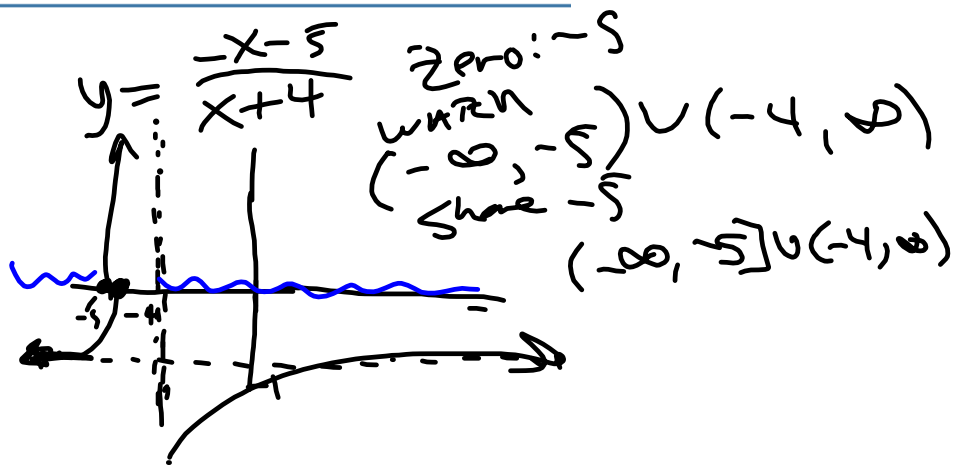
**Solving a rational inequality: Problem type 1**

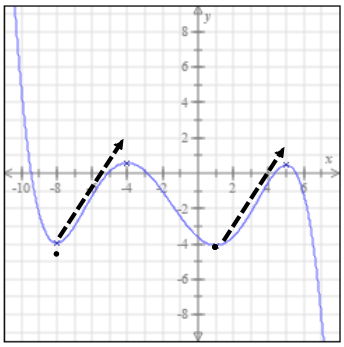
Solve the following inequality.

$$\frac{-x-5}{x+4} \leq 0$$ Watery Include Shore

Write your answer using interval notation.




the following questions about $f$. All local extrema of $f$ are shown in the graph.



(a) The function f is increasing over which intervals? Choose all that apply.

☐ (-∞ , -8) ☑ (-8, -4) ☐ (-4, 1) ☑ (1, 5) ☐ (-4, 5) ☐ (5, ∞ )

(b) The function f has local maxima at which x-values? If there is more than one value, separate them with commas.

-8,1

(c) What is the sign of the leading coefficient of f?

Select one negative disco left

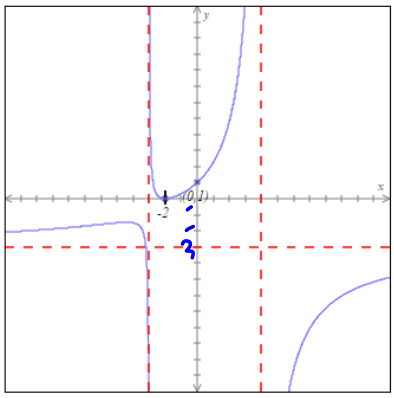
(d) Which of the following is a possibility for the degree of f? Choose all that apply.

☐ 4 ☑ 5 ☐ 6 ☑ 7 ☐ 8 ☑ 9 5 faces

**Writing the equation of a rational function given its graph**

The figure below shows the graph of a rational function $f$ with vertical asymptotes $x=-3$, $x=4$, and horizontal asymptote $y=-3$. The graph also has an $x$-intercept of $-2$, and it passes through the point $(0,1)$.

The equation for $f(x)$ has one of the five forms shown below. Choose the appropriate form for $f(x)$, and then write the equation. You can assume that $f(x)$ is in simplest form.




- $f(x)=\frac{a}{x-b}$
- $f(x)=\frac{a(x-b)}{x-c}$
- $f(x)=\frac{a}{(x-b)(x-c)}$
- $f(x)=\frac{a(x-b)}{(x-c)(x-d)}$
- $f(x)=\frac{a(x-b)(x-c)}{(x-d)(x-e)}$

HA: y=0

-5

**Finding the rate or time in a word problem on continuous exponential growth or decay**

The number of bacteria in a certain population increases according to a *continuous exponential growth model*, with a growth rate parameter of 3.8% per hour. How many hours does it take for the size of the sample to double?

**Note:** This is a *continuous* exponential growth model.

Do not round any intermediate computations, and round your answer to the nearest hundredth.

P=2

Q=1

R=.038

T=???

math 0: solver

0=P-Qe^(RT)

<alpha><enter>

**9. Inverse functions: Problem type 2**

The one-to-one function $g$ is defined below.

$$g(x) = \frac{9x-2}{x+4}$$

Find $g^{-1}(x)$, where $g^{-1}$ is the inverse of $g$.

Also state the domain and range of $g^{-1}$ in interval notation.

