ID: 005e9982

$$f(x) = 9{,}000(0.66)^x$$

The given function f models the number of advertisements a company sent to its clients each year, where x represents the number of years since 1997, and $0 \leq x \leq 5$. If $y = f(x)$ is graphed in the *xy*-plane, which of the following is the best interpretation of the *y*-intercept of the graph in this context?

A. The minimum estimated number of advertisements the company sent to its clients during the 5 years was $1{,}708$.

B. The minimum estimated number of advertisements the company sent to its clients during the 5 years was $9{,}000$.

C. The estimated number of advertisements the company sent to its clients in 1997 was $1{,}708$.

D. The estimated number of advertisements the company sent to its clients in 1997 was $9{,}000$.

ID: a1397504

$$0.36x^2 + 0.63x + 1.17$$

The given expression can be rewritten as $a(4x^2 + 7x + 13)$, where a is a constant. What is the value of a?

$a = 0.09$ ✓

ID: 536832c0

In the xy-plane, a line with equation $2y = 4.5$ intersects a parabola at exactly one point. If the parabola has equation $y = -4x^2 + bx$, where b is a positive constant, what is the value of b?

$y = 2.25$

$2.25 = -4x^2 + bx$

$0 = -4x^2 + bx - 2.25$

$0 = b^2 - 4(-4)(-2.25)$

$0 = b^2 - 36$

$36 = b^2$

$b = 6$ ✓

Alt method ↓

$x = \frac{-b}{2(-4)}$

$x = \frac{-b}{-8}$

$x = \frac{b}{8}$

$2.25 = -4\left(\frac{b}{8}\right)^2 + b\left(\frac{b}{8}\right)$

$2.25 = \frac{-b^2}{16} + \frac{2b^2}{16}$

$2.25 = \frac{b^2}{16}$

$b^2 = 36$

$b = 6$ ✓

ID: fb46b28e

Which expression is equivalent to $12x + 27$?

A. $12(9x + 1)$

B. $27(12x + 1)$

C. $3(4x + 9)$

D. $3(9x + 24)$

ID: eafd61d3

The expression $(3x - 23)(19x + 6)$ is equivalent to the expression $ax^2 + bx + c$, where a, b, and c are constants. What is the value of b?

$(3x)(6) + (-23)(19x)$

$18x - 437x$

$b = -419$ ✓

ID: 401c7c6c

Which expression is equivalent to $9x + 6x + 2y + 3y$?

A. $3x + 5y$

B. $6x + 8y$

C. $12x + 8y$

D. $15x + 5y$

ID: 9298a52e

$$x^2 + y + 7 = 7$$
$$20x + 100 - y = 0$$

The solution to the given system of equations is (x, y). What is the value of x?

$x^2 = -y$

$x^2 + 20x + 100 = 0$

$(x+10)(x+10) = 0$

$x = -10$

ID: 8df65561

$$f(x) = x^2 - 18x - 360$$

If the given function f is graphed in the *xy*-plane, where $y = f(x)$, what is an *x*-intercept of the graph?

A. $(-12, 0)$

B. $(-30, 0)$

C. $(-360, 0)$

D. $(12, 0)$

ID: f5f840a0

For the function f, $f(0) = 86$, and for each increase in x by 1, the value of $f(x)$ decreases by 80%. What is the value of $f(2)$?

$f(2) = 3.44$ ✓

ID: 219a57aa

Which expression represents the product of $\left(x^{-6}y^{3}z^{5}\right)$ and $\left(x^{4}z^{5}+y^{8}z^{-7}\right)$?

A. $x^{-2}z^{10}+y^{11}z^{-2}$

B. $x^{-2}z^{10}+x^{-6}z^{-2}$

C. $x^{-2}y^{3}z^{10}+y^{8}z^{-7}$

D. $x^{-2}y^{3}z^{10}+x^{-6}y^{11}z^{-2}$

ID: 3138e379

$$\sqrt[5]{70n}\left(\sqrt[6]{70n}\right)^2$$

For what value of x is the given expression equivalent to $(70n)^{30x}$, where $n > 1$?

