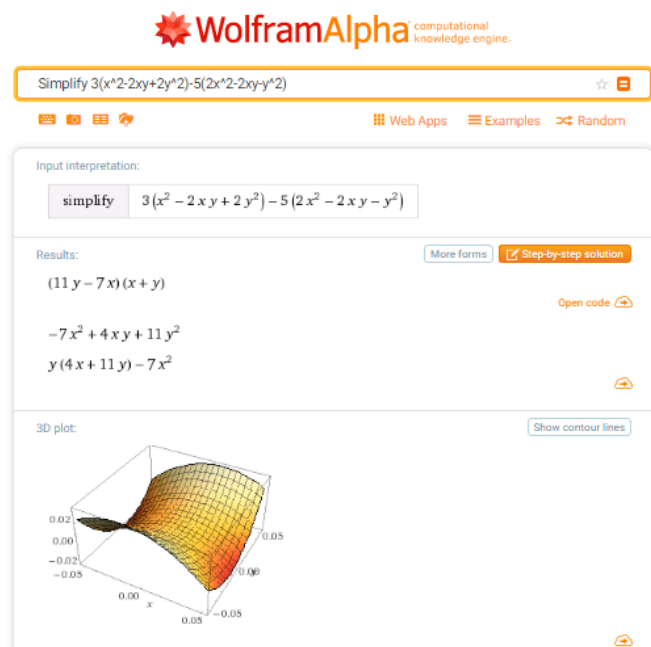


UNIT 0 ADDENDUM – HOW TO CHECK YOUR ANSWERS

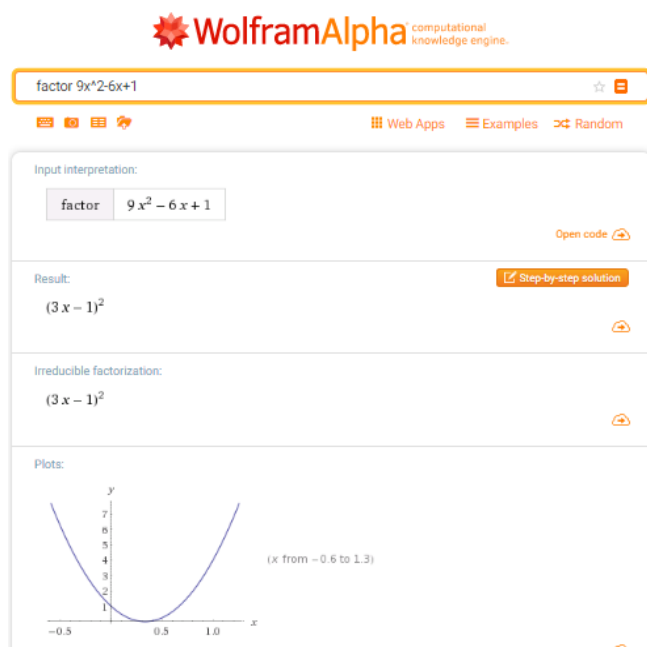
Mechanical Exercises – Use Wolfram Alpha

Examples

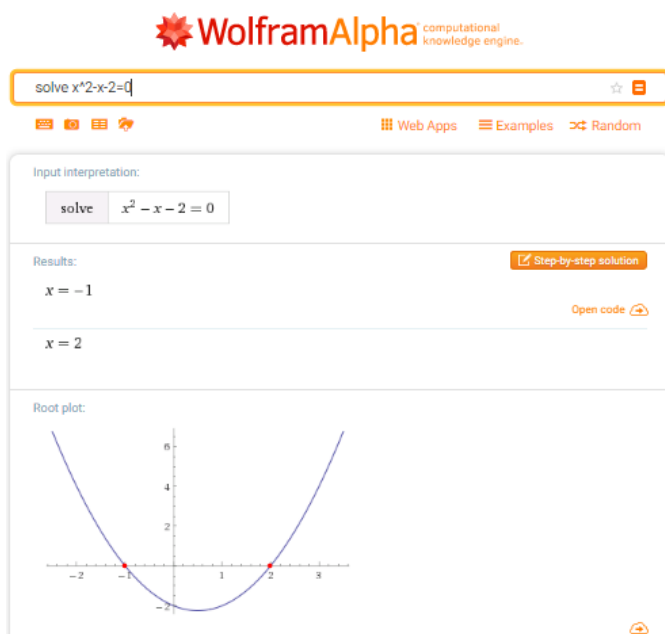
(a) Simplify $3(x^2 - 2xy + 2y^2) - 5(2x^2 - 2xy - y^2)$



