1. Divide and simplify: $\dfrac{(y-4)^2}{5} \div \dfrac{5y-20}{25}$

2. Subtract and simplify: $\dfrac{2}{x+4} - \dfrac{6}{x-4}$

3. Solve for x: $\dfrac{1}{x+6} + \dfrac{3}{x+4} = \dfrac{-2}{x^2+10x+24}$

4. Solve this proportion: $\dfrac{2y+3}{y} = \dfrac{3}{2}$

5. Simplify: $\dfrac{9+\dfrac{3}{x}}{\dfrac{x}{4}+\dfrac{1}{12}}$

6. Given $f(x)=2x-4$ and $g(x)=4x-7$, find $(f-g)(x)$.

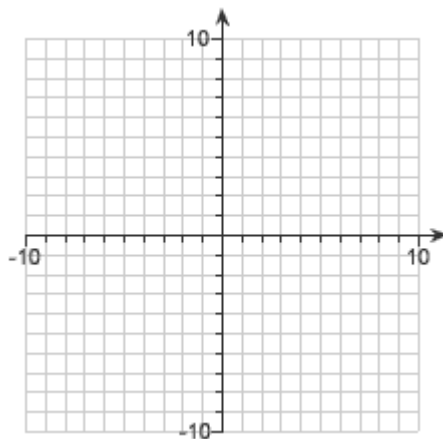7. Given $f(x) = \sqrt{x+1}$ and $g(x) = 5x$, find $(f \circ g)(1)$.

8. Given $f(x) = 3x + 8$ and $g(x) = 3x - 1$, find $(f \circ g)(x)$.

9. Solve the compound inequality and express your answer in interval notation: $-7 \le 3x - 1 \le 11$

10. Solve for x: $\sqrt{x+5} - 9 = 1$

11. Solve for x: $3|2x - 7| = 39$

12. Graph the region that solves this system: $\begin{cases} y \ge x + 7 \\ y \ge -x + 4 \end{cases}$

13. Simplify: $\sqrt[3]{16x^{18}y^{36}}$

14. Express in radical notation and simplify if possible:

    (a) $8x^{\frac{1}{2}}$ (b) $(8x)^{\frac{1}{2}}$

15. Simplify: $\left(\sqrt{11}-\sqrt{5}\right)^{2}$

16. Rationalize the denominator and simplify:

    (a) $\dfrac{5}{\sqrt{27x}}$ (b) $\dfrac{-7}{\sqrt{x}+3}$

17. Simplify into a complex number in standard form: $(4-3i)-(6+7i)+(-9i)$

18. Simplify into a complex number in standard form: $5i(6-6i)$

19. Simplify into a complex number in standard form: $(8-5i)(8+5i)$

20. Solve this quadratic equation: $2x^{2}+98=0$

21. Solve this quadratic equation: $x^2 + 4x + 8 = 0$

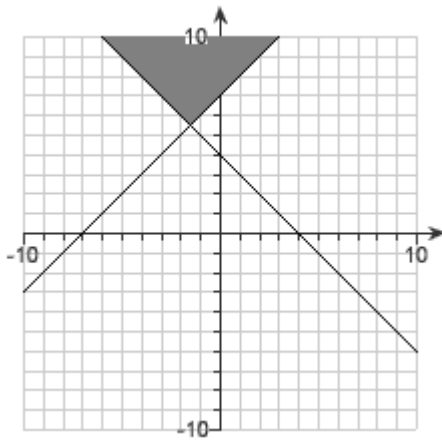22. Use the discriminant to determine the number and type of solutions:

$x^2 - 4x - 15 = 0$

23. Solve the inequality. Express your answer in interval notation: $(x-3)(x-5) > 0$

24. Solve the inequality. Express your answer in interval notation: $(x+3)(x-1) \leq 0$

25. Find the center and radius of the circle: $x^2 + (y-3)^2 = 64$

Math 100   Review Exercises – Final Exam – Answers

1. $y - 4$

2. $\dfrac{-4x - 32}{(x-4)(x+4)}$

3. $x = -6$ is not in the Domain, so there is no solution.

4. $y = -6$

5. $\dfrac{36}{x}$

6. $-2x + 3$

7. $\sqrt{6}$

8. $9x + 5$

9. $[-2, 4]$

10. $x = 95$

11. $x = 10, \quad x = -3$

12.

13. $2x^6 y^{12} \sqrt[3]{2}$

14. (a) $8\sqrt{x}$ (b) $2\sqrt{2x}$

15. $16 - 2\sqrt{55}$

16. (a) $\dfrac{5\sqrt{3x}}{9x}$ (b) $\dfrac{21 - 7\sqrt{x}}{x - 9}$

17. $-2 - 19i$

18. $30 + 30i$

19. 89

20. $x = \pm 7i$

21. $x = -2 \pm 2i$

22. two real solutions

23. $(-\infty, 3) \cup (5, \infty)$

24. $[-3, 1]$

25. center $(0,3)$; radius $= 8$