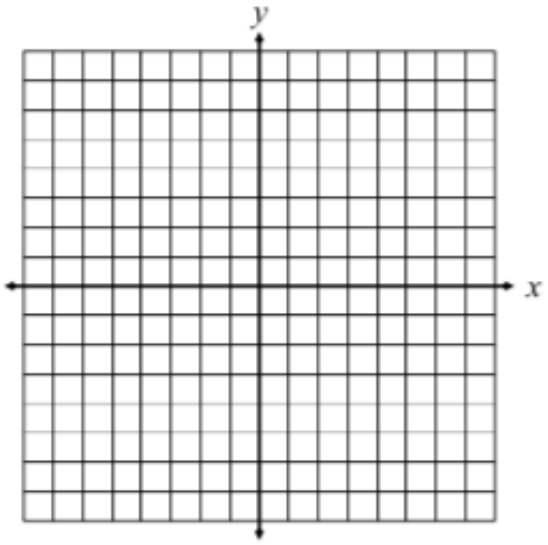
**Name:**_____
**Date:**_____**Class:**_____

**Final Exam Review**

1. **Solve by Graphing. State your Solutions.**

$$x^2 + 10x + 24 = 0$$




**Solutions:**_____

2. **Solve by Quadratic Formula. SHOW ALL WORK.**

$$5x^2 + 4x + 1 = 0$$

**SHOW ALL WORK.**

3. **Solve By Factoring.**

$$2x^2 - 32x + 128 = 0$$

4. **Solve By Completing the Square.**

$$6x^2 - 12x - 38 = 10$$

5. **Solve by Square Root Method.**

$$(x - 8)^2 - 7 = 25$$

**Simplify the Expressions below. SHOW ALL WORK.**

| | |
|---|---|
| **6.** $\sqrt{-288}$ | **7.** $i^{49}$ |
| **8.** $(-4i)^3 \cdot 2i$ | **9.** $18 - x^2 = 39$ |
| **10.** $(-6 + 10i) - (1 - 2i)$ | **11.** $(-7 + i)^2$ |
| **12.** $(5 - 2i)(2 + 7i) - 2i(3i)^2$ | **13.** $\frac{-35-15i}{5i}$ |
| **14.** $\frac{6i}{1-i}$ | **15.** $\frac{5-8i}{-1-4i}$ |

**Simplify the Monomials below. Final answers should contain positive exponents only.**

| | |
|---|---|
| **16.** $(-8x^4y^3)\cdot(2x^5y^2)+7x^9y^5$ | **17.** $\frac{15x^2y\cdot -6x^7y}{(3xy)^2}$ |

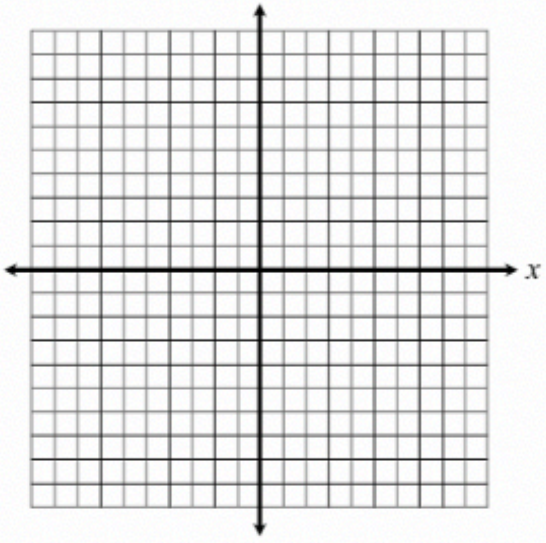
**Simplify. Final answers should be written in standard form.**

