Name _____ Date _____ Pd ____

Algebra 2 Spring Exam Review 21 - 22

List of concepts:

Ch. 5

Rational Exponents

Exponent Laws

Simplifying Radicals

Domain Restrictions

Function Operations

Solving Radical Equations & Inequalities

Composition of Functions

Inverse Functions

Ch. 6

Exponential Growth & Decay Functions

Natural Base e

Exponential & Logarithmic Expressions

Transformations of Exponential & Logarithmic

Properties of Logarithms

Solving Exponential & Logarithmic Equations

Ch. 6 Continued…

Modeling with Exponential & Logarithmic Functions

Compound Interest

Ch. 7

Inverse/Joint Variation

Graphing Rational Functions

Multiplying & Dividing Rational Expressions

Adding & Subtracting Rational Expressions

Solving Rational Equations

Practice Problems based on each chapter.

Chapter 5

1. Find $2f(x) - f(x-1)$ for $f(x) = 3x^2 + 5$.
2. Find $p(-2)$ for $p(x) = x^2 + 3x - 1$.
3. Find $f(-2)$, given $f(x) = -x^3 + 4x^2 + 6x - 20$
4. Let $f(x) = 3x^2$ and $g(x) = \frac{-2}{x^4}$. Determine $f(g(x))$ and $(g \cdot g)(x)$.
5. Let $f(x) = \frac{1}{2}x^{-2}$ and $g(x) = 2x^2$. Determine g of f of x, and $f(f(x))$.
6. The total number of months m that it takes to produce p canned hams (in thousands) is given by the formula $m = \frac{p^3}{63}$. Find the inverse of the function. Then answer: How many cans will be produced in 20 months?
7. The average speed that a tidal wave, created at Six Flags by a water ride, travels is represented by the function $s = (174d)^{\frac{1}{2}}$, where s is the speed (mph) that the wave is traveling and d is the average depth (ft) of the wave. Write the inverse function.

8. Simplify: $(2a - b)^4$.

9. Factor: $32a^6 - 4b^3$.

10. Simplify: $\sqrt{40x^3 y} \cdot \sqrt{20x^5 y^4}$.

11. Simplify $\left(x^{\sqrt{3}}\right)^{\sqrt{3}}$.

12. Simplify $7^{\sqrt{5}} \cdot 7^{\sqrt{8}}$.

13. Solve the equation $\dfrac{1}{6} = 6^{n + 4}$.

14. Simplify: $\left(-4x^{\frac{2}{3}}y^{-4}\right)^2 \left(x^{-\frac{4}{3}}y\right)^{-1}$.

15. Solve: $= (x + 2)^{\frac{1}{2}}$.

16. Simplify: $\dfrac{4\sqrt{24}}{2\sqrt{8}}$

17. Write the polynomial function whose zeros include -2 and $4 - 3i$.

18. Simplify $\left(3 - 4\sqrt{5}\right)\left(4 - \sqrt{2}\right)$.

19. Simplify $-\sqrt{8} + 2\sqrt{96 + 5\sqrt{4}}$

20 - 25: Graph the following functions, state the domain and range and all transformations from the function's parent function:

20. $f(x) = -2\sqrt{x + 6}$

21. $f(x) = \sqrt{2x - 4} + 3$

22. $f(x) = -\sqrt[3]{x} - 4$

23. $g(x) = -2x^3 + 5$

24. $h(x) = \frac{1}{3}x^3 - 2$

25. $g(x) = \left(\frac{3}{4}x - 4\right)^3$

Chapter 6

1. Graph $y = \left(\frac{1}{2}\right)^x$ be sure to include the pivot point and asymptote.

2. Graph $y = log_2 x$ be sure to include the pivot point and asymptote.

3. Graph $y = -\left(\frac{1}{2}\right)e^{-x}$ be sure to include the pivot point and asymptote.

4. Graph $y = (4)^x + 3$ be sure to include the pivot point and asymptote.

5. Expand: $log \frac{7}{5}$.

6. Expand: $log_3 9r^5$.

7. Condense: $log_2 25 + log_2 \frac{1}{5}$.

8. Condense: $log_4 3 + log_4 15 - log_4 9$.

9. Write $log_6 36 = 2$ in exponential form.

10. Solve: $x = (x + 2)^{\frac{1}{2}}$

11. Evaluate $\log_7 7^6$.

12. Evaluate $5^{\log_5 3}$.

13 – 18: Solve each equation:

