

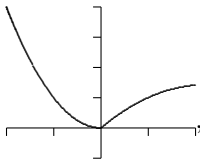
Final Review A

Math 110

Show all steps

1. Solve $2x^2 - 5x - 3 = 0$ by factoring.
2. Graph the solution to $\frac{2x-3}{3x+1} \leq 0$.
3. Solve the equation $|2t+1| = 3$.
4. Graph the solution to the inequality $\left| \frac{1-2x}{3} \right| \leq 3$.
5. Graph the solution to the inequality $|3x-1| \geq 4$.

- (a) $\log_4(1)$.
- (b) $\log_7(49)$
- (c) $\log_2(\sqrt{2})$
- (d) $\log(100)$
- (e) $\ln(e^{2x})$
- (f) $e^{\ln(3x)}$
- (g) $10^{\log \sqrt[3]{x}}$

6. If $y = f(x)$ has the graph , sketch the graphs of $y = f(-x) + 2$ and $y = f(x-1)$

17. Expand (a) $\log\left(\frac{x}{10}\right)$ and (b) $\log_b\left(\frac{x^3y}{z^2}\right)$.
18. Condense (a) $5\ln(x) - 3\ln(y)$ and (b) $\log_3(32) - 2\log_3(2)$.
19. Solve $4e^{2x} = 12$ and use your calculator to give answer to 2 decimal places.
20. Solve $\log_2(4x) + \log_2(x-2) = 5$.

7. Find the equation of the line that passes through $(4, 3)$ and $(2, 1)$.
8. Find the equation of the line parallel to $2x + y = 8$ through $(1, 2)$.

21. For the system
- $$\begin{aligned} x+2y &= 5 \\ x-4z &= -11 \\ 2x+7y+z &= 19 \end{aligned}$$

9. Write $f(x) = x^2 + 2x - 3$ in the form $a(x-h)^2 + k$, state the vertex and x -intercepts and sketch the graph.
10. Sketch the graph of $y = -2(x-1)(x+6)(x-3)^2$ showing its behavior at each x -intercept.
11. Find a polynomial $P(x)$ with zeros $x = 1 \pm \sqrt{2}$ and with $P(1) = 6$.

- (a) Write the system as an augmented matrix.
- (b) Use the Gauss-Jordan elimination method on the augmented matrix to show that the solution is $(1, 2, 3)$.




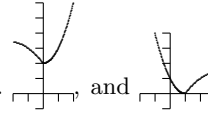

12. Use the rational zero theorem and synthetic division to find all roots of the equation $x^3 + 3x^2 + 3x + 1 = 0$.
13. Find the vertical and horizontal asymptotes for the functions $f(x) = \frac{2x^2 - 2}{x^2 + 4x + 4}$ and $g(x) = \frac{2x^2 - x - 1}{x^2 + 3x + 2}$.

22. Use augmented matrices to show that the inverse of
- $$\begin{bmatrix} 0 & 1 & 1 \\ 1 & 2 & 1 \\ 1 & 0 & 0 \end{bmatrix} \text{ is } \begin{bmatrix} 0 & 0 & 1 \\ -1 & 1 & -1 \\ 2 & -1 & 1 \end{bmatrix}.$$

14. What is the equation of the circle with radius 5 whose center is $(3, -4)$?
15. What is the center and radius for the circle with equation $x^2 + y^2 - 2x + 10y + 18 = 0$?
16. Evaluate each of the following without using a calculator.

23. Use Cramer's rule to solve the system
- $$\begin{cases} x-3y-z=1 \\ 2x+y+2z=0 \\ x-y-3z=4 \end{cases}$$
- for x .

24. Find the sum of the integers from 1 to one million.
25. Evaluate $\frac{1}{3} + \frac{1}{9} + \frac{1}{27} + \dots$.

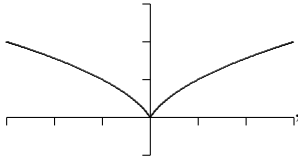
Answers to problems above: 1. $x = -\frac{1}{2}, x = 3$ 2.  3. $t = 1, t = -2$ 4.  5.  6.  7. $y = x - 1$ 8. $y = -2x + 4$ 9. $f(x) = (x+1)^2 - 4, (-1, -4), x = -3, 1,$  10. 11. $P(x) = -3x^2 + 6x - 3$ 12. $x = -1$

with multiplicity 3 13. for f : the vertical asymptote is $x = -2$ and the horizontal asymptote is $y = 2$, for g : the vertical asymptotes are $x = -1$ and $x = -2$ and the horizontal asymptote is $y = 2$ 14. $(x-3)^2 + (y+4)^2 = 25$ 15. center: $(1, -5)$, radius: $2\sqrt{2}$ 16. (a) 0, (b) 2, (c) $\frac{1}{2}$, (d) 2, (e) $2x$, (f) $3x$, (g) $\sqrt[3]{x}$ 17. (a) $\log(x) - 1$, (b) $3\log_b(x) + \log_b(y) - 2\log_b(z)$ 18. (a) $\ln\left(\frac{x^5}{y^3}\right)$, (b) $\log_3(8)$ 19. $x = \ln(3)/2 \approx 0.55$ 20. $x = 4$ 21. (a) $\left[\begin{array}{ccc|c} 1 & 2 & 0 & 5 \\ 1 & 0 & -4 & -11 \\ 2 & 7 & 1 & 19 \end{array} \right]$, (b) use row operation to write as $\left[\begin{array}{ccc|c} 1 & 0 & 0 & 1 \\ 0 & 1 & 0 & 2 \\ 0 & 0 & 1 & 3 \end{array} \right]$ 22. See review 5 23. $x = \frac{21}{22}$ 24. 500,000, 500,000 25. $\frac{1}{2}$