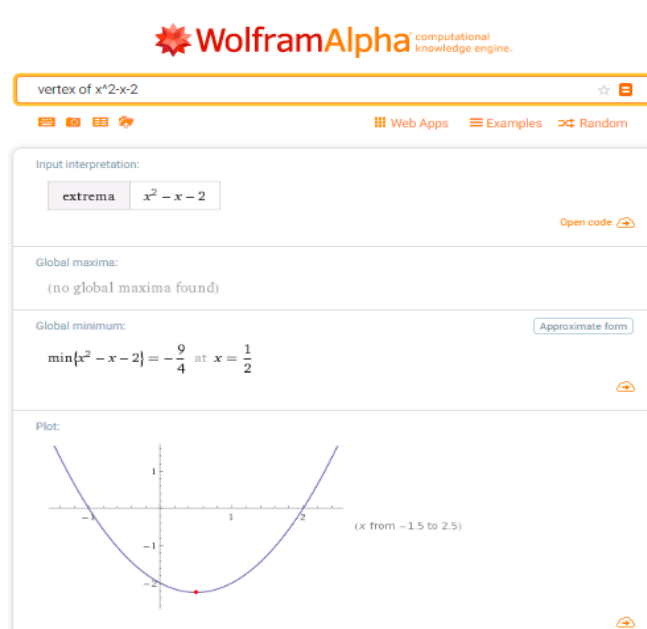
(b) Factor $9x^2 - 6x + 1$



(c) Solve $x^2 - x - 2 = 0$



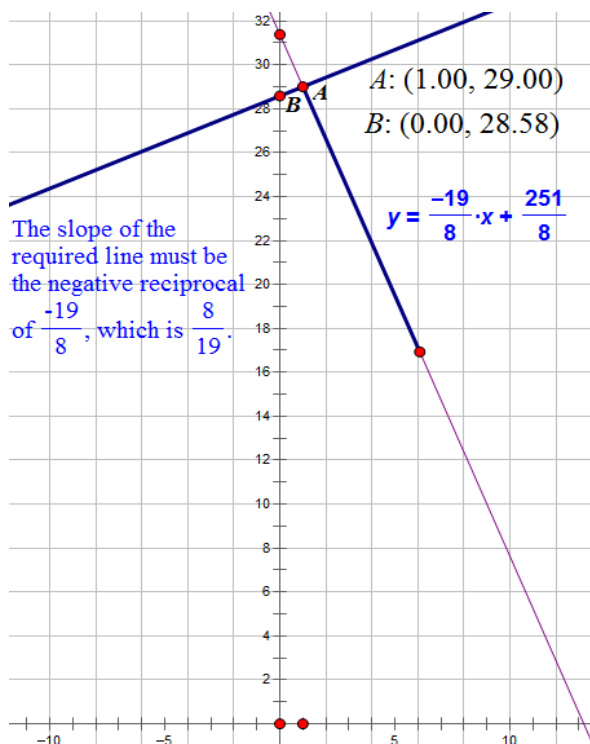
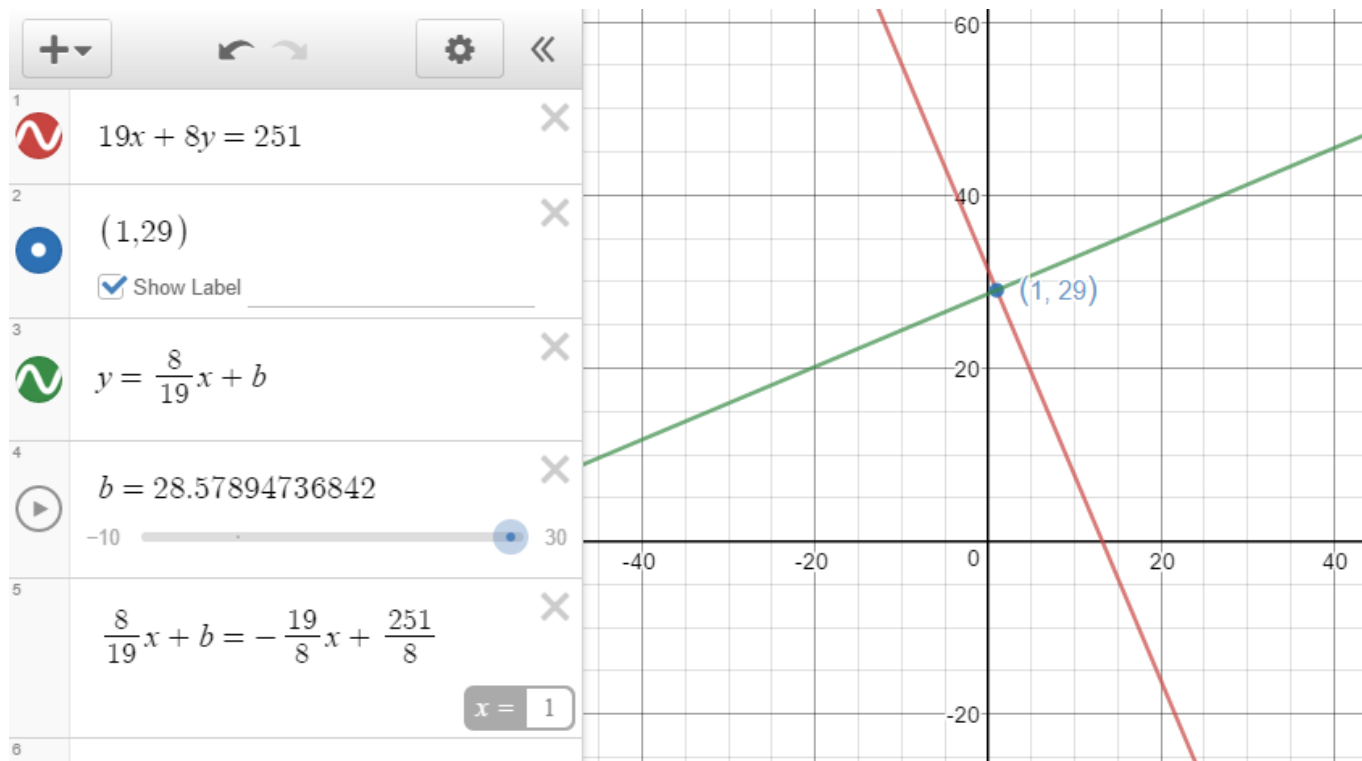
(d) Find the vertex of $y = x^2 - x - 2$



Everything Else – Use Desmos, Geometer's Sketchpad, Wolfram Alpha, Common Sense, Critical Thinking

Examples

- (a) Write an equation of a line that passes through the point (1, 29) and is parallel to the line with equation $19x + 8y = 251$.



