Name____________________________________BOY Pre-Calculus Diagnostic 2019-2020 Hour________ Date________

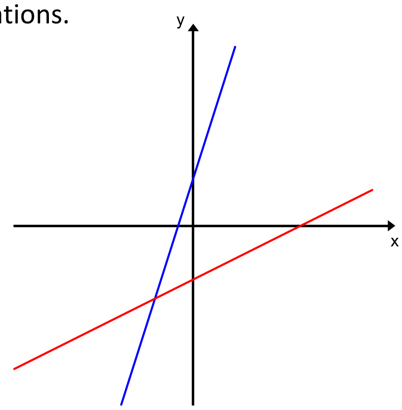
All of the work required for each of the problems should be shown in clear fashion. Exact Answers are required

This is a diagnostic of the retention of skills that you have already practiced.

NO Graphing calculators or graphing programs should be used on any of this.

This is an HONORS or ADVANCED course, so there is a higher expectation on your ability to use a wider variety of complex coefficients and constants in models and equations.

This also includes the use of letters as coefficients and constants in models and equations.



Part 1: Solving equations

1. Solve $\pi x+\sqrt{7}=\frac{1}{2}x-3$

   Exact Answer __________________ Decimal Approximation _______________(accurate to 4 decimal places)

   Short response: Explain the connection to the equation and the related graph provided

   ____

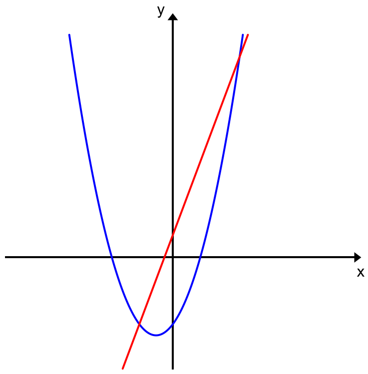
2. Let a, b, c, and d be nonzero real numbers,
   Solve $ax+b=cx-d$

   Exact answer____________________

3. Give an example of an equation that would have an integer solution for $ax+b=cx-d$

   a = ____ b = ____ c = _____ d = ______

4. Solve $x^2+2x-6=4x+2$



Exact Answers __________________ Decimal Approximations _______________(accurate to 4 decimal places)

Short response: Explain the connection to the equation and the related graph provided

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5. Let n be a nonzero real number,

   Solve $x^2+2x-6=x+n$

   Exact answer____________________

6. Give an example of an equation that would have a single integer solution for $x^2+2x-6=x+n$

   n = ____ State the exact solution______________

7. Give an example of an equation that would have a pair of integer solutions for $x^2+2x-6=x+n$

   b = ____

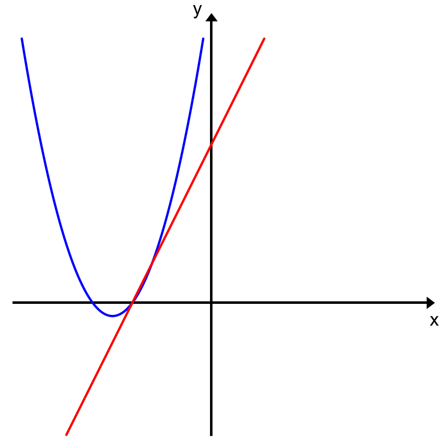
8. Give an example of an equation that would have a pair of imaginary solutions for $x^2+2x-6=x+n$

   n = ____

9. Give a set of restrictions for n that will guarantee that $x^2+2x-6=x+n$ has real solutions

   n = ____

10. Solve $(x+5)^2 - 1 = 3x + 12$



Exact Answer(s) ________________Decimal Approximation(s) _____________(accurate to 4 decimal places)

Short response: Explain the connection to the equation and the related graph provided

