

# Circuit Training

Name: \_\_\_\_\_

## AP Precalculus Review Circuit – No Calculator!

**Directions:** Begin in cell #1. Show the work necessary to arrive at your answer. You may require a separate sheet of paper. Search for your answer in one of the other cells and mark that cell #2, then work out the new problem. Proceed in this manner until you complete the circuit.

# 1

Answer: -1

Select values of two functions are given in the table. The functions are either linear, quadratic, or exponential. Determine the y-intercept of each function and then search for their product.

$x$	$f(x)$	$g(x)$
1	6	6
2	24	12
3	96	20
4	384	30

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Answer:  $\frac{11}{2}$ 

Consider the functions  $f(x) = \log_2(4x + 5) - \log_2 x$ , and  $g(x) = \log_2 x$ . In the  $xy$  – coordinate plane, what are all  $x$ -coordinate(s) of the intersection(s) of the graphs of  $f$  and  $g$ ?

If there is more than one intersection, search for the product of the  $x$ -coordinates. If there is only one, search for the  $x$ -coordinate of the intersection.

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Answer: 38

The function  $y = \frac{x^2+5x+4}{3x^2-3}$  has a vertical asymptote at  $x =$  \_\_\_\_\_, a horizontal asymptote at  $y =$  \_\_\_\_\_, a hole at  $x =$  \_\_\_\_\_, an  $x$ -intercept of  $x =$  \_\_\_\_\_ and a  $y$ -intercept of  $y =$  \_\_\_\_\_.

To advance in the circuit, find the product of the five answers.

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Answer: -3

Consider the rational function,  $q(x) = \frac{(x^2+2x+1)}{(1-x)}$ . Find the interval  $(a, b)$  on which  $q(x) \geq 0$ .

To advance in the circuit, search for  $a$ .

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Answer: 3

A polynomial function,  $p$ , has one real zero and two non-real zeros. The real zero is  $-2$  and one of the non-real zeros is  $-3 + 5i$ . What is the other non-real zero in  $a + bi$  form? \_\_\_\_\_

To advance in the circuit, find the sum of  $a$  and  $b$  for the non-real zero you found.

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Answer:  $2\sqrt{3}$ 

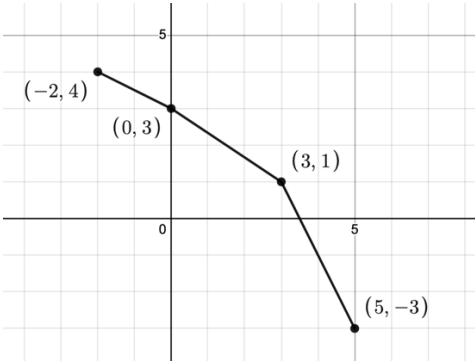
Solve the equation  $\sin 2\theta = \cos \theta$  for  $0 \leq \theta < 2\pi$ . There are multiple answers. Check your answers with your teacher and then advance to the answer choice -1.

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Answer:  $\infty$ 

A polynomial function  $p$  is given by  $p(x) = (x^2 - x - 2)(x^2 - 9x)$ . List the zeros of the function.

To advance in the circuit, find the sum of the zeros.

<p># _____ Answer: <math>-\infty</math></p> <p>The complex number represented by <math>4 \cos\left(-\frac{\pi}{6}\right) + i(4 \sin\left(-\frac{\pi}{6}\right))</math> has the polar coordinates <math>(r, \theta)</math> and the rectangular coordinates <math>(a, b)</math>. Find both representations of the complex number and then to advance in the circuit, find the <math>a</math>-coordinate.</p>	<p># _____ Answer: 1</p> <p>The piecewise function, <math>f</math>, consisting of three line segments is shown.</p>  <p>The function, <math>g</math>, not pictured, is the inverse of <math>f</math>. What is the minimum value of <math>g</math>?</p>
<p># _____ Answer: 10</p> <p>Consider the function <math>f(x) = e^x</math>. As <math>x</math> decreases without bound, <math>f(x)</math> tends towards _____.</p>	<p># _____ Answer: <math>-8</math></p> <p><math>\lim_{x \rightarrow -\infty} (-0.5x^7 + 6x^5 - 12x^4 + x) =</math></p>
<p># _____ Answer: <math>-\frac{16}{9}</math></p> <p>Let <math>g(x) = 6\sin^2 x + \ln \sqrt{x} + 6\cos^2 x + \tan\left(\frac{3\pi}{4e} x\right)</math>.</p> <p>What is <math>g(e)</math>?</p>	<p># _____ Answer: 5</p> <p>What is the period of <math>h(t) = 4 \sin\left(\frac{\pi}{3} t\right) + 5</math>?</p>
<p># _____ Answer: <math>-2</math></p> <p>The expression <math>6 \log \sqrt[3]{x} + 5 \log \frac{1}{y}</math> can be written as <math>\log x^a y^b</math>. What are the values of <math>a</math> and <math>b</math>?</p> <p>To advance in the circuit, find the sum of <math>a</math> and <math>b</math>.</p>	<p># _____ Answer: 0</p> <p>The function <math>g(x) = 6 \cdot 7^{2x} + 5 \cdot 49^x</math> can be written in the form <math>g(x) = a \cdot b^x</math>.</p> <p>The value of <math>a</math> is _____ and the value of <math>b</math> is _____.</p> <p>To advance in the circuit, find <math>b - a</math>.</p>
<p># _____ Answer: 6</p> <p>What is the minimum value of <math>h(t) = 4 \sin\left(\frac{\pi}{3} t\right) + 5</math>?</p>	