Final Exam Review
The Final Exam: No Notes, No Formulas Allowed. Show All Work.
1 hour and 50 minutes.

For questions 1 – 3, use factoring to solve each polynomial equation.

1. $20x^2 - 12x = 0$ **2.** $20x^2 - 23x + 6 = 0$ **3.** $9x^2 + 7x - 7 = 3x(x-4)$

4. Set up an equation and solve: The area of a rectangle is 21 sq. ft. The length is 1 ft. less than twice the width. Find the dimensions.

5. Divide: $\dfrac{x^2-4x-12}{x^2-x-6} \div \dfrac{18-3x}{x^2-9}$.

6. Add: $\dfrac{3x}{x^2-2x-8} + \dfrac{2x}{x^2-3x-10}$

7. Simplify the complex fraction: $\dfrac{\dfrac{y}{x}+x}{\dfrac{x}{y}+y}$

8. Solve for x: $\dfrac{4x}{x-1} - \dfrac{x}{x+3} = \dfrac{-12}{x^2+2x-3}$

9. Set up an equation to solve the following: The sum of a number and its reciprocal is $\dfrac{25}{12}$. Find the number.

Problems 10-13, assume all variables represent positive numbers.

10. Simplify: $\sqrt[3]{16x^9y^3}$

11. Simplify: $\sqrt{50x^7y^9}$

12. Combine the following expressions: $x^2\sqrt{18y} - 2x\sqrt{2x^2y} + 4y\sqrt{12x} - \sqrt{3xy^2}$

13. Rationalize the denominator: $\dfrac{7}{\sqrt{13}}$

14. Rationalize the denominator: $\dfrac{\sqrt{x}}{\sqrt{x}-\sqrt{y}}$

15. Evaluate each expression.

(a) $8^{2/3} =$ _____

(b) $\left(\dfrac{49}{4}\right)^{-3/2}$ _____

16. Simplify: $\left(5x^{3/11}\right)\left(6x^{5/11}\right)$

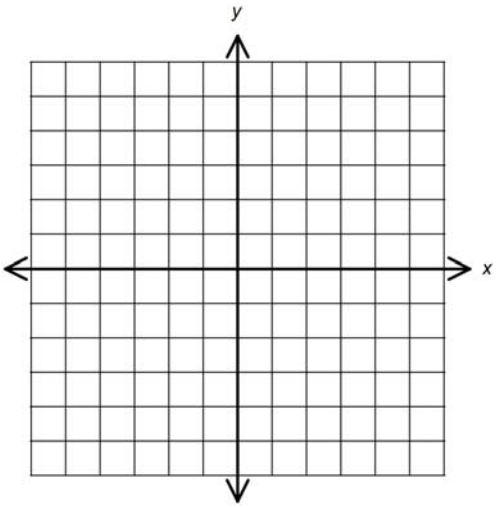
17. Find the product. Write complex numbers in $a + bi$ form: $(7 + 2i)(4 + 3i)$

18. Find the quotient. Write complex numbers in $a + bi$ form: $\dfrac{3}{5-7i}$

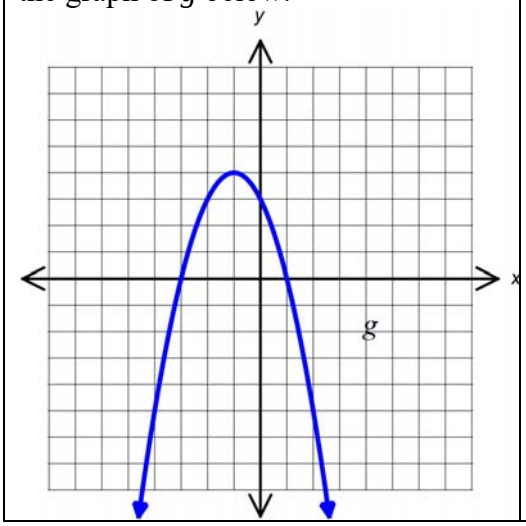
19. Solve for x: $\sqrt{2x+5} = x - 5$

20. Complete the table and graph: $y = x^2 - 5$.

x	y
−2	
−1	
0	
1	
2	



21. Answer the questions about the graph of g below.



(a) Does g represent a function? _____

(b) What is the domain of g? **(**Write answer in interval notation):

(c) What is the range of g? **(**Write answer in interval notation):

22. If $f(x) = 2x + 5$ and $g(x) = x^2 + 2$, find:

(a) $g(-5)$ **(b)** $f(a+h)$ **(c)** $g(a)$ **(d)** $(f+g)(x)$

23. Find the equation of the line that passes through $(-3, 2)$ and $(-5, 9)$.
Write this equation in slope-intercept form, if possible.

24. Sketch the graph of the equation: $3x - 5y = 15$

25. What is the slope of the line that is perpendicular to $x + 3y = 4$?

26. Write the equation of the line parallel to the line with equation $y = 3$ that passes through the point $(4, 6)$. Write in slope-intercept form, if possible.

