Circuit Training

Name: Key

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	−4
2	24	12	+6
3	96	20	+8
4	384	30	+10

$g(0) = 2$

f is exponential with a constant ratio of 4

$f(0) = \frac{6}{4} = \frac{3}{2}$ $\quad f(0)\cdot g(0) = \frac{3}{2}\cdot 2 = 3$

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9 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?

$\log_2(4x+5) = 2\log_2 x$

$4x+5 = x^2$

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.

$0 = x^2 - 4x - 5$

$0 = (x-5)(x+1)$ $\quad x=5$ ~~$x=-1$~~

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7 Answer: 38

$\frac{(x+1)(x+4)}{3(x+1)(x-1)}$

The function $y = \frac{x^2+5x+4}{3x^2-3}$ has a vertical asymptote at x = 1, a horizontal asymptote at y = $\frac{1}{3}$, a hole at x = −1, an x-intercept of x = −4 and a y-intercept of y = $\frac{-4}{3}$.

To advance in the circuit, find the product of the five answers. $\frac{-16}{9}$

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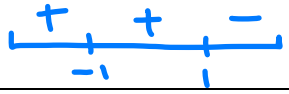
14 Answer: -3

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

$q(x) = \frac{(x+1)(x+1)}{(1-x)}$



$a = -\infty$

To advance in the circuit, search for a.

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2 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? $-3-5i$

$-3-5 = -8$

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

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16 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.

$2\sin\theta\cos\theta = \cos\theta$

$2\sin\theta = 1$ or $\cos\theta = 0$

$\theta = \frac{\pi}{6}, \frac{5\pi}{6}$ $\quad \theta = \frac{\pi}{2}, \frac{3\pi}{2}$

$\theta = \frac{\pi}{6}, \frac{5\pi}{6}, \frac{\pi}{2}, \frac{3\pi}{2}$

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4 Answer: ∞

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.

$p(x) = (x-2)(x+1)x(x-9)$ $\quad 2 + -1 + 0 + 9$

10

15 — Answer: $-\infty$

The complex number represented by

$$4\cos\left(-\frac{\pi}{6}\right)+i(4\sin\left(-\frac{\pi}{6}\right)$$

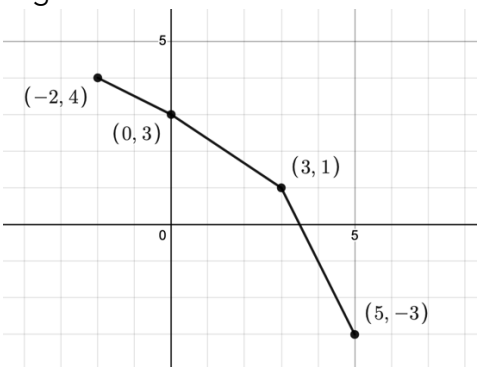
has the polar coordinates $(r,\theta)$and the rectangular coordinates (a,b). Find both representations of the complex number and then to advance in the circuit, find the a-coordinate.

$r=4,\ \theta=\frac{-\pi}{6}$

$a=4\cdot\frac{\sqrt{3}}{2}=\boxed{2\sqrt{3}}$ $b=4\cdot\frac{-1}{2}=-2$

12 — Answer: 1

The piecewise function, f, consisting of three line segments is shown.



-2

The function, g, not pictured, is the inverse of f. What is the minimum value of g?

Domain of f = Range of g

5 — Answer: 10

Consider the function $f(x)=e^x$. As x decreases without bound, $f(x)$ tends towards 0 .

3 — Answer: -8

odd

$\lim_{x\to-\infty}(-0.5x^7+6x^5-12x^4+x)=\infty$

neg.

8 — Answer: $-\frac{16}{9}$

$6(\sin^2x+\cos^2x)=6$

Let $g(x)=6\sin^2x+\ln\sqrt{x}+6\cos^2x+\tan\left(\frac{3\pi}{4e}x\right)$.

What is $g(e)$?

$g(e)=6+\ln\sqrt{e}+\tan\left(\frac{3\pi}{4}\right)$

$=6+\frac{1}{2}+-1=5+\frac{1}{2}=\frac{11}{2}$

10 — Answer: 5

What is the period of $h(t)=4\sin\left(\frac{\pi}{3}t\right)+5$?

$\frac{2\pi}{(\pi/3)}=6$

13 — Answer: -2

The expression $6\log\sqrt[3]{x}+5\log\frac{1}{y}$ can be written as $\log x^ay^b$. What are the values of a and b ?

$\log\left(x^{\frac{1}{3}}\right)^6+\log\left(y^{-1}\right)^5$

$a=2$ $b=-5$

To advance in the circuit, find the sum of a and b.

$2-5=-3$

6 — Answer: 0

The function $g(x)=6\cdot7^{2x}+5\cdot49^x$ can be written in the form $g(x)=a\cdot b^x$.

The value of a is 11 and the value of b is 49.

$6\cdot49^x+5\cdot49^x=11\cdot49^x$

To advance in the circuit, find $b-a$. $49-11=38$

11 — Answer: 6

What is the minimum value of $h(t)=4\sin\left(\frac{\pi}{3}t\right)+5$?

$5-4=1$