Math III Semester 1 Final Review

SHOW ALL WORK on a separate piece of paper. This is due ON OR BEFORE the day of the final and is worth up to 3% extra credit on your Final Exam grade.

Solve the equation for *y*.

1. $2xy + x = 12$
2. $\frac{2x+y}{3} = 5$

Graph each function

3. $y = -2x^2 + 8x - 5$
4. $y = (x+3)^2 + 1$
5. $y = 2\sqrt{x+3} - 4$
6. $y = -2\sqrt[3]{x+1} + 5$
7. $y = -|x+5| + 7$
8. $y = 3(x+2)^3 - 4$

Solve the equation. Check for extraneous solutions if needed.

9. $3(p-9)^2 = 81$
10. $7x^2 - 3 = 11$
11. $m^2 + 8m = -3$
12. $2x^2 + 1 = -15$
13. $3\sqrt{2x+4} = 12$
14. $3 = |-6 + 3b|$
15. $|2x+3| = 3x$
16. $|5x-6| = x$
17. $|x+1| = 4x$
18. $\sqrt[3]{x-5} = -3$
19. $3x^{3/4} = 192$

Perform the indicated operation.

20. $(3x^2 - 5x + 7) - (2x^2 + 9x - 1)$
21. $(12x^3 + 31x^2 - 17x - 6) \div (x+3)$
22. $(2x-3)(5x^2 - x + 6)$
23. $(8x^4 + 5x^3 + 4x^2 - x + 7) \div (x+1)$
24. Graph the relation. Then tell whether the relation is a function.

x	2	–3	4	0	–3	1
y	2	–2	0	2	3	–1

25. Given $f(x) = 80 - 3x$; find $f(5)$

Factor the polynomial completely.

26. $n^5 + 216n^2$
27. $5x^4 + 10x^2 - 15$
28. $2x^3 - 3x^2 + 4x - 6$
29. $64x^3 + 343$
30. $16x^2 - 4y^2$
31. $54y^3 + 2$

Describe the end behavior of the graph of the polynomial function and graph the function.

32. $y = x^4 - 2x^2 - x - 1$

33. $y = -3x^3 - 6x^2$

Let $f(x) = 3x$ and $g(x) = x - 5$. Perform the indicated operation and state the domain.

34. $f(x) + g(x)$

35. $f(x) - g(x)$

36. $f(x) \cdot g(x)$

37. $\dfrac{f(x)}{g(x)}$

Solve the absolute value inequality.

38. $|3x + 4| > 5$

39. $|2x - 4| - 1 > 0$

40. $|x + 8| \geq 10$

Find all zeros of the polynomial function.

41. $f(x) = x^3 - 24x - 32$

42. $f(x) = x^3 - 4x^2 - 11x + 2$

43. $f(x) = x^4 - 2x^3 - 23x^2 - 2x - 24$

44. $4x^3 - 8x^2 - x + 2 = 0$

45. $3x^4 - 11x^2 - 20 = 0$

Sketch the graph of the function. Include any vertical or horizontal asymptotes.

46. $y = \dfrac{5}{x + 2}$

47. $f(x) = \dfrac{4 - 2x}{x - 3}$

48. $f(x) = \dfrac{3x + 2}{x + 2}$

Perform the indicated operations. Simplify the result.

49. $\dfrac{x+2}{x+9} \cdot \left[\dfrac{x^2 + 9x}{x^2 - 4} \div \dfrac{3x^2 + 6x}{x^2 + 2x} \right]$

50. $\dfrac{n^2 - 9}{n + 3} \cdot \dfrac{n}{2n - 6}$

51. $\dfrac{x^2 + 4x}{x^2 - 6x + 8} \cdot \dfrac{x^2 - x - 2}{3x^3 + 12x^2}$

52. $\dfrac{x^2 + 8x - 20}{5x^3 + 50x^2} \div \dfrac{x^2 + 9x}{x^2 + 7x - 18}$

53. $\dfrac{9}{x + 3} + \dfrac{2}{x - 3}$

54. $\dfrac{4x}{x^2 - 9} + \dfrac{2}{x + 3} - \dfrac{2}{x - 3}$

55. $\dfrac{3x + 4}{x^2 - 16} - \dfrac{2}{x - 4}$

Simplify the complex fraction.

56. $\dfrac{\dfrac{2}{x+2} - \dfrac{3}{x}}{\dfrac{3}{x+2} + \dfrac{2}{x}}$

Solve the equation. Check for extraneous solutions.