Final Review B

Math 110

Show all steps




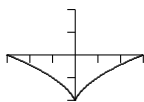
1. Solve $3x^2 + x - 2 = 0$ by factoring.
2. Graph the solution to $\frac{x-1}{x+1} \geq 0$.
3. Solve the equation $\left|\frac{x+3}{2}\right| = 3$.
4. Graph the solution to the inequality $|2x+3| < 1$.
5. Graph the solution to the inequality $\left|\frac{2x+5}{3}\right| \geq 1$.
6. If $y = f(x)$ has the graph , sketch the graphs of $y = f(x) - 2$ and $y = -f(x+1)$.
7. Find the equation of the line that passes through $(2, 1)$ and $(3, 4)$.
8. Find the equation of the line perpendicular to $2x + 3y = 6$ through $(1, 3)$.
9. Write $f(x) = -x^2 - 2x + 8$ in the form $a(x-h)^2 + k$, state the vertex and x -intercepts and sketch the graph.
10. Sketch the graph of $y = x^3(x-1)^2$ showing its behavior at each x -intercept.
11. Find a polynomial $P(x)$ with zeros $x = 3 \pm 5i$ and with $P(0) = 17$.
12. Use the rational zero theorem and synthetic division to find all roots of the equation $2x^3 - 5x^2 + 22x - 10 = 0$.
13. Find the vertical and horizontal asymptotes for the functions $f(x) = \frac{x^2 - 2x - 3}{2x - 1}$ and $g(x) = \frac{x - 1}{x^2 - x - 2}$.
14. What is the equation of the circle with radius 1 whose center is $(4, 1)$?
15. What is the center and radius for the circle with equation $x^2 + y^2 + 4x - 4y = 1$?
16. Evaluate each of the following without using a calculator.

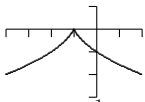
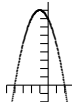
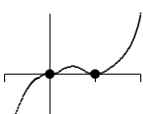
- (a) $\log_3(3)$.
- (b) $\log_2(8)$.
- (c) $\log_4(2)$.
- (d) $\log\left(\frac{1}{10}\right)$.
- (e) $\ln(e^x)$.
- (f) $e^{\ln(x+1)}$.
- (g) $10^{\log(x^2)}$.

17. Expand (a) $\ln(xe^x)$ and (b) $\log\left(\frac{x}{y^2z^3}\right)$.
18. Condense (a) $4\ln(x) + \ln(y)$ and (b) $\log_2(3x) - 2\log_2(3)$.
19. Solve $2e^{x+1} = 6$ and use your calculator to give answer to 2 decimal places.
20. Solve $\log_3(4x-5) - \log_3(x+1) = 1$.

$$x+3y+z=10$$
21. For the system $x+y+z=6$,

$$x+8y+2z=23$$
 - (a) Write the system as an augmented matrix.
 - (b) Use the Gauss-Jordan elimination method on the augmented matrix to show that the solution is $(1, 2, 3)$.
22. Use augmented matrices to show that the inverse of $\begin{bmatrix} 2 & 3 & 1 \\ 1 & 0 & 1 \\ 0 & 1 & 0 \end{bmatrix}$ is $\begin{bmatrix} 1 & -1 & -3 \\ 0 & 0 & 1 \\ -1 & 2 & 3 \end{bmatrix}$.
23. Use Cramer's rule to solve the system $\begin{cases} x+3y+z=0 \\ x+y+2z=3 \\ 2x-y+3z=4 \end{cases}$ for z .
24. Evaluate $\sum_{k=1}^{1000} 2k - 3$.
25. Evaluate $\frac{4}{5} + \frac{4}{25} + \frac{4}{125} + \dots$.

Answers to problems above: 1. $x = \frac{2}{3}, x = -1$ 2.  3. $x = 3, x = -9$ 4.  5.  6.  and

 7. $y = 3x - 5$ 8. $y = \frac{3}{2}x + \frac{3}{2}$ 9. $f(x) = -(x+1)^2 + 9, (-1, 9), x = -4, 2$,  10.  11. $P(x) = \frac{1}{2}x^2 - 3x + 17$

12. $x = \frac{1}{2}, x = 1 \pm 3i$ 13. for f : the vertical asymptote is $x = \frac{1}{2}$ and there is no horizontal asymptote, for g : the vertical asymptotes are $x = -1$ and $x = 2$ and the horizontal asymptote is $y = 0$ 14. $(x-4)^2 + (y-1)^2 = 1$ 15. center: $(-2, 2)$, radius: 3 16. 3. (a) 1, (b) 3, (c) $\frac{1}{2}$, (d) -1 , (e) x , (f) $x+1$, (g) x^2 17. (a) $\ln(x)+x$, (b) $\log(x) - 2\log(y) - 3\log(z)$ 18. (a) $\ln(x^4y)$, (b) $\log_2\left(\frac{x}{3}\right)$ 19. $x = \ln(3) - 1 \approx 0.10$
20. $x = 8$ 21. (a) $\left[\begin{array}{ccc|c} 1 & 3 & 1 & 10 \\ 1 & 1 & 1 & 6 \\ 1 & 8 & 2 & 23 \end{array} \right]$, (b) use row operation to write as $\left[\begin{array}{ccc|c} 1 & 0 & 0 & 1 \\ 0 & 1 & 0 & 2 \\ 0 & 0 & 1 & 3 \end{array} \right]$ 22. See review 5 23. $z = \frac{13}{5}$ 24. 998000 25. 1