| | |
|---|---|
| **18.** $(1-2n)^3-7n(n^2-2)$ | **19.** $4(2-3w)(w^2-2w+10)$ |

**Graph Each Function and Identify its key characteristics**

**20.**

$f(x)=2x^3-7x^2+6$




**Domain:** _____

**Range:** _____

**Rel. Maximum(s):** _____

**Rel. Minimum(s):** _____

**End Behavior:** As $x\to\infty$, $f(x)\to$ _____

As $x\to-\infty$, $f(x)\to$ _____

**Inc. Intervals:** _____

**Dec. Intervals:** _____

**Factor each polynomial completely. Mach sure you check for a GCF first.**

| | |
|---|---|
| **21.** $9y^7 - 144y$ | **22.** $54x^3 + 250y^3$ |
| **23.** $x^3y^2 - 343y^2$ | **24.** $2a^3 + 28a^2 + 96a$ |
| **25.** $15n^3 - 6n^2 - 25n + 10$ | |

**Solve each equation by FACTORING. Simplify all irrational and complex solutions.**

| | |
|---|---|
| **26.** $12x^3 - 3x^2 = 0$ | **27.** $9x^4 - 16 = 0$ |
| **28.** $x^3 + 512 = 0$ | **29.** $8x^3 - 125 = 0$ |
| **30.** $2x^3 - 16x^2 - 40x = 0$ | **31.** $2x^3 - 5x^2 + 40x - 100 = 0$ |

**Divide the polynomial by the monomial. Write in standard form.**

| |
|---|
| **32.** $\frac{21a^3b^3+35a^4b^2-56a^2b^4}{-7a^2b^2}$ |

**Divide each polynomial by the binomial. Write in standard form.**

| | |
|---|---|
| **33.** $\frac{6a^2+11a-10}{3a-2}$ | **34.** $\frac{5m^2-18m-8}{m-4}$ |

**Given $f(x) = 2x^2 - 9x + 2$, $g(x) = 1 - 6x$, and $h(x) = x^2 - 4$, find each function. Indicate any restrictions in the domain.**

| | |
|---|---|
| **35.** $(f - g)(x)$ | **36.** $\left(\frac{f}{h}\right)(x)$ |
| **37.** $(g + f)(x)$ | **38.** $(g \cdot h)(x)$ |
| **39.** $(f \circ g)(x)$ | **40.** $(h - g)(-7)$ |

**Simplify the radicals below and give ALL possible roots.**

| | | |
|---|---|---|
| **41.** $-8\sqrt{63}$ | **42.** $2\sqrt[3]{-54}$ | **43.** $6\sqrt[4]{405}$ |
| **44.** $3\sqrt{49x^9y^{16}}$ | **45.** $\sqrt[3]{-625m^{28}n^{12}}$ | **46.** $-2\sqrt[4]{80x^8y^9z}$ |

**Simplify each expression below.**

| | |
|---|---|
| **47.** $\sqrt[4]{8a^3b} \cdot \sqrt[4]{10a^2b^7}$ | **48.** $(3-2\sqrt{k})^2$ |
| **49.** $\sqrt[4]{\frac{2m^7}{625n^4}}$ | **50.** $\frac{2\sqrt{3}-3}{6-\sqrt{3}}$ |
| **51.** $5\sqrt[3]{32x^3y^4} - 3xy\sqrt[3]{4y}$ | **52.** $8\sqrt[4]{48} - 5\sqrt{90} + 9\sqrt[4]{3}$ |

| **53. Rewrite in radical form. Simplify if needed.** | **54. Rewrite in exponential form.** |
|---|---|
| $(-2a)^{\frac{4}{3}}$ | $\sqrt[4]{18x^9y^2}$ |

**Simplify each expression. Give final answers in simplest <u>radical</u> form.**

| **55.** $\frac{x^{\frac{7}{3}}}{x^{\frac{2}{3}}}$ | **56.** $\sqrt[4]{36w^6}$ |
|---|---|

