

Math 3a Extra Final Exam Review

A. Solve for x:

1. $4x^2 + x - 3 = 0$

2. $x^2 - 6x + 8 = 0$

3. $x^2 - 6x - 8 = 0$

4. $x^4 - 13x^2 + 36 = 0$

5. $x^4 - 15x^2 - 16 = 0$

6. $-3x + 7 < 5$

7. $-5x - 10 \leq 15$

8. $|5x - 3| > 12$

9. $\frac{5}{x-3} - \frac{2}{2x-6} = 1 + \frac{2}{x}$

10. $\frac{3x-5}{16} - \frac{2x+3}{8} = 1 + \frac{7x-9}{4}$

11. $x^4 - 6x^2 - 8x + 24 = 0$

12. $x^4 - 2x^3 - 10x^2 + 18x + 9 = 0$

13. $|x-3| + |2x+3| > 12$

B. Simplify the following expressions:

1. $\sqrt{576x^8y^9}$

4. $\frac{2-4i}{1+3i}$

7. $\sqrt[3]{\frac{81x^2y^5z^{13}}{4m^7}}$

2. $\sqrt[3]{576x^8y^9}$

5. $\frac{3+\sqrt{7}}{3-\sqrt{7}}$

8. $\sqrt{\frac{2}{3}} + \sqrt{24} - \sqrt{\frac{3}{2}}$

3. $\sqrt[4]{576x^8y^9}$

6. $\frac{(2x^5y^{-9})(-y^3x^4)^2}{(x^2y^{17})^4}$

9. i^{243}

C. Factor the following completely.

1. $x^2 - 4x + 4 - 9y^2$

4. $36x^3 - 24x^2 - 45x$

2. $24x^2 + 55x - 24$

5. $3x^5 + x^4 - 48x - 16$

3. $2x^5 + 5x^4 - 8x - 20$

6. $x^6 - 9x^3 + 8$

D. Solve for x and y using any method.

1. $3x - 5y = -13$

2. $7x - 2y = 29$

3. $x + y + 2z = 6$

$4x + 3y = 2$

$2x + 5y = 25$

$3x - 4y - 4z = 0$

$2x + 3y = 1$

E. Coordinate Geometry

1. Write the equation of the line which is the perpendicular bisector of the segment whose endpoints are $(-2, -5)$ and $(4, 1)$
2. Write the equation of the line which passes through $(-1, 7)$ and is parallel to $3x + 4y = 17$.
3. Find the equation of the median to $\overline{AB}$ of the triangle A $(0, 0)$ B $(6, -4)$ and C $(1, 9)$
4. Find the domain of the following:
 - a) $y = |2x - 4| + 1$
 - b) $y = \frac{x^2 + 4x}{2x + 1}$
 - c) $y = \sqrt{x^2 - 7x}$
5. Graph the following completely

- a) $y = |2x - 4|$
- b) $y = x^2 + 4x - 1$
- c) $y = \begin{cases} 2x & x > 2 \\ 4 & -2 \leq x \leq 2 \\ -x + 1 & x < -2 \end{cases}$
- d) $y = \frac{x - 1}{2x + 1}$
- e) $y = \frac{x - 1}{(2x + 1)^2}$
- g) $y = \frac{x^2 - 1}{x}$

F. Divide:

1.
$$\frac{3x^5 + 2x^3 - 5x^2 + 3}{x^2 - 2x + 2}$$

G. Word Problems

1. George bought 7 quarts of cleaning fluid; x quarts at \$3 per quart and y quarts at \$2 per quart. Find how much of each he bought if the total cost was \$16.
2. The perimeter of a rectangle is 86 cm. Twice the width exceeds the length by 2 cm. Find the dimensions of the rectangle.
4. The sum of the squares of 2 consecutive even integers is 244. Find the integers.
5. Find two consecutive integers whose product is 552.
6. The difference of the squares of 2 consecutive odd integers is 48. Find the integers.
7. A rectangular garden 25' by 50' is increased on ALL sides by the same amount. Its area increases 400 square feet. By how much is each dimension increased?

Answers

Section A

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|--------------------------|-----------------------|----------------------------------|----------------------------------|
| 1. $x = \frac{3}{4}, -1$ | 4. $x = \pm 2, \pm 3$ | 7. $x \geq -5$ | 10. $x = \frac{9}{29}$ |
| 2. $x = 4, 2$ | 5. $x = \pm 4, \pm i$ | 8. $x > 3$ or $x < \frac{-9}{5}$ | 11. $x = 2, 2, -2 \pm i\sqrt{2}$ |
| 3. $x = 3 \pm \sqrt{17}$ | 6. $x > \frac{2}{3}$ | 9. $x = 6, -1$ | 12. $x = \pm 3, 1 \pm \sqrt{2}$ |
13. $x > 4$ or $x < -4$

Section B

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|----------------------------|--------------------------|--|
| 1. $24x^4y^4\sqrt{y}$ | 4. $-1-i$ | 7. $\frac{3yz^4\sqrt[3]{6x^2y^2zm^2}}{2m^3}$ |
| 2. $4x^2y^3\sqrt[3]{9x^2}$ | 5. $8+3\sqrt{7}$ | 8. $\frac{11\sqrt{6}}{6}$ |
| 3. $2x^2y^2\sqrt[4]{36y}$ | 6. $\frac{2x^5}{y^{71}}$ | 9. $-i$ |

Section C

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|---------------------------|------------------------------------|
| 1. $(x-2+3y)(x-2-3y)$ | 4. $3x(6x+5)(2x-3)$ |
| 2. $(8x-3)(3x+8)$ | 5. $(3x+1)(x^2+4)(x+2)(x-2)$ |
| 3. $(2x+5)(x^2+2)(x^2-2)$ | 6. $(x-2)(x^2+2x+4)(x-1)(x^2+x+1)$ |

Section D

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|--------------|-------------|--------------------------------------|
| 1. $(-1, 2)$ | 2. $(5, 3)$ | 3. $\left(2, -1, \frac{5}{2}\right)$ |
|--------------|-------------|--------------------------------------|

Section E

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|---|-----------------------------|---------------------------------|
| 1. $y = -x - 1$ | 4. a) all reals | 5. Graphs will be done in class |
| 2. $y = -\frac{3}{4}x + \frac{25}{4}$ or $3x + 4y = 25$ | b) $x \neq -\frac{1}{2}$ | |
| 3. $y = -\frac{11}{2}x + \frac{29}{2}$ | c) $x \geq 7$ or $x \leq 0$ | |

Section F

1. $3x^3 + 6x^2 + 8x - 1 + \frac{-18x + 5}{x^2 - 2x + 2}$

Section G

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|-------------------|-----------------------------------|
| 1. $x = 2, y = 5$ | 5. 23, 24 or -24, -23 |
| 2. 15 cm by 28 cm | 6. 13, 11 |
| 3. | 7. $2\frac{1}{2}$, on each side. |
4. 10, 12 or -12, -10