27. Solve the following inequality. Write the solution set in interval notation and graph on the number line.
$5(2x + 7) \le 6(3x + 5)$

28. Graph the solution for $x - 3y \ge 9$.

29. Graph the solution for $x > 5$.

30. Solve using the **extraction of roots** theorem (square root method): $(2x + 5)^2 = 8$

31. Solve by completing the square: $x^2 + 6x + 3 = 0$

32. Solve using the quadratic formula: $x^2 - 4x + 11 = 0$

33. Solve: $|4x + 3| = 7$

34. Solve the following absolute value inequality.
Write the solution set in interval notation and graph on the number line: $|3x - 1| - 2 \le 10$

Answers

1. $x = 0, \frac{3}{5}$

2. $x = \frac{3}{4}, \frac{2}{5}$

3. $x = \frac{1}{3}, -\frac{7}{2}$

4. length = 6 ft. width = $\frac{7}{2}$ ft.

5. $\frac{-(x+3)}{3}$ or $-\frac{(x+3)}{3}$

6. $\frac{5x^2 - 23x}{(x-4)(x+2)(x-5)}$

7. $\frac{y^2 + x^2 y}{x^2 + xy^2}$ or $\frac{y\left(y + x^2\right)}{x\left(x + y^2\right)}$

8. $x = \frac{-4}{3}$ $x = -3$ is extraneous solution

9. The equation: $x + \frac{1}{x} = \frac{25}{12}$

$x = \frac{3}{4}$ or $x = \frac{4}{3}$

10. $2x^3 y \sqrt[3]{2}$

11. $5x^3 y^4 \sqrt{2xy}$

12. $x^2\sqrt{2}y + 7y\sqrt{3x}$

13. $\frac{7\sqrt{13}}{13}$

14. $\frac{\sqrt{x}(\sqrt{x} + \sqrt{y})}{x - y} = \frac{x + \sqrt{xy}}{x - y}$

15. (a) 4 (b) $x = \frac{8}{343}$

16. $30x^{8/11}$

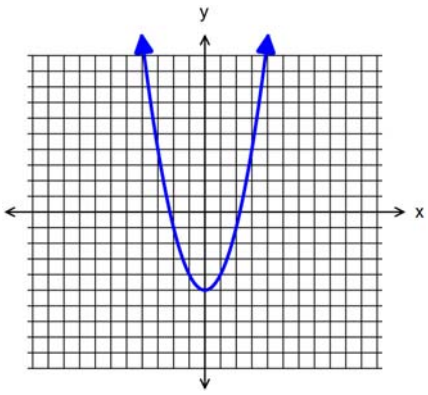
17. $22 + 29i$

18. $\frac{15 + 21i}{74}$ or $\frac{15}{74} + \frac{21}{74}i$

19. $x = 10$ $x = 2$ is extraneous solution

20.

x	y
−2	−1
−1	−4
0	−5
1	−4
2	−1



21. (a) yes

(b) $(-\infty, \infty)$

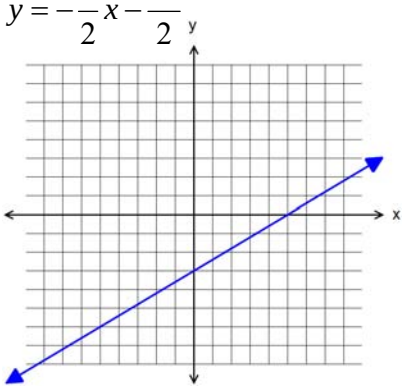
(c) $(-\infty, 4]$

22. (a) 27 (b) $2a + 2h + 5$

(c) $a^2 + 2$ (d) $x^2 + 2x + 7$

23. $y = -\frac{7}{2}x - \frac{17}{2}$

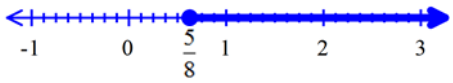
24.



25. $m = 3$

26. $y = 6$

27. $\left[\frac{5}{8}, \infty\right)$



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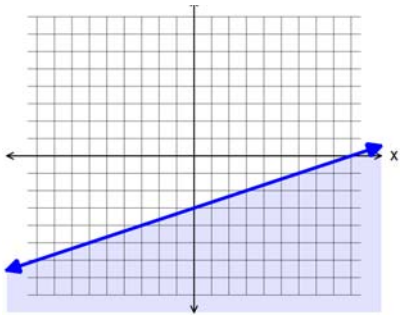

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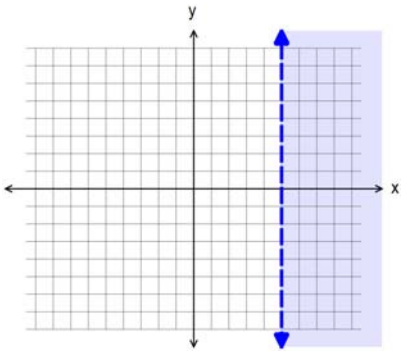

30. $\frac{-5 \pm 2\sqrt{2}}{2}$

31. $x = -3 \pm \sqrt{6}$

32. $x = \frac{4 \pm \sqrt{-28}}{2} = \frac{4 \pm 2i\sqrt{7}}{2} = 2 \pm i\sqrt{7}$

33. $x = 1, \frac{-5}{2}$ (you will receive no credit for just one answer)

34. $\left[\frac{-11}{3}, \frac{13}{3}\right]$