I took 51.5 minutes to do these problems. At first, I thought it was too long, but there's is also no way to really utilize Desmos on these. Do you think my time is short enough for the exam?

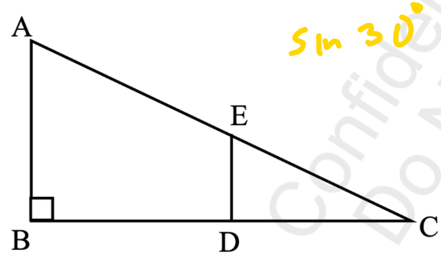
All the problems I chose are level 3 and 4 — you should expect that many of the questions are easier than this. The level 4 questions from this book would mainly fit into the second harder math module or at the very end of the first module.

You get 35 minutes for each 22-question module, so just over a minute and a half per question on average. But some of them will go much more quickly. If you find that a problem seems to be slowing you down significantly, pick an answer, flag it for review, and go answer some other faster ones first.

9. p. 194 Ch. 20 #40

4

40. In the figure below, $AC = 5$. The measure of $\angle C$ is half the measure of $\angle A$, and AB is parallel to ED. In triangle CDE, what is the measure of $\sin C$?



sin 30°

A) $\frac{1}{2}$

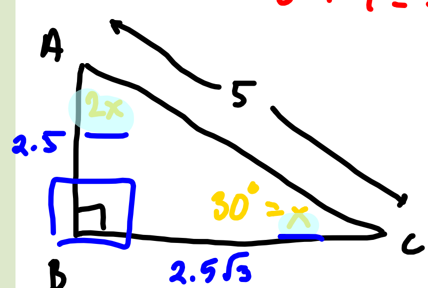
B) $\frac{3}{5}$

C) $\frac{4}{5}$

~~D)~~

3-4-5

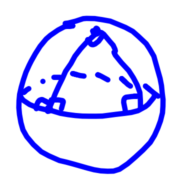
$3^2 + 4^2 = 5^2$



$2x + x + 90 = 180°$

$3x = 90$

$x = 30$



September 14, 2026

6. p. 139 Ch. 16 #23

23. In triangles ABC and DEF, AB and DE each are 7 inches. Angle A and Angle D are both 37°. Which of the following is sufficient to determine that triangles ABC and DEF are congruent?