$\sqrt[5]{70n}\ (\sqrt[3]{70n})$

$(70n)^{\frac{1}{5}} \cdot (70n)^{\frac{1}{3}}$

$\sqrt[15]{70n}$

$(70n)^{\frac{1}{15}}$

$\frac{1}{15} = 30x$

$x = \frac{1}{450}$ X

$(70n)^{\frac{1}{5}} \cdot \left[(70n)^{\frac{1}{6}}\right]^2$

$(70n)^{\frac{1}{5}} \cdot (70n)^{\frac{1}{3}}$

$\frac{1}{5} + \frac{1}{3} = \frac{3}{15} + \frac{5}{15} = \frac{8}{15}$

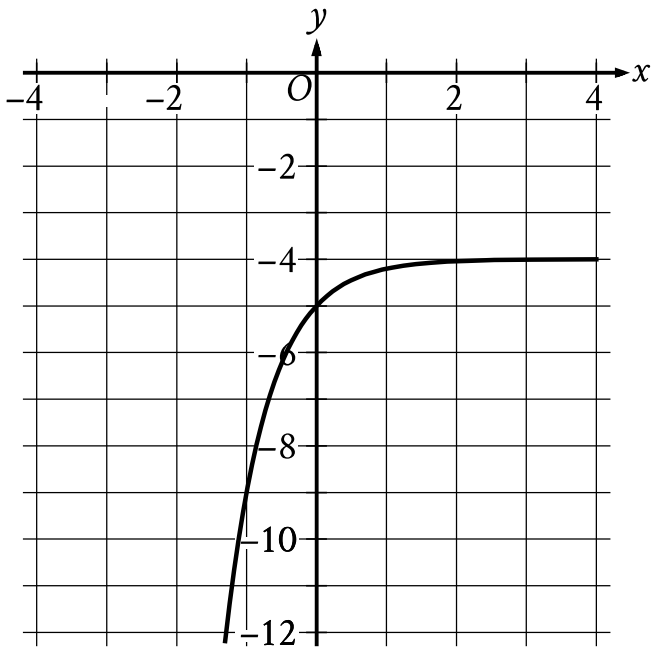
$(70n)^{8/15}$

$\frac{8}{15} = 30x$

$x = \frac{8}{450}$

$x = \frac{4}{225}$ or $0.017778\ldots$

ID: 9322d5de



What is the y-intercept of the graph shown?

A. $(-1, -9)$

B. $(0, -5)$

C. $(0, -4)$

D. $(0, 0)$

ID: 3e4e3220

x	y
21	−8
23	8
25	−8

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?

$m = \frac{8-(-8)}{23-21} = \frac{16}{2} = 8$

$y - 23 = 8(x - 8)$

$y - 23 = 8x - 64$

$y = 8x - 41$

Answer $= -41 - 4 = \boxed{-44}$ X

$f(0) + 4 = -4(-23)^2 + 8$

$f(0) + 4 = -2108$

$f(0) = -2112$

$m = 8$

$y - 25 = 8(x + 8)$

$y - 25 = 8x + 64$

$y = 8x + 89$

Vertex $= (23, 8)$

$y = a(x - 23)^2 + 8$

$-8 = a(21 - 23)^2 + 8$

$-16 = 4a$

$a = -4$

$f(0) + 4 = -4(x - 23)^2 + 8$

ID: 76bb62a9

The function f is defined by $f(x) = 4 + \sqrt{x}$. What is the value of $f(144)$?

A. 0

B. 16

C. 40

D. 76

ID: 9955f37a

$$f(x) = (x + 6)(x - 4)$$

If the given function f is graphed in the *xy*-plane, where $y = f(x)$, what is the *x*-coordinate of an *x*-intercept of the graph?