57. $\dfrac{x - 7}{x + 9} = \dfrac{x + 1}{x - 4}$

58. $\frac{k}{k+1} + \frac{1}{k-1} = \frac{4k-3}{(k+1)(k-1)}$

59. $\frac{2x}{x-2} = \frac{1}{x^2-4} + 1$

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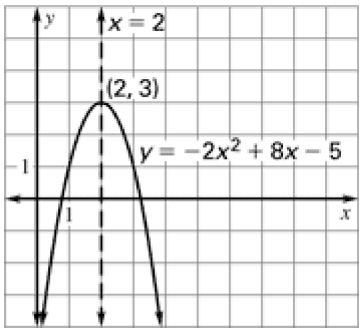
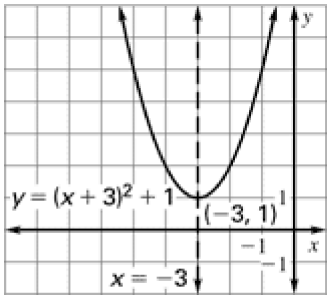
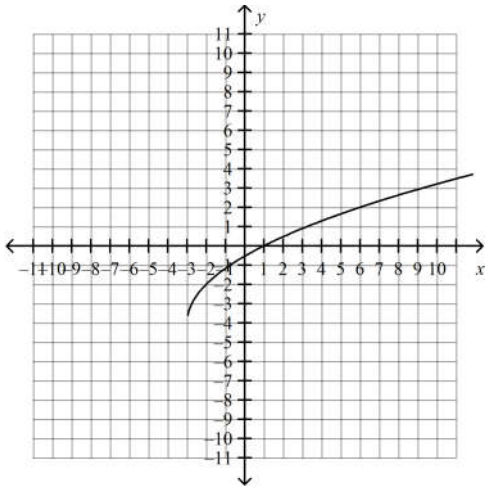
Answer Section

1. $y = \dfrac{12 - x}{2x}$
2. *15-2x*
3. 

4. 

5. 

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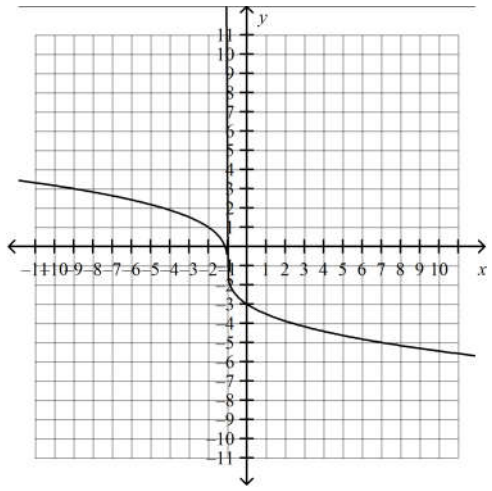

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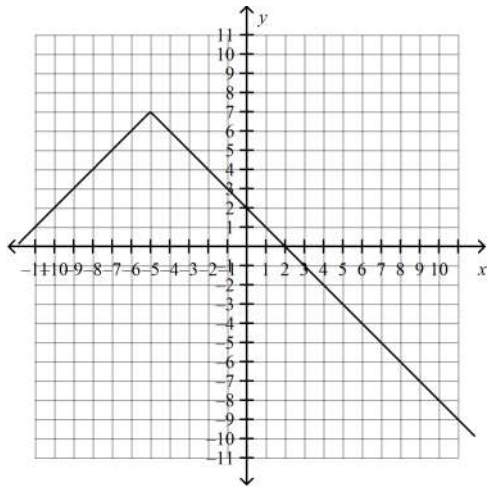

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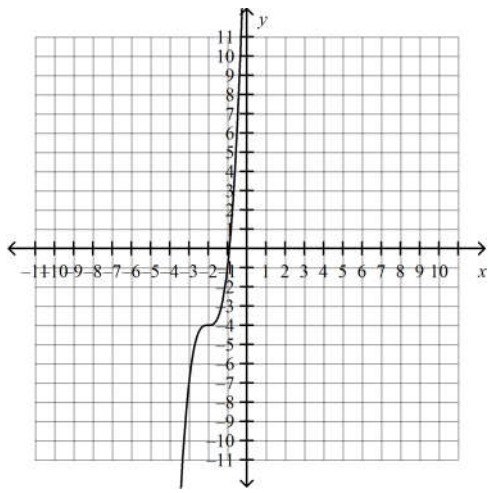
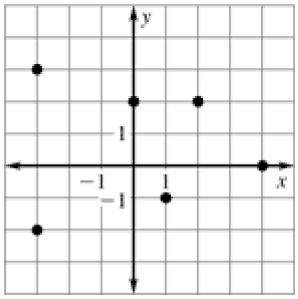