$y = \frac{9x-2}{x+4}$

$y(x+4) = 9x-2$

$xy+4y = 9x-2$

$-xy \quad +2 \qquad +2-xy$

$4y+2 = 9x-xy$

$4y+2 \qquad x(9-y)$

$\frac{4y+2}{9-y} = x$

$\frac{4x+2}{9-x} = f^{-1}$

HA: $y = -4$

Domain

$(-\infty,-4)\cup(-4,\infty)$

Domain: $(-\infty,9)\cup(9,\infty)$

Range: $(-\infty,-4)\cup(-4,\infty)$

**12. Trigonometric functions and special angles: Problem type 2**

Find the exact values below. If applicable, click on "Undefined".

$\csc \frac{4\pi}{3}$

$\cot \frac{4\pi}{3}$

1/sin(4pi/3)= -1.15 $-2/\sqrt{3}$

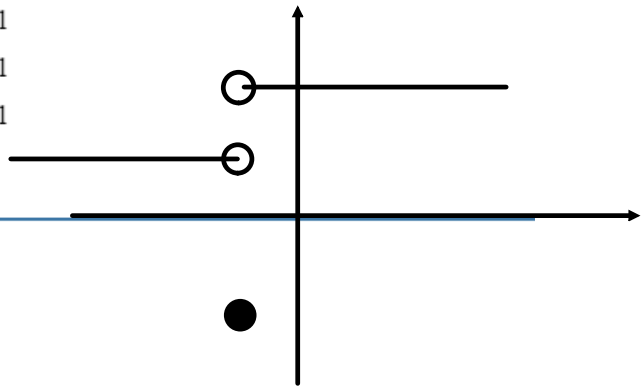
1/tan(4pi/3)= .577 $\sqrt{3}/3$

**13. Graphing a piecewise-defined function: Problem type 1**

Suppose that the function $h$ is defined , for all real numbers, as follows.

$$h(x) = \begin{cases} 1 & \text{if } x < -1 \\ -2 & \text{if } x = -1 \\ 3 & \text{if } x > -1 \end{cases}$$

Graph the function $h$.

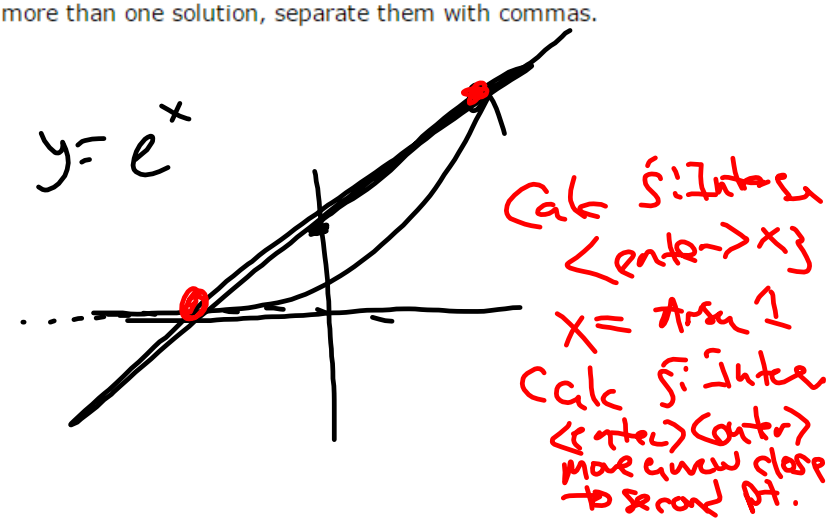


**14. Using a graphing calculator to solve an exponential or logarithmic equation**

Use the ALEKS graphing calculator to solve the equation.

$$e^x = x + 2$$

Round to the nearest hundredth.
If there is more than one solution, separate them with commas.



**15. Finding x- and y-intercepts given a polynomial function**

Find all $y$-intercepts and $x$-intercepts of the graph of the function.

$$f(x) = 2x^3 + 8x^2 - 2x - 8$$

If there is more than one answer, separate them with commas.

Click on "None" if applicable.

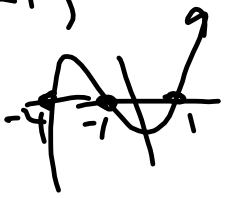
$y = 2x^2(x+4) - 2(x+4)$

$(x+4)(2x^2 - 2)$

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

$2(x+4)(x+1)(x-1)$

Zeros: $-4, -1, 1$




**16. Finding a final amount in a word problem on exponential growth or decay**

An amount of \$24,000 is borrowed for 7 years at 5.5% interest, compounded annually. If the loan is paid in full at the end of that period, how much must be paid back?

Use the calculator provided and round your answer to the nearest dollar.

**You answered:**

\$ 35271

Your answer is incorrect.

$24{,}000\left(1 + \frac{.055}{1}\right)^{1 \cdot 7}$

$24000(1.055)^7$

**The correct answer is:**

\$34,912

**17. Solving a multi-step equation involving natural logarithms**

Solve for $x$.

$$4\ln(x-4)=12$$

Do not round any intermediate computations, and round your answer to the nearest hundredth.