$x = -6$ ✓

ID: e0cc40e8

$$38x^2 = 38(9)$$

What is the negative solution to the given equation?

$x^2 = 9$

$x = \pm 3$

$x = -3$ ✓

ID: 23923e5b

Simply vertex formulae, no physics here.

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?

A. **234**

B. **778**

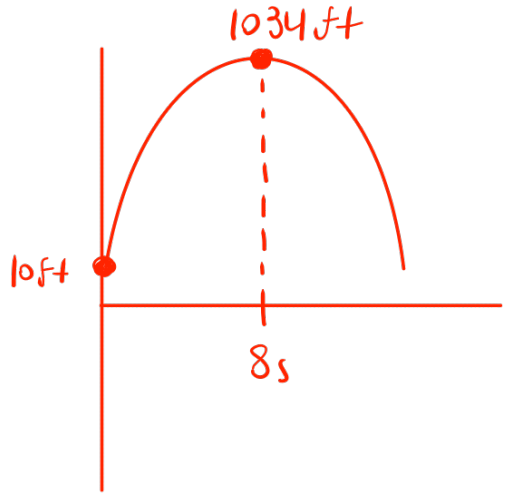
C. **970** ✓

D. **1,014**

dt-graph

(0, 10)

(8, 1034)



1034 ft − 9.81(2) m

Vertex = (8, 1034)

$y = a(x-h)^2 + k$

$10 = a(0-8)^2 + 1034$

$10 = 64a + 1034$

$-1024 = 64a$

$a = -16$

$f(x) = -16(x-8)^2 + 1034$

$f(10) = -16(10-8)^2 + 1034$

$f(10) = -64 + 1034$, $f(10) = 970$ ft

$s = ut + \frac{1}{2}at^2$

$1034 = u(8) + \frac{1}{2}(10)(8)^2$

$1034 = 8u + 320$

$714 = 8u$

$u = 89.25\ ms^{-1}$

Doesn't work. Points are given in feet, not meters.

ID: 59cf1dd3

$(x-1)^2 = -4$

Tells us the answer right away. This quadratic with a negative right-hand side has no solution.

How many distinct real solutions does the given equation have?

A. Exactly one

B. Exactly two

C. Infinitely many

D. Zero ✓

$x^2 - 2x + 1 = -4$

$x^2 - 2x + 5 = 0$

$x = \frac{2 \pm \sqrt{(-2)^2 - 4(1)(5)}}{2(1)}$

$x = \frac{2 \pm \sqrt{-16}}{2}$

Uhoh. All solutions are imaginary.

Taking $(x-1)$ as a whole expression, whatever this comes out to should be positive because it's $(x-1)^2$; it's being squared. However, it's set equal to a negative number, and it's impossible for a squared value to be negative. Therefore, the equation is false, and there are no solutions for x.

ID: 9f13fad1

$$-16x^2 - 8x + c = 0$$

In the given equation, c is a constant. The equation has exactly one solution. What is the value of c?