3

I. The measures of angles B and C are equal. no new info on ΔDEF

II. $AC = DF$

III. $BC = EF$

~~A) I only~~

B) II only

~~C) III only~~

D) II or III only

Δ congruency

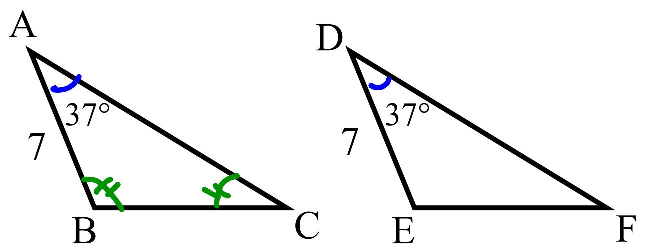
SAA

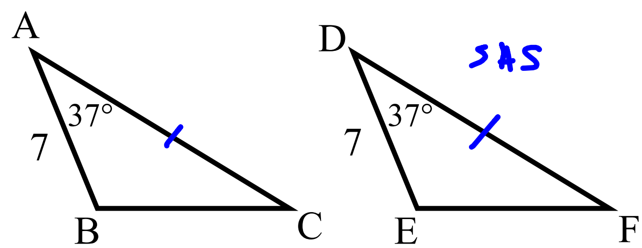
AAS

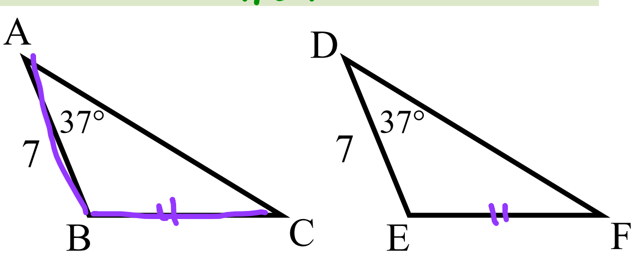
SSS

SAS

ASA







SSA

Tables, basic regression skills in Desmos

Checking inequality values with a table

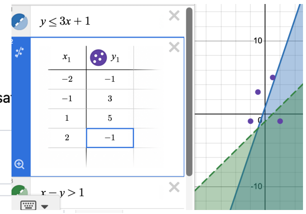
Question c8a5eb4

Algebra - Linear inequalities in one or two variables

2/34 Show

$y \le 3x + 1$
$x - y > 1$

Which of the following ordered pairs (x, y) sa
system of inequalities above?



- $(-2, -1)$
- $(-1, 3)$
- $(1, 5)$
- $(2, -1)$

Choice D is correct. Any point (x, y) that is a solution to the given system of inequalities must satisfy both inequalities in the system. The second inequality in the system can be rewritten as $x > y + 1$. Of the given answer choices, only choice D satisfies this inequality, because inequality $2 > -1 + 1$ is a true statement. The point $(2, -1)$ also satisfies the first inequality.

Question 1218a8f6

Algebra - Linear inequalities in one or two variables

4/34 Show

$$y > 7x - 4$$

For which of the following tables are all the values of x and their corresponding values of y solutions to the given inequality?

x	y
3	13
5	27
8	48

x	y
3	21
5	27
8	52

x	y
3	17
5	31
8	52

x	y
3	21
5	35
8	56

Choice D is correct. A solution (x, y) to the given inequality is a value of x and the corresponding value of y such that the value of y is greater than the value of $7x - 4$. All the tables in the choices have the same three values of x, so each of the three values of x can be substituted in the given inequality to compare the corresponding values of y in each of the tables. Substituting 3 for x in the given inequality yields $y > 7(3) - 4$, or $y > 17$. Substituting 5 for x in the given inequality yields $y > 7(5) - 4$, or $y > 31$. Substituting 8 for x in the given inequality yields $y > 7(8) - 4$, or $y > 52$. Therefore, when $x = 3$, $x = 5$, and $x = 8$, the corresponding values of y must be greater than 17, greater than 31, and greater than 52, respectively. In the table in choice D, when $x = 3$, the corresponding value of y is 21, which is greater than 17; when $x = 5$, the corresponding value of y is 35, which is greater than 31; when $x = 8$, the corresponding value of y is 56, which is greater than 52. Of the given choices, only choice D gives values of x and their corresponding values of y that are all solutions to the given inequality.

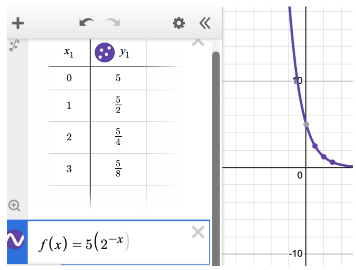
September 14, 2026

Producing a table from an equation

Question ee353457

Show Advanced Math - Nonlinear functions

x	f(x)
0	5
1	$\frac{5}{2}$
2	$\frac{5}{4}$
3	$\frac{5}{8}$



The table above gives the values of the function f for some values of x. Which of the following equations could define f ?

- $f(x) = 5(2^{x+1})$
- $f(x) = 5(2^{x})$
- $f(x) = 5(2^{-(x+1)})$
- $f(x) = 5(2^{-x})$

Choice D is correct. Each choice has a function with coefficient 5 and base 2, so the exponents must be analyzed. When the input value of x increases, the output value of f(x) decreases, so the exponent must be negative. An exponent of −x yields the values in the table: $5 = 5(2^{-0})$, $\frac{5}{2} = 5(2^{-1})$, $\frac{5}{4} = (2^{-2})$, and $\frac{5}{8} = 5(2^{-3})$.