$\ln_e(x-4)=3$

Prop 1

$e^3=x-4$

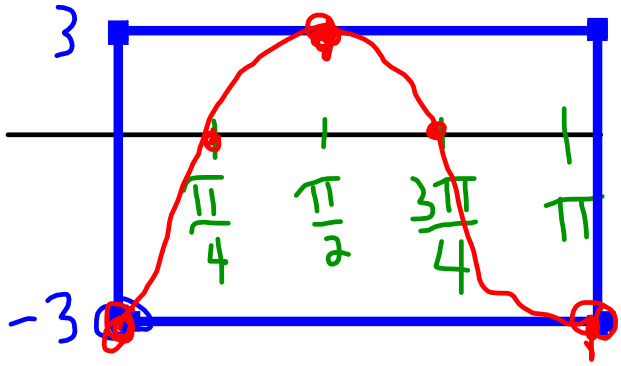
$x=e^3+4$

**18. Sketching the graph of a sine or cosine function: Problem type 2**

Graph the function $y=-3\cos 2x$.

period: pi

amp 3



**19. Solving an equation involving logarithms on both sides: Problem type 2**

Solve for $x$.

$$\ln 2 = \ln(x+2) - \ln 19$$

P2 2 P3

$\ln 2 = \ln \frac{(x+2)}{19}$

P5

$2 = \frac{x+2}{19}$

$38 = x+2$

$x = 36$

$\ln 2 + \ln 19 = \ln(x+2)$

$\ln 38 = \ln(x+2)$

**Actual Test 1 - Question #12;**
**Using a graphing calculator to solve a word problem involving a local extremum of a polynomial function**

A box with a hinged lid is to be made out of a rectangular piece of cardboard that measures 3 inches by 8 inches. Six squares will be cut from the cardboard: one square will be cut from each of the corners, and one square will be cut from the middle of each of the 8-inch sides (see Figure 1). The remaining cardboard will be folded to form the box and its lid (see Figure 2). Letting $x$ represent the side-lengths (in inches) of the squares, use the ALEKS graphing calculator to find the value of $x$ that maximizes the volume enclosed by this box. Then give the maximum volume. Round your responses to two decimal places.

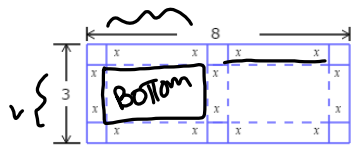


Figure 1

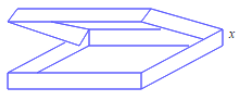


Figure 2

$L = 3-2x$

$W = \frac{8-3x}{2}$

$h = x$

$V = (3-2x)\left(\frac{8-3x}{2}\right)x$

Calc 4: max

Left: 0

Right: 1.5

Guess: 0

X= _____

**Actual Test 1 - Question #12;**
**Using a graphing calculator to solve a word problem involving a local extremum of a polynomial function**

A manufacturer cuts squares from the corners of a rectangular piece of sheet metal that measures 2 centimeters by 5 centimeters (see Figure 1). The manufacturer then folds the metal upward to make an open-topped box (see Figure 2). Letting $x$ represent the side-lengths (in centimeters) of the squares, use the ALEKS graphing calculator to find the value of $x$ that maximizes the volume enclosed by this box. Then give the maximum volume. Round your responses to two decimal places.

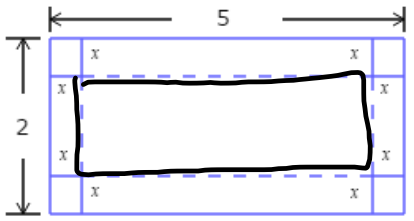


Figure 1

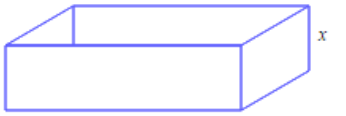


Figure 2

$L = 2-2x$
$W = 5-2x$
$H = x$

$V = x(2-2x)(5-2x)$

**Actual Test 1 - Question #12;**
**Using a graphing calculator to solve a word problem involving a local extremum of a polynomial function**

On a rectangular piece of cardboard with perimeter 17 inches, three parallel and equally spaced creases are made (see Figure 1). The cardboard is then folded along the creases to make a rectangular box with open ends (see Figure 2). Letting $x$ represent the distance (in inches) between the creases, use the ALEKS graphing calculator to find the value of $x$ that maximizes the volume enclosed by this box. Then give the maximum volume. Round your responses to two decimal places.

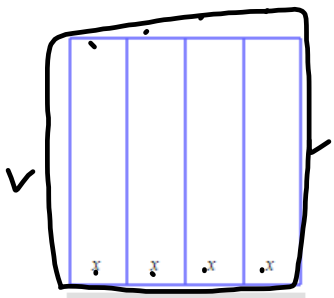


Figure 1

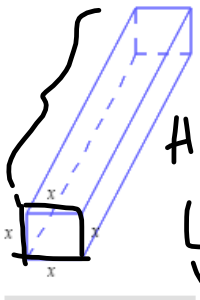


Figure 2

$8x + 2H = 17$

$2H = 17 - 8x$

$H = (17 - 8x)/2$

$L = x$

$W = x$

$V = x^2\left(\frac{17-8x}{2}\right)$