13. $5^{x-2} = 16$

14. $\log_8 y = 3$

15. $\log_6(5 - 3a) = \log_6(a^2 - 5)$

16. $\log_3(x + 3) + \log_3(x - 2) = \log_3 14$

17. $\log_2(2x + 6) - \log_2 x = 3$

18. $\log_5 x = \frac{1}{2}\log_5 25$

19. If $\log_7 3 = a$ and $\log_7 5 = b$, express $\log_7 \dfrac{3}{5}$ in terms of a and b.

20. A new I-Mac costs $1300. How much should you put into a savings account today that pays 6% compounded continuously if you have 2 years until you want to make this purchase?

21. Josh has $3500 to invest. His hometown bank pays 5.25% interest, compounded quarterly while The 1st Bank of Houston pays 6% compounded continuously. Where should he invest his money if this is a short, 1 year investment?

22. The table shows the number of kinkajou (k) in a particular forest (t) years after the forest fire. Write and use an exponential model to find how many years it will take for the kinkajou population to surpass 20,000.

Years after the fire, y	0	1	2	3	4	5
kinkajou (k)	20	60	180	540	1620	4860

Chapter 7

1. Simplify: $\sqrt{40x^3 y} \cdot \sqrt{20x^5 y^4}$

2. State all of the asymptotes and holes for the rational function $f(x) = \dfrac{x^2 + 2x + 1}{x^2 + 4x + 3}$.

3. Find $\dfrac{x^2 + 9x + 20}{x^2 + 6x + 9} \cdot \dfrac{x + 3}{x + 4}$

4. Find $\dfrac{x^3}{x^2 - 64} \div \dfrac{x^2}{x + 8}$

5. Simplify $\dfrac{\dfrac{2}{x} - \dfrac{4}{3x}}{\dfrac{1}{2x} + \dfrac{3}{4x}}$

6. Find $\dfrac{6}{x^2 - 4} + \dfrac{2}{x - 2}$

7. Simplify $\dfrac{\dfrac{x}{2} - \dfrac{x^2}{4}}{\dfrac{x}{3} - \dfrac{x}{5}}$

8. Find $\dfrac{5}{3m + 1} - \dfrac{3m - 1}{9m^2 - 1}$

9. If y varies inversely as x and $y = 18$ when $x = -3$, find the constant of variation, k.

10. Solve $x + \dfrac{2x}{x-2} = \dfrac{3x-2}{x-2}$

11. If y varies directly with x and $y = 5$ when $x = 3$, find y when $x = 35$.

12. Graph $y = \dfrac{1}{(x+2)(x+1)}$

13. Simplify $\left(x^{\sqrt{3}}\right)^{\sqrt{3}}$

15. Solve the equation $\dfrac{1}{6} = 6^{n+4}$

14. Simplify $7^{\sqrt{5}} \cdot 7^{\sqrt{8}}$

16. Simplify: $\left(-4x^{\frac{2}{3}}y^{-4}\right)^{2}\left(x^{-\frac{4}{3}}y\right)^{-1}$

17 – 19: Graph the following functions, state the domain and range and all transformations from the function's parent function:

17. $f(x) = -2\sqrt{x+6}$

18. $f(x) = \sqrt{2x-4}+3$

19. $f(x) = -\sqrt[3]{x}-4$

20. Solve: $4^{x} = \dfrac{1}{16}$

21. Solve: $8^{3x+1} = 16^{x+3}$

22. Solve: $\dfrac{3+\dfrac{3}{x}}{\dfrac{6}{x}} = \dfrac{\dfrac{9}{x}+x}{3}$

23 – 25: State all asymptotes and holes for the following rational equations.

23. $f(x) = \dfrac{x^2 - 3x + 2}{x^2 + x - 6}$

24. $g(x) = \dfrac{3x^2}{2x^2 + 9x - 5}$

25. $r(x) = \dfrac{3x^3 - 2x^2 + 1}{2x^2}$

26. Graph $q(x) = \dfrac{8}{x^2 - 2x - 15}$

27. Find the inverse of $f(x) = \dfrac{2}{5}x - 3$.

28. Find the inverse of $g(x) = (3x-1)^2$

Be sure to complete this entire review on a separate sheet of paper with work (as directed) to earn bonus points on your final exam. Use notes, homework, dailies, quizzes, and tests as additional review if needed. Formulas are also great to study and make your own formula sheet that covers the YEAR!!