Choices A and B are incorrect and may result from choosing equations that yield an increasing, rather than decreasing, output value of f(x) when the input value of x increases. Choice C is incorrect and may result from choosing an equation that doesn't yield the values in the table.

Question 9b3255b4

Show Algebra - Linear functions

The boiling point of water at sea level is 212 degrees Fahrenheit (°F). For every 550 feet above sea level, the boiling point of water is lowered by about 1°F. Which of the following equations can be used to find the boiling point B of water, in °F, x feet above sea level?

- $B = 550 + \frac{x}{212}$
- $B = 550 - \frac{x}{212}$
- $B = 212 + \frac{x}{550}$
- $B = 212 - \frac{x}{550}$

Choice D is correct. It's given that the boiling point of water at sea level is 212°F and that for every 550 feet above sea level, the boiling point of water is lowered by about 1°F. Therefore, the change in the boiling point of water x feet above sea level is represented by the expression $-\frac{x}{550}$. Adding this expression to the boiling point of water at sea level gives the equation for the boiling point B of water, in °F, x feet above sea level: $B = -\frac{x}{550} + 212$, or $B = 212 - \frac{x}{550}$.

Producing a table from an equation (more)

Question 36fa1fbd

Show Advanced Math - Nonlinear functions

Kao measured the temperature of a cup of hot chocolate placed in a room with a constant temperature of 70 degrees Fahrenheit (°F). The temperature of the hot chocolate was 185°F at 6:00 p.m. when it started cooling. The temperature of the hot chocolate was 156°F at 6:05 p.m. and 135°F at 6:10 p.m. The hot chocolate's temperature continued to decrease. Of the following functions, which best models the temperature $T(m)$, in degrees Fahrenheit, of Kao's hot chocolate m minutes after it started cooling?

- $T(m) = 185(1.25)^m$
- $T(m) = 185(0.85)^m$
- $T(m) = (185 - 70)(0.75)^{\frac{m}{5}}$
- $T(m) = 70 + 115(0.75)^{\frac{m}{5}}$

Choice D is correct. The hot chocolate cools from 185°F over time, never going lower than the room temperature, 70°F. Since the base of the exponent in this function, 0.75, is less than 1, $T(m)$ decreases as time increases. Using the function, the temperature, in °F, at 6:00 p.m. can be estimated as $T(0)$ and is equal to $70 + 115(0.75)^{\frac{0}{5}} = 185$. The temperature, in °F, at 6:05 p.m. can be estimated as $T(5)$ and is equal to $70 + 115(0.75)^{\frac{5}{5}}$, which is approximately 156°F. Finally, the temperature, in °F, at 6:10 p.m. can be estimated as $T(10)$ and is equal to $70 + 115(0.75)^{\frac{10}{5}}$, which is approximately 135°F.

Since these three given values of m and their corresponding values for $T(m)$ can be verified using the function $T(m) = 70 + 115(0.75)^{\frac{m}{5}}$, this is the best function out of the given choices to model the temperature of Kao's hot chocolate after m minutes.

Choice A is incorrect because the base of the exponent, 1.25, results in the value of $T(m)$ increasing over time rather than decreasing. Choice B is incorrect because when m is large enough, $T(m)$ becomes less than 70. Choice C is incorrect because the maximum value of $T(m)$ at 6:00 p.m. is 115°F, not 185°F.

Linear regression with the icon

Question 9b6bf9d

Show Algebra - Linear functions

x	$g(x)$
1	54
2	51
3	48
4	45

For the linear function g, the table shows four values of x and their corresponding values of $g(x)$. The function can be written as $g(x) = mx + b$, where m and b are constants. What is
value of b?