WolframAlpha computational knowledge engine.

line perpendicular to $19x+8y=251$ that passes through $(1, 29)$

Web Apps Examples Random

Input interpretation:

normal line $19x + 8y = 251$ at $(x, y) = (1, 29)$

Result:

$$y = \frac{8x}{19} + \frac{543}{19}$$

Approximate form

Tangent line:

$$y = \frac{251}{8} - \frac{19x}{8}$$

Approximate form

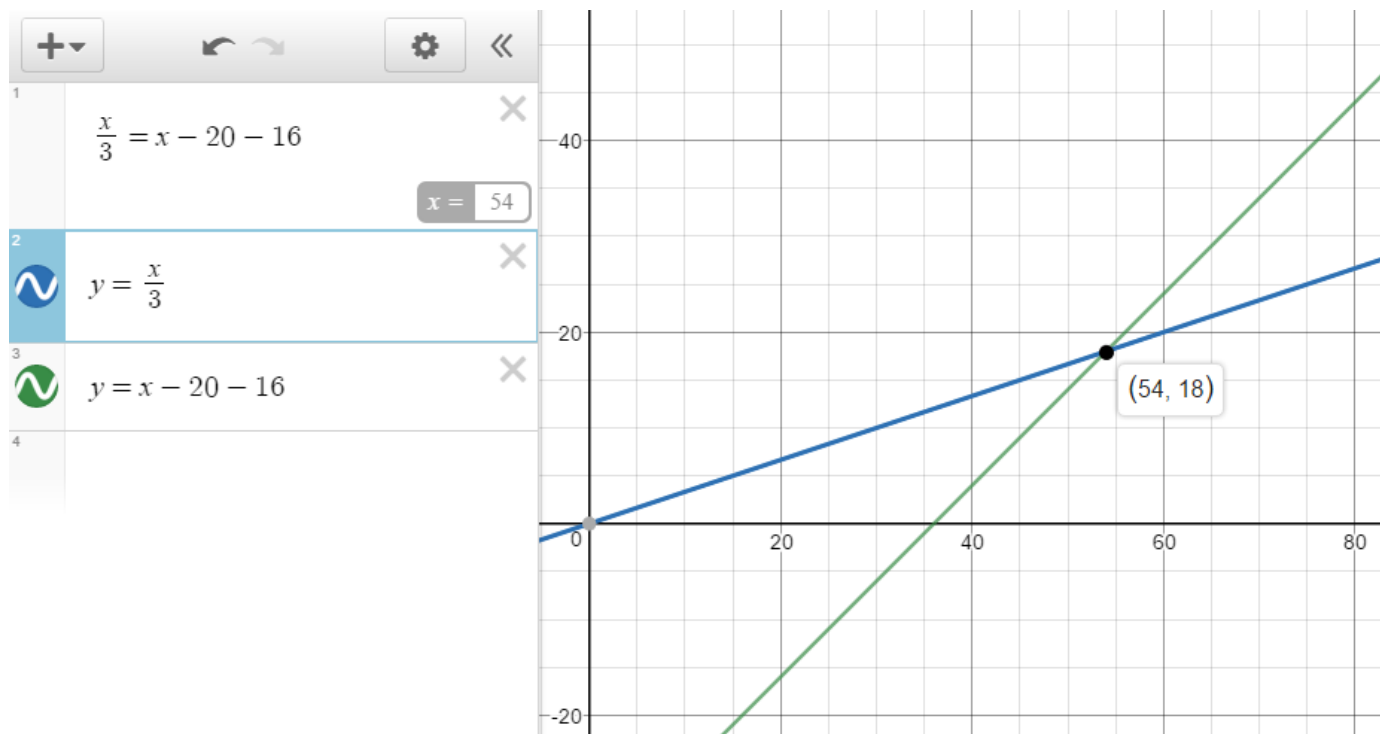
- (b) One-third of Natalie's age is 16 years less than her age 20 years ago. How old is Natalie?

Solution

Let a represent Natalie's (current) age.

$$(\text{Natalie's Age}) / 3 = (\text{Age 20 Years Ago}) - 16$$

$$\frac{a}{3} = a - 20 - 16$$



- (c) A concrete bridge over a river has an underside in the shape of a parabolic arch. At water level, the arch is 30 m wide. It has a maximum height of 10 m above the water. The minimum vertical thickness of the concrete is 15 m.

- Find an equation whose graph has the same shape as that of the arch.
- What is the vertical thickness of the concrete 3 m from the centre of the arch.
- If the water level rises 2 m, how wide will the arch be at this new level?

