

MATH 111 Sample 02 Exam 2

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: $\log_6\left(\frac{1}{36}\right)$ [A] -2 [B] -3 [C] 3 [D] 2

2. Express in terms of logarithms of x , y , and z : $\log_a \frac{8xy^2}{z^2}$

[A] $8 + \log_a x + 2\log_a y - 2\log_a z$ [B] $\frac{\log_a 8 + \log_a x + 2\log_a y}{2\log_a z}$

[C] $\log_a 8 + \log_a x + 2\log_a y - 2\log_a z$ [D] $16 + \log_a xy - 2\log_a z$

3. Evaluate $\ln 60$ correct to three decimal places and write the result in exponential form.

[A] $e^{4.094} = 60$ [B] $60^{4.094} = e$ [C] $10^{4.093} = 60$ [D] $e^{4.093} = 60$

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4. Given $\log_{10} 2 = F$ and $\log_{10} 7 = G$, find $\log_{10} 14$.

[A] $F + G$

[B] 10^{FG}

[C] 10^{F+G}

[D] FG

5. Find $\ln 712$. Round your answer to four decimal places.

Solve:

6. $3x^2 + 4x - 4 = 0$

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Solve:

7. $10x^{-2} + 3x^{-1} - 1 = 0$

[A] $x = -5, x = 2$

[B] $x = \frac{1}{5}, x = -\frac{1}{2}$

[C] $x = 5, x = -2$

[D] $x = 5, x = \frac{1}{2}$

8. $\sqrt[6]{x} = \sqrt[4]{3}$

9. $x^2 + 2x \leq 8$

[A] $-4 \leq x \leq 2$

[B] $x \leq -2$ or $x \geq 4$

[C] $x \leq -4$ or $x \geq 2$

[D] none of these

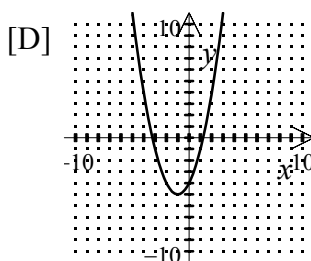
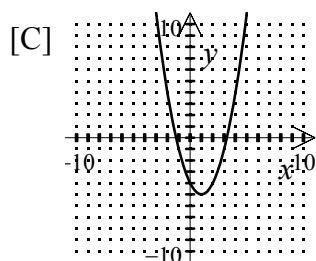
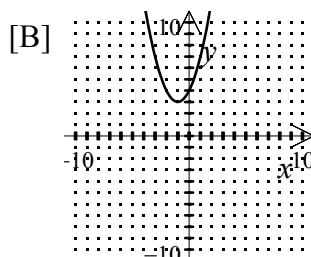
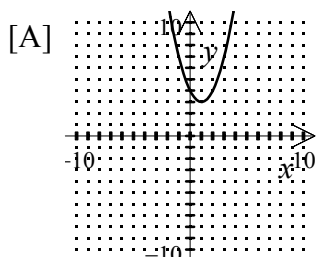
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10. Graph: $f(x) = x^2 + 2x - 4$



11. List all of the potential rational zeros of the polynomial function. Do not attempt to find the zeros. $f(x) = 3x^3 - x^2 + 2x + 6$

[A] $\pm 2, \pm 3, \pm 6, \pm \frac{1}{3}, \pm \frac{2}{3}, \pm \frac{7}{3}$

[B] $\pm 1, \pm 2, \pm 3, \pm 6, \pm \frac{1}{3}, \pm \frac{2}{3}$

[C] $0, \pm 1, \pm 2, \pm 3, \pm \frac{1}{3}, \pm \frac{2}{3}$

[D] $\pm 2, \pm 3, \pm 6, \pm 18, \pm \frac{1}{3}, \pm \frac{2}{3}$

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12. List all of the potential rational zeros of the polynomial function. Do not attempt to find the zeros. $f(x) = 5x^3 - x^2 + 3x + 15$

13. Use synthetic division to determine which pair of integers provide both a lower and an upper bound for the zeros of $f(x) = 2x^4 + 14x^3 + 22x^2 - 14x - 24$?

[A] -5, 0

[B] -7, 1

[C] -8, 0

[D] none of these

14. Simplify the equation and graph: $-4x^2 + 9y^2 - 24x + 36y - 144 = 0$

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15. Determine the vertices, asymptotes, and foci of the hyperbola defined by $400x^2 - 16y^2 = 25$.