3

27

54

57

Choice D is correct. It's given that for the linear f
table shows four values of x and their correspon
$g(x)$. It's also given that the function can be writ
$= mx + b$, where m and b are constants. The ta
that when the value of x is 1, the corresponding
is 54. Substituting 1 for x and 54 for $g(x)$ in $g($
yields $54 = m(1) + b$ or, $54 = m + b$. Subtract
both sides of this equation yields $54 - b = m$. T
shows that when the value of x is 2, the corresp
of $g(x)$ is 51. Substituting 2 for x and 51 for $g($
$= mx + b$ yields $51 = m(2) + b$, or $51 = 2m$
Substituting $54 - b$ for m in this equation yields
$- b) + b$. Applying the distributive property to th
side of this equation yields $51 = 108 - 2b + b$,
$- b$. Subtracting 108 from both sides of this equ
$-57 = -b$. Dividing both sides of this equation
$57 = b$.

x_1	y_1
1	54
2	51
3	48
4	45

Linear Regression

EQUATION

$y = -3x + 57$

STATISTICS

$R^2 = 1$

$r = -1$

RESIDUALS

e_1 plot

Question 3f963a8f

Show Algebra - Linear functions

x	$f(x)$
0	−2
2	4
6	16

Some values of the linear function f are shown in the table above. What is the value of $f(3)$?

6

7

8

9

Choice B is correct. A linear function has a constant rate of change, and any two rows of the table shown can be used to calculate this rate. From the first row to the second, the value of x is increased by 2 and the value of $f(x)$ is increased by $6 = 4 - (-2)$. So the values of $f(x)$ increase by 3 for every increase by 1 in the value of x. Since $f(2) = 4$, it follows that $f(2+1) = 4 + 3 = 7$. Therefore, $f(3) = 7$.

Choice A is incorrect. This is the third x-value in the table, not $f(3)$. Choices C and D are incorrect and may result from errors when calculating the function's rate of change.

Linear regression with the icon (more)

Question 697cd383

Show Algebra - Linear functions

x	$f(x)$
1	-64
2	0
3	64

For the linear function f, the table shows three values of x and their corresponding values of $f(x)$. Function f is defined by $f(x) = ax + b$, where a and b are constants. What is the value of $a - b$?

- -64
- 62
- 128
- 192

Choice D is correct. The table gives that $f(x) = 0$ when $x = 2$. Substituting 0 for $f(x)$ and 2 for x into the equation $f(x) = ax + b$ yields $0 = 2a + b$. Subtracting $2a$ from both sides of this equation yields $b = -2a$. The table gives that $f(x) = -64$ when $x = 1$. Substituting $-2a$ for b, -64 for $f(x)$, and 1 for x into the equation $f(x) = ax + b$ yields $-64 = a(1) + (-2a)$. Combining like terms yields $-64 = -a$, or $a = 64$. Since $b = -2a$, substituting 64 for a into this equation gives $b = (-2)(64)$, which yields $b = -128$. Thus, the value of $a - b$ can be written as $64 - (-128)$, which is 192.

Choice A is incorrect. This is the value of $a + b$, not $a - b$.

Choice B is incorrect. This is the value of $a - 2$, not $a - b$.

Choice C is incorrect. This is the value of $2a$, not $a - b$.

Question 3a6ff98c

Show Algebra - Linear functions

x	y
-12	-45
6	45

The table shows two values of x and their corresponding values of y. The graph of the linear equation representing this relationship passes through the point $\left(\frac{1}{4},\ a\right)$. What is the value of a?

