

The graph below shows the curve of best fit that represents the low temperature for every day in February.



2. Three different models have been proposed that could be used to determine the temperature for a particular date in February. The models are given below:

Model 1: $y = ax^2 + bx + c$

Model 2: $y = a(x+3)(x+9)(x+20)$

Model 3: $y = \dfrac{a}{(x-3)(x-9)^2(x-20)}$

None of these models are completely appropriate for the graph. Explain what is incorrect with each of the models and then suggest and justify a better model.

Model 2 is a quadratic function, it would look like a parabola.

Model 2 is a cubic function, it would be odd, so its ends would probably face different directions.

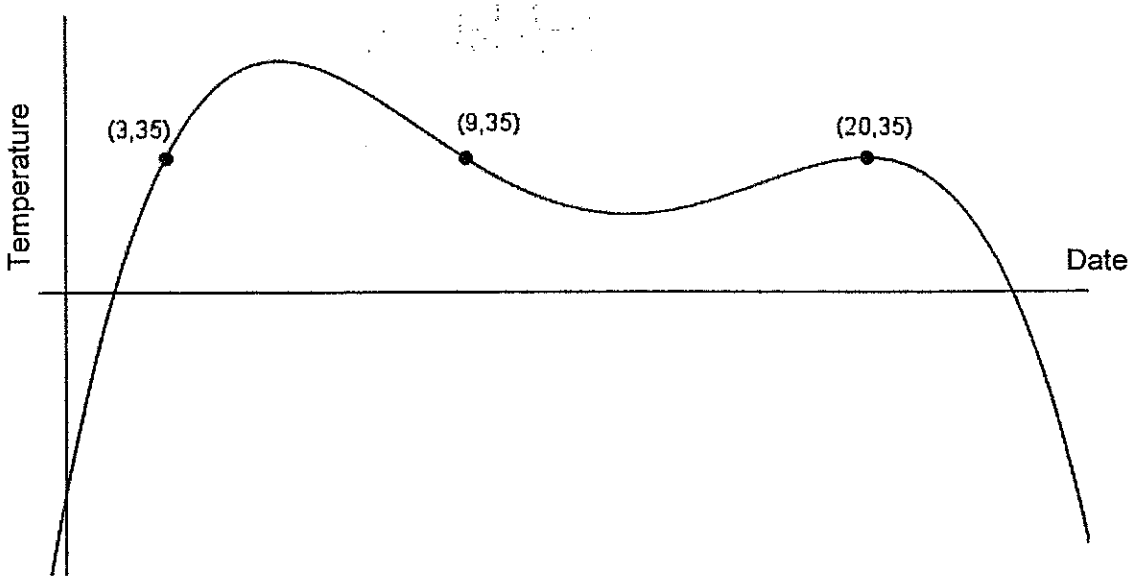
Model 3 is a rational function, because x is in the denominator, it has several asymptotes, which aren't on this graph.

A better model would be a quartic function with 3 x-intercepts, 1 a double root.

$y = (x-3)(x-9)(x-20)^2$

STUDENT H

The weather in July showed a related pattern to the weather in February. The curve of best fit for July is shown below:



3. Explain the relationship between the graph for February and the graph for July. Use that relationship to create an equation for the temperatures in July.

The graph for July is inverted from February then moved up 35 places.

$y = -1\left[(x-3)(x-9)(x-20)^2\right] + 35$