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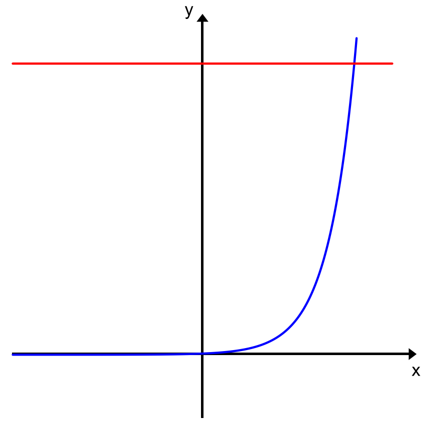
11. Let m be a nonzero real number, $(x+5)^2 - 1 = mx + 10$,
Determine a value of m that would lead to a pair of integer solutions

m = __________

12. Let m be a nonzero real number, $(x+5)^2 - 1 = mx + 10$,
Determine a value of m that would lead to a pair of imaginary solutions

m = __________

13. Solve $9 \bullet 2^{x} - 5 = 2299$



Exact Answer(s) ________________Decimal Approximation(s) _____________(accurate to 4 decimal places)

Short response: Explain the connection to the equation and the related graph provided

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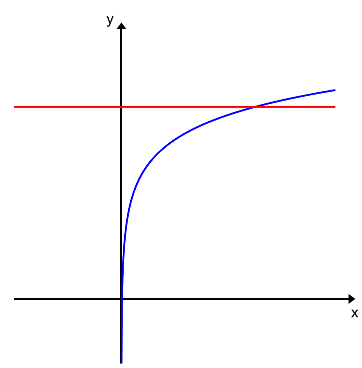
14. Let n be a nonzero real number with $4 \bullet 3^{x} - 12 = n$
Determine a value of n that would lead to an integer solution

n = ___________

15. Solve $-6 + 9 \bullet \log_{5} x = 30$



Exact Answer(s) ________________Decimal Approximation(s) _____________(accurate to 4 decimal places)

Short response: Explain the connection to the equation and the related graph provided

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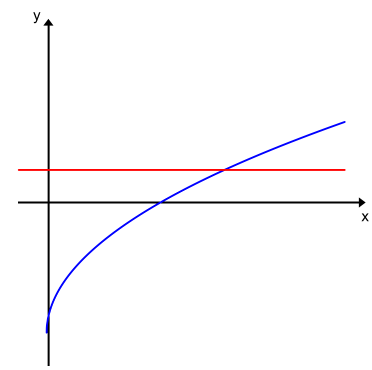
16. Let b be a nonzero real number with $-7+3\bullet\log_{8} x=n$

Determine a value of n that would lead to an integer solution

n = ___________

17. Solve $\frac{1}{3}\bullet\sqrt{5x+9}-8=2$



Exact Answer(s) _________________Decimal Approximation(s) ______________(accurate to 4 decimal places)

Short response: Explain the connection to the equation and the related graph provided

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18. Let b be a nonzero real number with $n\bullet\sqrt{4x-8}-10=14$

Determine a value of n that would lead to an integer solution

b = ___________

19. Let b be a nonzero real number with $8\bullet\sqrt[3]{4x+n}-10=22$

Determine a value of n that would lead to an integer solution

n = ___________

20. Let a, b, and c be nonzero real numbers.
    Solve $(x+a)^2+b=c$ in terms of a, b, and c.
    List any additional considerations for a, b, and c that are necessary to guarantee real solutions.

21. Let a, b, c, and d be nonzero real numbers.
    Solve $a \bullet b^x + c = d$ in terms of a, b, c, and d.
    List any additional considerations for a, b, c, and d that are necessary to guarantee integer solutions.

22. Let a, b, c, and d be nonzero real numbers.
    Solve $a + b \bullet \log_c x = d$ in terms of a, b, c, and d.
    List any additional considerations for a, b, c, and d that are necessary to guarantee integer solutions.

23. Let a, b, c, d, and g be nonzero real numbers.
    Solve $a \bullet \sqrt[4]{bx+c} + d = g$ in terms of a, b, c, d, and g.
    List any additional considerations for a, b, c, d, and g that are necessary to guarantee integer solutions.