A1.1-1.2 #8

Find a pair of numbers whose sum and product are both equal to 6.

(Use symbolic notation and fractions where needed. Give your answer in the form of a comma separated list.)

The numbers are

help (fractions)

x, y Sum is 6

$x+y=6$

Product is 6, $x \cdot y = 6$

$y = 6-x$ $\quad x \cdot y = 6$

$x(6-x) = 6$

$6x - x^2 = 6$ $\quad x^2 - 6x + 6 = 0$

$-6x + x^2 \quad -6x + x^2$

$$x^2 - 6x + 9 \quad + 6 = 0 + 9$$

$$(x-3)^2 + 6 - 6 = 9 - 6$$

$$(x-3)^2 = 3.$$

$$x - 3 = \pm\sqrt{3}$$

$$x = 3 \pm \sqrt{3}.$$

Try & $x = 3 + \sqrt{3}.$

$$y = 6 - x = 6 - (3 + \sqrt{3})$$

$$= \underline{3 - \sqrt{3}}$$

$x = 3 + \sqrt{3}, \quad y = 3 - \sqrt{3}.$

<u>Check</u>. $x + y = 6. \; x \cdot y = ?$

A1.3-1.5 #11

Find the inverse f^{-1} of $f(x) = \dfrac{x-4}{1+5x}$

(Use symbolic notation and fractions where needed.)

$f^{-1}(x) =$ help (fractions)

Hint: Use the Two-Step method.

Solution:

$$y = \frac{x-4}{1+5x}$$

$$y(1+5x) = x-4$$

$$5yx + y - x = x - 4 - x$$
$$-y \qquad\qquad -y$$

$$5xy - x = -4 - y$$

$$x(5y-1) = -4 - y$$

$$x = \frac{-4-y}{5y-1} = \frac{4+y}{1-5y}$$

$$f^{-1}(x) = \frac{4+x}{1-5x}.$$

<u>Check</u>. - Graph.

$f(0) = -4$. Try $f^{-1}(-4) = 0$

3

A1.3-1.5 #12

Let $f(x) = x^5 + x + 8$. Find the value of the inverse function at a point.

(Use symbolic notation and fractions where needed.)

$f^{-1}(254) =$ help (fractions)

Try to solve

$$x^5 + x + 8 = 254.$$

Solving this equation is hard.

Hope today you are lucky.

$f(0) = 8$ X $\quad f(1) = 10$ X

$f(2) = 42$ X $\quad f(3) = 243 + 3 + 8 = 254$

$f^{-1}(254) = 3.$

A1.4-1.5 #10

(1 point) **local/rmb-problems/circle-bug.pg**

A bug is located at the point $(5,0)$ at time $t=0$ and crawls at the rate of 6 units/minute in the counterclockwise direction along the circle centered at the origin of radius 5.

Find the coordinates (x,y) which give the location of the bug after 26 minutes.

$x =$, $y =$

help (numbers)

After how many minutes will the bug first return to the location $(5,0)$?

minutes

Give the coordinates $(x(t), y(t))$ at an arbitrary time $t \geq 0$.

$x(t) =$, $y(t) =$

help (formulas)

Solution:

After 26 minutes bug has moved $26 \cdot 6$ units.

$= 156$. Location is $\left(5\cos\left(\frac{156}{5}\right), 5\sin\left(\frac{156}{5}\right)\right)$.

After t minutes

~~$(5(\cos(26t$~~

$\left(5\cos\left(\frac{6t}{5}\right), 5\sin\left(\frac{6t}{5}\right)\right).$

1^{st} return after

$\frac{2\pi \cdot 5}{6}$ minutes.

A.16 #12

(1 point) **local/rmb-problems/exp-alg.pg**

A function f is given by the formula $f(x) = A \cdot e^{kx}$ for constants A and k.

We also know that $f(0) = 11$ and $f(4) = 8$.

Find numerical values for the constants A and k.

$A =$, $k =$

help (numbers).

The function f is ? .

Solution:

$$f(0) = 11 = A \cdot e^{k \cdot 0} = A$$

$$f(4) = 8 = Ae^{k4}$$

$$A = 11. \quad 8 = 11e^{4k}.$$

$$\ln(8/11) = \ln(e^{4k}).$$

$$= 4k\ln(e).$$

$$\ln(8/11). = 4k.$$

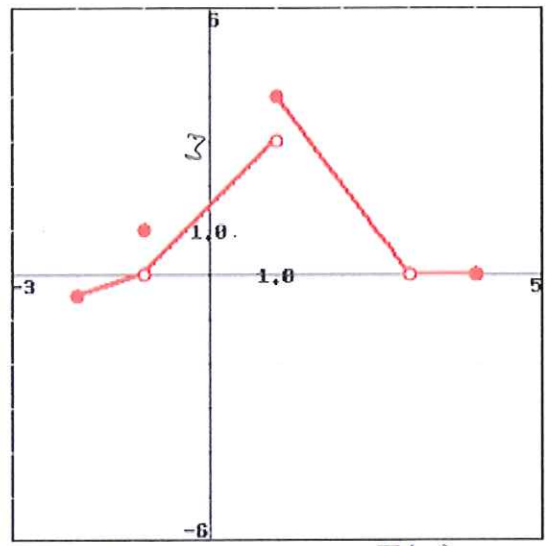
$$k = \frac{1}{4} \ln(8/11).$$

A2.1-2.2 #14

(1 point) **Library/Union/setLimitConcepts/ur_lr_1-5_1.pg**
Let F be the function whose graph is shown below. Evaluate each of the following expressions.

(If a limit does not exist or is undefined, enter "DNE".)

1. $\lim_{x\to -1^-} F(x)=$ 0
2. $\lim_{x\to -1^+} F(x)=$ 0
3. $\lim_{x\to -1} F(x)=$ 0
4. $F(-1)=$ 1
5. $\lim_{x\to 1^-} F(x)=$ 3
6. $\lim_{x\to 1^+} F(x)=$ 4
7. $\lim_{x\to 1} F(x)=$ DNE
8. $\lim_{x\to 3} F(x)=$ 0
9. $F(3)=$ DNE



The graph of $y = F(x)$.

A2.3 #8

Evaluate the limit assuming that $\lim_{x \to 2} g(x) = 10$:

$$\lim_{x \to 2} \frac{g(x)}{x^2} =$$

Solution:

$$\lim_{x \to 2} \frac{g(x)}{x^2} = \frac{\lim_{x \to 2} g(x)}{\lim_{x \to 2} x^2} = \frac{10}{4}.$$

Provided $\lim_{x \to 2} x^2$ exists & is not 0. But $\lim_{x \to 2} x^2 = 4$, since $f(x) = x^2$ is continuous.

Thus

$$\frac{\lim\limits_{x\to 2} g(x)}{\lim\limits_{x\to 2} x^2} = \frac{10}{4} = \frac{5}{2}.$$