$\Delta = b^2 - 4ac$

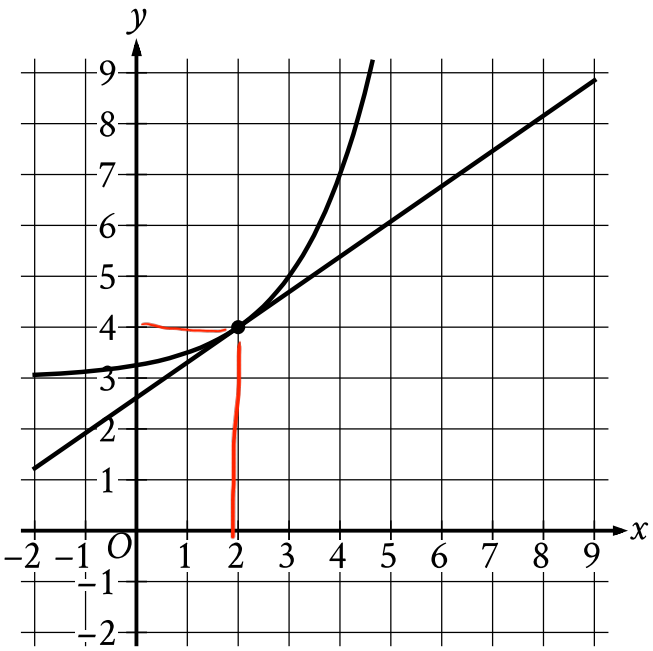
$0 = (-8)^2 - 4(-16)(c)$

$0 = 64 + 64c$

$-64 = 64c$

$c = -1$ ✓

ID: 9c7ef949



The graph of a system of a linear equation and a nonlinear equation is shown. What is the solution (x, y) to this system?

A. $(0, 0)$

B. $(0, 2)$

C. $(2, 4)$

D. $(4, 0)$

ID: e65d34a5

The area A, in square centimeters, of a rectangular painting can be represented by the expression $w(w+29)$, where w is the width, in centimeters, of the painting. Which expression represents the length, in centimeters, of the painting?

A. w

B. 29

C. $(w+29)$

D. $w(w+29)$

ID: b7f055bc

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?

A. $\frac{1}{4}$

B. $\frac{1}{2}$

C. **54**

D. **60**

$10 = a^0 + b$

$10 = 1 + b$

$b = 9$

* 10 looks like the y-intercept at first, but because of the nature of variable exponents it turns out to something different

$\frac{325}{36} = a^{-2} + 9$

$\frac{325}{36} - \frac{324}{36} = \frac{1}{a^2}$

$\frac{1}{36} = \frac{1}{a^2}$

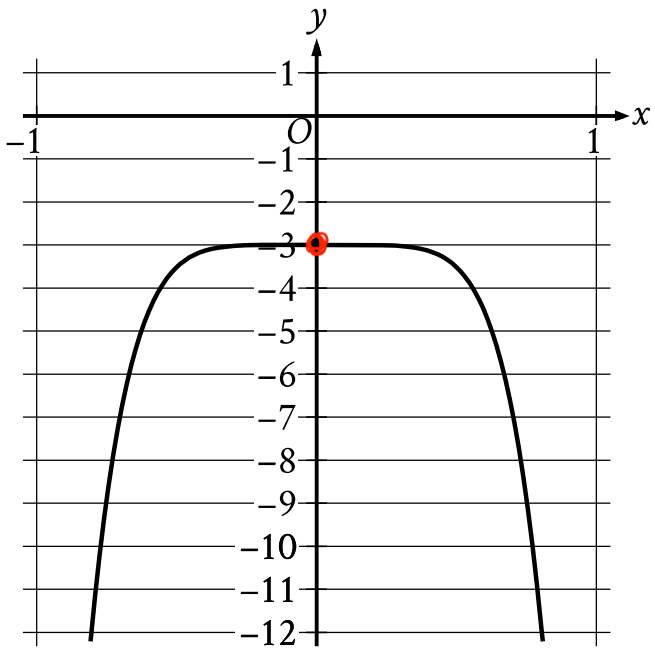
$a^2 = 36$

$a_+ = 6$

$ab = 9(6)$

$ab = 54$

ID: 089483cd



The graph of the polynomial function f, where $y = f(x)$, is shown. The y-intercept of the graph is $(0, y)$. What is the value of y?

$y = -3$ ✓

ID: 3aaf7740

Time (years)	Total amount (dollars)
0	670.00
1	674.02
2	678.06

Sara opened a savings account at a bank. The table shows the exponential relationship between the time t, in years, since Sara opened the account and the total amount d, in dollars, in the account. If Sara made no additional deposits or withdrawals, which of the following equations best represents the relationship between t and d?

A. $d = 0.006$msup

B. $d = 670$msup

670 is the correct present value ✓

C. $d =$ msup

D. $d =$ msup