MATH 110 Sample 03 Exam 1

For each problem, show your work in the space provided.
Write your Final Answer (and the letter answer) on the Answer Sheet provided.

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1. Evaluate ln 59 correct to three decimal places and write the result in exponential form.

   [A] $e^{4.078} = 59$ [B] $10^{4.077} = 59$ [C] $59^{4.078} = e$ [D] $e^{4.077} = 59$

2. Write the equation $3125^{2/5} = 25$ in logarithmic form.

   [A] $5\log_2 25 = 3125$ [B] $\log_{3125} 25 = \dfrac{2}{5}$ [C] $\log_{25} 3125 = \dfrac{5}{2}$ [D] $\log_{2/5} 25 = 3125$

3. Write in exponential form: $w = \log_{83} v$

   [A] $83 = w^v$ [B] $83 = v^w$ [C] $83^v = w$ [D] $83^w = v$
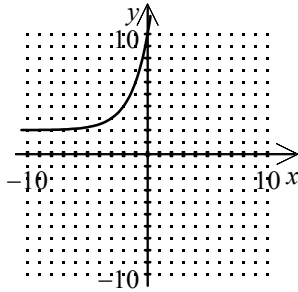
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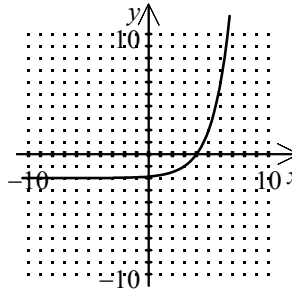
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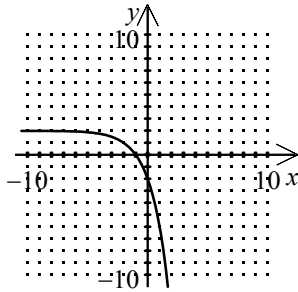
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4. Graph: $f(x) = (2)^{x-3} - 2$

[A]

[B]

[C]

[D] none of these

5. The number of bacteria present in a culture after t minutes is given as $B = 1000e^{kt}$. If there are 3586 bacteria present after 8 minutes, find k.

[A] 0.182   [B] 1.277   [C] 0.16   [D] 10.216

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6. Write the following as the logarithm of a single expression. Assume that variables represent positive numbers.

$$\log_{11} 3 + \log_{11}(x+5) + \log_{11}(y+8)$$

7. Evaluate: $\log_4 64$ [A] 3   [B] $\dfrac{1}{3}$ [C] 12   [D] $\dfrac{1}{12}$

8. A radioactive substance decays so that the amount A present at time t (years) is $A = A_0 e^{-1.7t}$. Find the half-life (time for half to decay) of this substance. ($\ln .5 = -0.69315$)

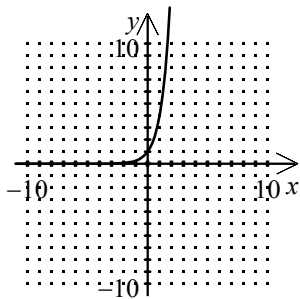[A] about 0.204 yr   [B] about 3.465 yr   [C] about 0.408 yr   [D] about 0.815 yr

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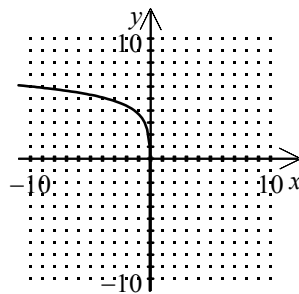**Write your Final Answer (and the letter answer) on the Answer Sheet provided.**

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9. If $1000 is invested at 9% compounded monthly for 7 years the compounded amount is given by $A = 1000(1.0075)^{84}$. Given that log 1.0075 = 0.00325, find log A. (Note that 1000 $= 10^3$)

 [A] 3.273   [B] 3.00325   [C] 4.273   [D] 4.0075
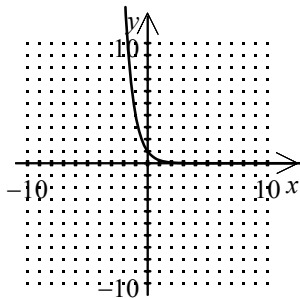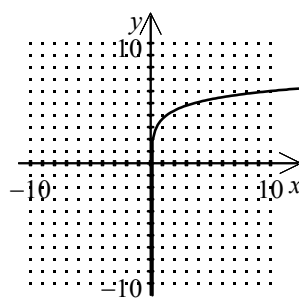
10. Graph: $f(x) = \left(\dfrac{1}{4}\right)^x$

 [A]

 [B]

 [C]

 [D]

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Solve:

11. $x^4 - 12x^2 + 11 = 0$

   [A] $1, \sqrt{11}$ [B] none of these   [C] $\pm 1, \pm\sqrt{11}$ [D] $\pm 1, \pm 11$

12. $x^2 + y^2 = 64$
   $x + y = 8$

   [A] $\{(0, 8), (8, 0)\}$ [B] $\{(0, 0), (8, -8)\}$

   [C] $\{(0, -8), (-8, 0)\}$ [D] $\{(8, -8), (-8, -8)\}$

13. $\sqrt{x + 7} = x - 13$

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Solve:

14. $x^3 + 5x^2 - x - 5 = 0$ [A] $-1, 5, 1$ [B] $-5, -1, 1$ [C] $5, 1$ [D] $-5, 1$