[A] vertices: $\left(0, \pm \frac{5}{4}\right)$, asymptotes: $y = \pm \frac{1}{5}x$, foci: $\left(0, \pm \frac{1}{4}\sqrt{26}\right)$

[B] vertices: $\left(\pm \frac{1}{4}, 0\right)$, asymptotes: $y = \pm 5x$, foci: $\left(\pm \frac{1}{4}\sqrt{26}, 0\right)$

[C] vertices: $\left(0, \pm \frac{5}{4}\right)$, asymptotes: $y = \pm 5x$, foci: $\left(0, \pm \frac{1}{4}\sqrt{26}\right)$

[D] vertices: $\left(\pm \frac{1}{4}, 0\right)$, asymptotes: $y = \pm \frac{1}{5}x$, foci: $\left(\pm \frac{1}{4}\sqrt{26}, 0\right)$

16. Use Cramer's rule to solve for y : $3x - y - 2z = 14$

$$2x + 3y - z = -3$$

$$2x - 3y + z = 7$$

[A] -4

[B] -6

[C] -3

[D] 1

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17. Write the partial fraction decomposition of the rational expression: $\frac{x}{(x-2)(x-3)}$

[A] $\frac{-2}{x-2} + \frac{3}{x-3}$

[B] $\frac{-\frac{2}{5}}{x-2} + \frac{\frac{3}{5}}{x-3}$

[C] $\frac{3}{x-2} + \frac{-2}{x-3}$

[D] $\frac{\frac{2}{5}}{x-2} + \frac{-\frac{3}{5}}{x-3}$

18. If $A = \begin{bmatrix} 8 & 5 \\ -2 & -3 \end{bmatrix}$, find $5A$.

19. Find the inverse of the matrix (if it exists) $\begin{bmatrix} -1 & -3 \\ 5 & 4 \end{bmatrix}$.

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20. For the geometric progression 3125, 625, 125, 25, ..., find a_n .

21. Evaluate: $\sum_{k=1}^{25} (7k - 1)$ [A] 2275 [B] 2250 [C] 192 [D] 2337.5

22. Find the common ratio: $-\frac{2}{5}, -\frac{3}{5}, -\frac{9}{10}, \dots$

23. Multiply: $(-5x + y^4)^3$

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24. How many subsets of five elements are contained in the set $\{a, b, c, d, e, f, g\}$?
[A] 21 [B] 2520 [C] 35 [D] 31
25. From a group of four boys and eight girls, a boy and a girl will be selected to attend a conference. In how many ways can the selection be made?
[A] 32 [B] 12 [C] 24 [D] 28

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[1] _____

[2] _____

[3] _____

[4] _____

[5] _____

[6] _____

[7] _____

[8] _____

[9] _____

[10] _____

[11] _____

[12] _____

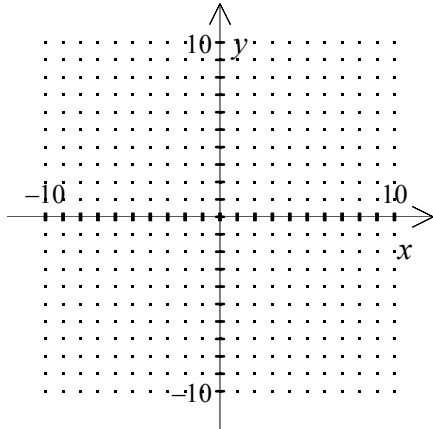
[13] _____

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[14] _____

[15] _____

[16] _____

[17] _____

[18] _____

[19] _____

[20] _____

[21] _____

[22] _____

[23] _____

[24] _____

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[25] _____

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[1] [A] _____

[2] [C] _____

[3] [A] _____

[4] [A] _____

[5] 6.5681 _____

[6] $\frac{2}{3}^{-2}$ _____

[7] [C] _____

[8] $3^{3/2}$ _____

[9] [A] _____

[10] [D] _____

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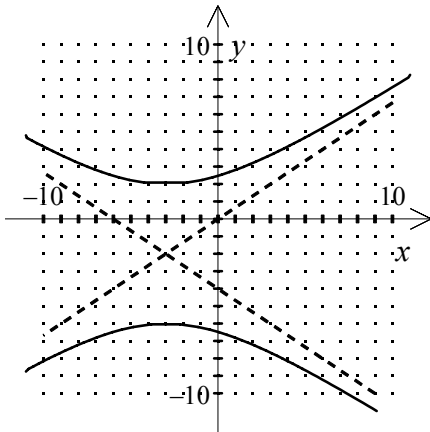
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[11] [B] _____

[12] $\pm 1, \pm 3, \pm 5, \pm 15, \pm \frac{1}{5}, \pm \frac{3}{5}$ _____

[13] [B] _____



[14] $\frac{(y+2)^2}{16} - \frac{(x+3)^2}{36} = 1$ _____

[15] [B] _____

[16] [C] _____

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[17] [A] _____

[18] $\begin{bmatrix} 40 & 25 \\ -10 & -15 \end{bmatrix}$ _____

[19] $\begin{bmatrix} \frac{4}{11} & \frac{3}{11} \\ -\frac{5}{11} & -\frac{1}{11} \end{bmatrix}$ _____

[20] $\left(\frac{1}{5}\right)^{n-6}$ _____

[21] [B] _____

[22] $\frac{3}{2}$ _____

[23] $-125x^3 + 75x^2y^4 - 15xy^8 + y^{12}$ _____

[24] [A] _____

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[25] [A] _____