Answer

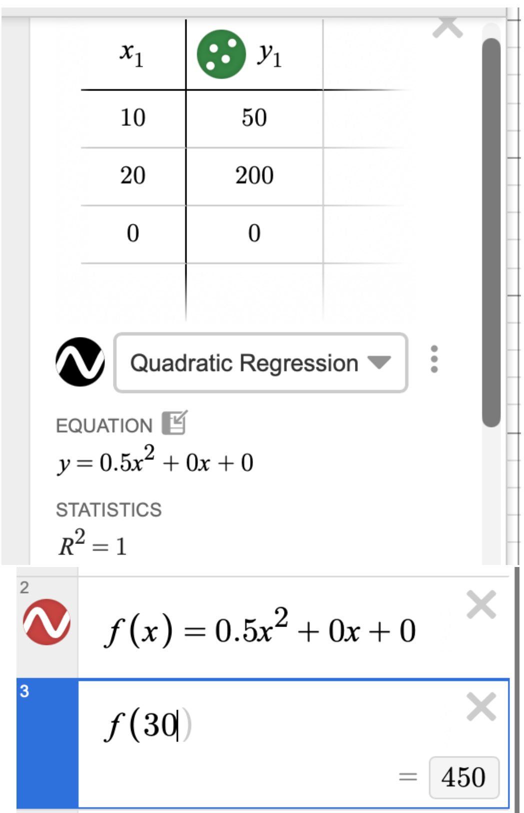
The correct answer is $\frac{65}{4}$. The linear relationship between x and y can be represented by the equation $y = mx + b$, where m and b are constants. It's given in the table that when $x = -12$, $y = -45$. Substituting -12 for x and -45 for y in the equation $y = mx + b$ yields $-45 = -12m + b$, which can be rewritten as $-45 + 12m = b$. It's also given in the table that when $x = 6$, $y = 45$. Substituting 6 for x and 45 for y in the equation $y = mx + b$ yields $45 = 6m + b$, which can be rewritten as $45 - 6m = b$. Substituting $-45 + 12m$ for b in this equation yields $45 - 6m = -45 + 12m$. Adding $6m$ to both sides of this equation yields $45 = -45 + 18m$. Adding 45 to both sides of this equation yields $90 = 18m$. Dividing both sides of this equation by 18 yields $5 = m$, or $m = 5$. Substituting 5 for m, -12 for x, and -45 for y in the equation $y = mx + b$ yields $-45 = 5(-12) + b$, or $-45 = -60 + b$. Adding 60 to both sides of this equation yields $15 = b$. Therefore, $m = 5$ and $b = 15$. Substituting 5 for m and 15 for b in the equation $y = mx + b$ yields $y = 5x + 15$. Thus, the equation $y = 5x + 15$ represents the linear relationship between x and y. It's also given that the graph of the linear equation representing this relationship passes through the point $\left(\frac{1}{4}, a\right)$. Substituting $\frac{1}{4}$ for x and a for y in the equation $y = 5x + 15$ yields $a = 5\left(\frac{1}{4}\right) + 15$, which is equivalent to $a = \frac{5}{4} + 15$, or $a = \frac{65}{4}$. Note that 65/4 and 16.25 are examples of ways to enter a correct answer.

Quadratic regression from a table

Question 8ed94555

Show Advanced Math - Nonlinear functions

The total distance d, in meters, traveled by an object moving in a straight line can be modeled by a quadratic function that is defined in terms of t, where t is the time in seconds. At a time of 10.0 seconds, the total distance traveled by the object is 50.0 meters, and at a time of 20.0 seconds, the total distance traveled by the object is 200.0 meters. If the object was at a distance of 0 meters when $t = 0$, then what is the total distance traveled, in meters, by the object after 30.0 seconds?



The correct answer is 450. The quadratic equation that models this situation can be written in the form $d = at^2 + bt + c$, where a, b, and c are constants. It's given that the distance, d, the object traveled was 0 meters when $t = 0$ seconds. These values can be substituted into the equation to solve for a, b, and c: $0 = a(0)^2 + b(0) + c$. Therefore, $c = 0$, and it follows that $d = at^2 + bt$. Since it's also given that d is 50 when t is 10 and d is 200 when t is 20, these values for d and t can be substituted to create a system of two linear equations: $50 = a(10)^2 + b(10)$ and $200 = a(20)^2 + b(20)$, or $10a + b = 5$ and $20a + b = 10$. Subtracting the first equation from the second equation yields $10a = 5$, or $a = \frac{1}{2}$. Substituting $\frac{1}{2}$ for a in the first equation and solving for b yields $b = 0$. Therefore, the equation that represents this situation is $d = \frac{1}{2}t^2$. Evaluating this function when $t = 30$ seconds yields $d = \frac{1}{2}(30)^2 = 450$, or $d = 450$ meters.