9. $p = 9 \pm 3\sqrt{3}$

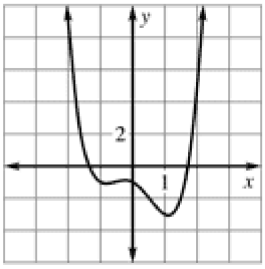
10. $x = \pm\sqrt{2}$

11. $m = -4 \pm \sqrt{13}$

12. $2i\sqrt{2},\ -2i\sqrt{2}$
13. 6
14. 3, 1
15. $x = 3$
16. $1, \frac{3}{2}$
17. $\frac{1}{3}$
18. –22
19. $x = 256$
20. $x^2 - 14x + 8$
21. $12x^2 - 5x - 2$
22. $10x^3 - 17x^2 + 15x - 18$
23. $8x^3 - 3x^2 + 7x - 8 + \frac{15}{x+1}$
24. no



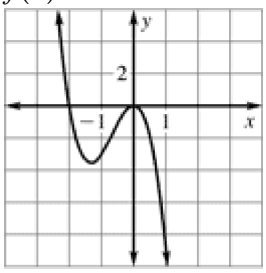
25. 65
26. $n^2(n+6)\left(n^2 - 6n + 36\right)$
27. $5\left(x^2 + 3\right)(x-1)(x+1)$
28. $(2x-3)\left(x^2 + 2\right)$
29. $(4x+7)\left(16x^2 - 28x + 49\right)$
30. $4\left(2x + y\right)\left(2x - y\right)$
31. $2\left(3y + 1\right)\left(9y^2 - 3y + 1\right)$

32. 

$f(x) \to +\infty$ as $x \to -\infty$,

$f(x) \to +\infty$ as $x \to -\infty$

33. $f(x) \to +\infty$ as $x \to -\infty$, $f(x) \to -\infty$ as $x \to +\infty$



34. $4x - 5$;

Domain: all real numbers

35. $2x + 5$;

Domain: all real numbers

36. $3x^2 - 15x$;

Domain: all real numbers

37. $\dfrac{3x}{x-5}$;

Domain: all real numbers except 5

38. $x > \dfrac{1}{3}$ or $x < -3$

39. $x > \dfrac{5}{2}$ or $x < \dfrac{3}{2}$

40. $x \geq 2$ or $x \leq -18$

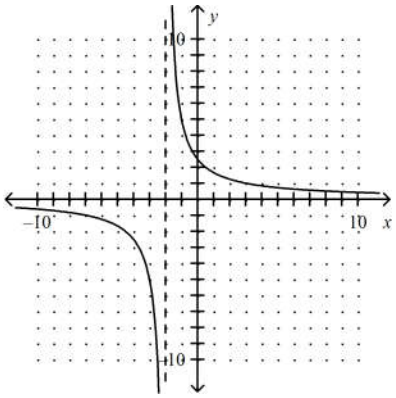
41. $-4, 2 \pm 2\sqrt{3}$

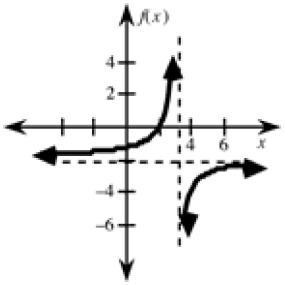
42. $-2, 3 \pm \sqrt{2}$

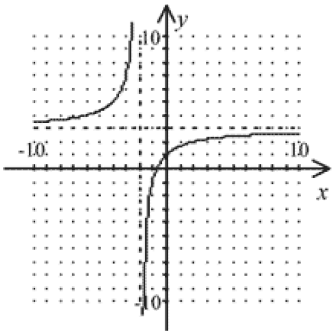
43. $-4,\ 6,\ \pm i$

44. $x = 2, \dfrac{1}{2}, -\dfrac{1}{2}$

45. $x = \pm\sqrt{5}, \pm\dfrac{2i\sqrt{3}}{3}$

46. 

47. 

48. 

49. $\frac{x}{3(x-2)}$

50. $\frac{n}{2}$

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

52. $\frac{(x-2)^2}{5x^3}$

53. $\frac{11x-21}{x^2-9}$

54. $\frac{4}{x+3}$

55. $\frac{1}{x+4}$

56. $-\frac{x+6}{5x+4}$

57. $\frac{19}{21}$
58. 2
59. –1, –3