15. Graph the system:
$y = (x + 2)^2$
$y = -2x + 4$

16. Solve: $\sqrt{z + 1} + 1 = z$

17. Solve for x: $x^4 - 8x^2 + 7 = 0$

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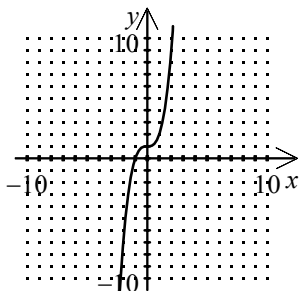
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18. Solve: $\dfrac{5x + 1}{x - 1} \leq 7$

19. Solve the system: $x^2 + y^2 = 25$
$$y = -3x + 3$$

20. Use the Remainder Theorem to find $P(-5)$ if $P(x) = x^6 + 4x^5 + 5x^3 - 4x^2 + 30.$

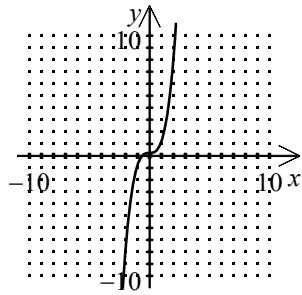21. Given the graph of $y = x^3 + 1$, determine the graph of $y = -\dfrac{1}{4}(x^3 + 1).$
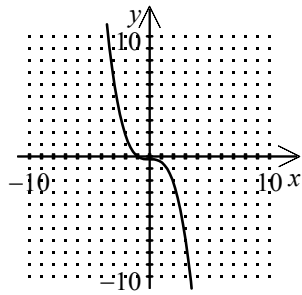
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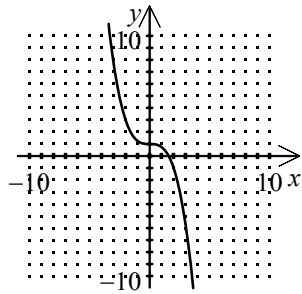
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[A]

[B]

[C]

[D]

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(21.)

22. List all of the potential rational zeros of the polynomial function. Do not attempt to find the
zeros. $f(x) = 3x^3 - 5x^2 - 2x - 3$

23. Use Descartes' Rule of Signs to determine how many positive and how many negative real
zeros the polynomial functions may have. Do not attempt to find the zeros.
$f(x) = x^6 - 2x^5 + 4x^4 - 5x^3 + 2x^2 - x + 3$

24. Use the Factor Theorem to determine which of the following is **NOT** a factor of
$f(x) = 3x^4 - 4x^3 - 73x^2 + 134x + 120$.

[A] $x + 5$ [B] $3x + 8$ [C] $x - 4$ [D] $x - 3$

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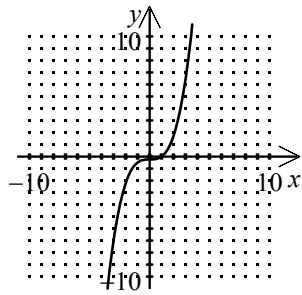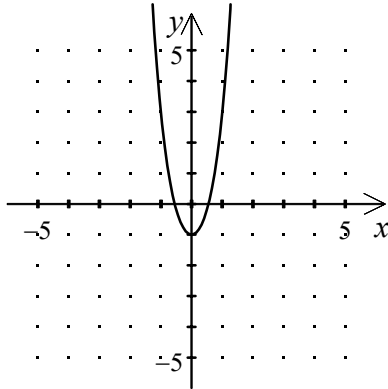
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25. Use the graph to determine if the function is odd, even, or neither.

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[1] _____

[2] _____

[3] _____

[4] _____

[5] _____

[6] _____

[7] _____

[8] _____

[9] _____

[10] _____

[11] _____

[12] _____

[13] _____

[14] _____

[15] _____

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[16] _____

[17] _____

[18] _____

[19] _____

[20] _____

[21] _____

[22] _____

[23] _____

[24] _____

[25] _____

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[1] [A] _____

[2] [B] _____

[3] [D] _____

[4] [B] _____

[5] [C] _____

[6] $\underline{\log_{11}(3xy + 24x + 15y + 120)}$ _____

[7] [A] _____

[8] [C] _____

[9] [A] _____

[10] [C] _____

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[11] [C]

[12] [A]

[13] 18

[14] [B]

[15]

[16] 3

[17] $\pm 1, \pm \sqrt{7}$

[18] $x < 1$ or $x \geq 4$

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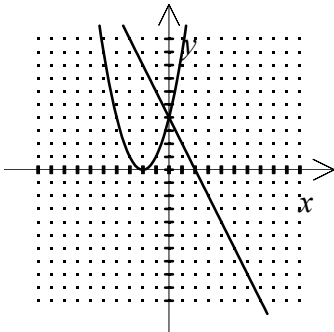Renton Tech College Su2005

[19] $\left(\dfrac{9 + \sqrt{241}}{10}, \ \dfrac{3 - 3\sqrt{241}}{10} \right), \left(\dfrac{9 - \sqrt{241}}{10}, \ \dfrac{3 + 3\sqrt{241}}{10} \right)$

[20] 2430

[21] [B]

[22] $\pm 1, \ \pm 3, \ \pm \dfrac{1}{3}$

[23] 6, 4, 2, or no positive real zeros; no negative real zeros

[24] [B]

[25] even