Projectile motion

Question 95e390e

Show Advanced Math - Nonlinear functions

A quadratic function models the height, in feet, of an object above the ground in terms of the time, in seconds, after the object is launched off an elevated surface. The model indicates the object has an initial height of 10 feet above the ground and reaches its maximum height of $1{,}034$ feet above the ground 8 seconds after being launched. Based on the model, what is the height, in feet, of the object above the ground 10 seconds after being launched?

time	height
0	10
highest 8	1034
16	10

- 234
- 778
- 970
- 1,014

×

Choice C is correct. It's given that a quadratic function models the height, in feet, of an object above the ground in terms of the time, in seconds, after the object is launched off an elevated surface. This quadratic function can be defined by an equation of the form $f(x) = a(x-h)^2 + k$, where $f(x)$ is the height of the object x seconds after it was launched, and a, h, and k are constants such that the function reaches its maximum value, k, when $x = h$. Since the model indicates the object reaches its maximum height of $1{,}034$ feet above the ground 8 seconds after being launched, $f(x)$ reaches its maximum value, $1{,}034$, when $x = 8$. Therefore, $k = 1{,}034$ and $h = 8$. Substituting 8 for h and $1{,}034$ for k in the function $f(x) = a(x-h)^2 + k$ yields $f(x) = a(x-8)^2 + 1{,}034$. Since the model indicates the object has an initial height of 10 feet above the ground, the value of $f(x)$ is 10 when $x = 0$. Substituting 0 for x and 10 for $f(x)$ in the equation $f(x) = a(x-8)^2 + 1{,}034$ yields $10 = a(0-8)^2 + 1{,}034$, or $10 = 64a + 1{,}034$. Subtracting $1{,}034$ from both sides of this equation yields $64a = -1{,}024$. Dividing both sides of this equation by 64 yields $a = -16$. Therefore, the model can be represented by the equation $f(x) = -16(x-8)^2 + 1{,}034$. Substituting 10 for x in this equation yields $f(10) = -16(10-8)^2 + 1{,}034$, or $f(10) = 970$. Therefore, based on the model, 10 seconds after being launched, the height of the object above the ground is 970 feet.

x_1	y_1
0	10
8	1034
16	10

by symmetry

Quadratic Regression

EQUATION

$y = -16x^2 + 256x + 10$

STATISTICS

$R^2 = 1$

$h(x) = -16x^2 + 256x +$

$h(10)$

$= 970$

Custom regression

Question 7a391218

Show **Advanced Math - Nonlinear functions**

The function h is defined by $h(x) = a^x + b$, where a and b are positive constants. The graph of $y = h(x)$ in the xy-plane passes through the points $(0, 10)$ and $(-2, \frac{325}{36})$. What is the value of ab?

- $\frac{1}{4}$
- $\frac{1}{2}$
- 54
- 60

x_1	y_1
0	10
-2	$\frac{325}{36}$

$y_1 \sim a^{x_1} + b$

REGRESSION PARAMETERS

$a = 6$

$b = 9$

STATISTICS

ab

$= 54$

…ce C is correct. It's given that the function h is defined by …$) = a^x + b$ and that the graph of $y = h(x)$ in the xy-…e passes through the points $(0, 10)$ and $(-2, \frac{325}{36})$. …stituting 0 for x and 10 for $h(x)$ in the equation $h(x)$ …$^x + b$ yields $10 = a^0 + b$, or $10 = 1 + b$. Subtracting 1 … both sides of this equation yields $9 = b$. Substituting -2 … and $\frac{325}{36}$ for $h(x)$ in the equation $h(x) = a^x + 9$ yields …$= a^{-2} + 9$. Subtracting 9 from both sides of this …ation yields $\frac{1}{36} = a^{-2}$, which can be rewritten as $a^2 = 36$ …ing the square root of both sides of this equation yields a … and $a = -6$, but because it's given that a is a positive …stant, a must equal 6. Because the value of a is 6 and the …e of b is 9, the value of ab is $(6)(9)$, or 54.