**Solve each equation. Be sure to check for extraneous solutions.**

| **57.** $-7+(16p+8)^{\frac{1}{3}}=-1$ | **58.** $(3x-21)^{\frac{1}{3}}=(19-x)^{\frac{1}{3}}$ |
|---|---|
| **59.** $\frac{\sqrt[4]{7w-5}}{2}=\sqrt[4]{w-2}$ | **60.** $\sqrt{q-21}=\sqrt{q}+7$ |

**Simplify the expressions below.**

| | |
|---|---|
| **61.** $\frac{n^2+7n}{4n^2+28n}$ | **62.** $\frac{y^2-36}{5y^2-26y-24}$ |

**Find the product. Give your answer in simplest form.**

| | |
|---|---|
| **63.** $\frac{m^2-6m+8}{2m-2} \cdot \frac{10}{m-4}$ | **64.** $\frac{6c^2+13c-63}{6c^2-17c+7} \cdot \frac{2c^2-9c+4}{12c+54}$ |

**Find the quotient. Give your answer in simplest form.**

| | |
|---|---|
| **65.** $\frac{1-h^2}{2h^2-10h-12} \div \frac{2h-2}{6}$ | **66.** $\frac{2a^2+14a}{8a^2} \div (10a+70)$ |

**Find the sum/difference. Give your answer in simplest form.**

| | |
|---|---|
| **67.** $\frac{8a-18}{3a^2+14a+8}+\frac{7}{3a+2}$ | **68.** $\frac{22w+11}{8w^2-6w}-\frac{3}{2w}$ |

**Simplify each expression.**

| | |
|---|---|
| **69.** $\frac{\frac{n^2-9n+14}{4n+28}}{\frac{n-7}{n+7}}$ | **70.** $\frac{\frac{2v^2+16v}{2v^2-5v-7}}{\frac{4v^2+28v-32}{10v^2-10}}$ |

**Solve each equation. Be sure to check all equations.**

| | |
|---|---|
| **71.** $\frac{2}{a-2}=\frac{3a-1}{2a+11}$ | **72.** $\frac{4}{3v}-\frac{1}{v}=\frac{v+2}{2v^2}$ |

**Solve each equation using a common base.**

| | |
|---|---|
| **73.** $2^{w+4} \cdot 2^{w+6} = 2^{2w+1}$ | **74.** $2^{3k-1} \cdot 2^{5k-7} = 16$ |

**Write each equation in exponential form or logarithmic form.**

| | |
|---|---|
| **75.** $\log_2 128 = 7$ | **76.** $8^3 = 512$ |

**Evaluate each logarithm. Use the change of base formula when necessary.**

| | | |
|---|---|---|
| **77.** $\log_{16} \frac{1}{2}$ | **78.** $\log 1000$ | **79.** $\log_5 38$ |

| | |
|---|---|
| **Rewrite as a single logarithm. Simplify if possible.**<br>**80.** $\frac{1}{3}(\log_5 8 + \log_5 27) - \log_5 3$ | **Expand each logarithm.**<br>**81.** $\log_3 \sqrt[4]{m^5 n^2}$ |

**Solve each equation. Check for extraneous solutions.**

| | |
|---|---|
| **82.** $\log_7(4n-7) = \log_7(-3n)$ | **83.** $\log_2 4 + \log_2(c-9) = 5$ |

| | |
|---|---|
| **Write each equation in logarithmic form.**<br>**84.** $e^{x-9} = 74$ | **Write each equation in exponential form.**<br>**85.** $\ln 87 = x + 4$ |
| **Condense each expression as a single logarithm.**<br>**86.** $\frac{1}{2} \cdot \ln 256 - 3 \cdot \ln 2$ | **Expand each logarithmic expression.**<br>**87.** $\ln(\frac{m^5}{n^2})^3$ |

**Solve each equation. Be sure to check for extraneous solutions.**

| | |
|---|---|
| **88.** $\ln 8 + \ln(n-9) = 5 \cdot \ln 2$ | **89.** $4e^{3k} + 1 = 85$ |