Question ea182446

Show **Advanced Math - Nonlinear functions**

$h(x) = x^3 + ax^2 + bx + c$

$y_1 \sim x_1^3 + ax^2 + bx_1 + c$

x	y
-5	0
6	0
7	0

The function h is defined above, where a, b, and c are integer constants. If the zeros of the function are -5, 6, and 7, what is the value of c ?

Answer

The correct answer is 210. Since -5, 6, and 7 are zeros of the function, the function can be rewritten as $h(x) = (x+5)(x-6)(x-7)$. Expanding the function yields $h(x) = x^3 - 8x^2 - 23x + 210$. Thus, $a = -8$, $b = -23$, and $c = 210$. Therefore, the value of c is 210.

Translations in the table, so calculations in the entries

Question eff1fea0

Show **Advanced Math - Nonlinear functions**

x	y
21	-8
23	8
25	-8

EQUATION

$f(x) + 4 = y = -4x^2 + 184x - 2108$

-4 -4

$f(x) = -4x^2 + 184x - 2112$

The table shows three values of x and their corresponding values of y, where $y = f(x) + 4$ and f is a quadratic function. What is the y-coordinate of the y-intercept of the graph of $y = f(x)$ in the *xy*-plane?

The correct answer is $-2{,}112$. It's given that f is a quadratic function. It follows that f can be defined by an equation of the form $f(x) = a(x-h)^2 + k$, where a, h, and k are constants. It's also given that the table shows three values of x and their corresponding values of y, where $y = f(x) + 4$. Substituting $a(x-h)^2 + k$ for $f(x)$ in this equation yields $y = a(x-h)^2 + k + 4$. This equation represents a quadratic relationship between x and y, where $k + 4$ is either the maximum or the minimum value of y, which occurs when $x = h$. For quadratic relationships between x and y, the maximum or minimum value of y occurs at the value of x halfway between any two values of x that have the same corresponding value of y. The table shows that *x*-values of 21 and 25 correspond to the same *y*-value, -8. Since 23 is halfway between 21 and 25, the maximum or minimum value of y occurs at an *x*-value of 23. The table shows that when $x = 23$, $y = 8$. It follows that $h = 23$ and $k + 4 = 8$. Subtracting 4 from both sides of the equation $k + 4 = 8$ yields $k = 4$. Substituting 23 for h and 4 for k in the equation $y = a(x-h)^2 + k + 4$ yields $y = a(x-23)^2 + 4 + 4$, or $y = a(x-23)^2 + 8$. The value of a can be found by substituting any *x*-value and its corresponding *y*-value for x and y, respectively, in this equation. Substituting 25 for x and -8 for y in this equation yields $-8 = a(25-23)^2 + 8$, or $-8 = a(2)^2 + 8$. Subtracting 8 from both sides of this equation yields $-16 = a(2)^2$, or $-16 = 4a$. Dividing both sides of this equation by 4 yields $-4 = a$. Substituting -4 for a, 23 for h, and 4 for k in the equation $f(x) = a(x-h)^2 + k$ yields $f(x) = -4(x-23)^2 + 4$. The *y*-intercept of the graph of $y = f(x)$ in the *xy*-plane is the point on the graph where $x = 0$. Substituting 0 for x in the equation $f(x) = -4(x-23)^2 + 4$ yields $f(0) = -4(0-23)^2 + 4$, or $f(0) = -4(-23)^2 + 4$. This is equivalent to $f(0) = -2{,}112$, so the *y*-intercept of the graph of $y = f(x)$ in the *xy*-plane is $(0, -2{,}112)$. Thus, the y-coordinate of the y-intercept of the graph of $y = f(x)$ in the *xy*-plane is $-2{,}112$.