

114 – Final Exam Review Worksheet

1. For each of the following, find $f(-3)$ and find the domain of $f(x)$

a. $f(x) = \frac{3x-4}{2x^2+7x-15}$

b. $f(x) = \frac{7-2x}{6x^2-13x-5}$

2. The number of winning tickets in a lottery varies inversely with the value of the winnings from each ticket. If there are 14 winning tickets, the prize each ticket holder gets is \$2.1 million. What is the size of the prize, if there are 19 winning tickets? What is the total jackpot in this lottery?
3. The distance an object falls varies with the square of the time it takes to fall that distance. How much further can an object fall in 30 seconds, than in can in 20 seconds?
4. Simplify the following. Do not leave negative exponents, or radicals in the denominators, in your answers.

a. $\frac{12a^3b^{-2}c}{4a^{-1}b^{-5}c^{-4}}$

b. $\left(\frac{-2b^{-3}d}{bd^{-1}}\right)^{-4}$

c. $\sqrt[5]{-32a^4b^7c^{18}}$

d. $\sqrt[3]{54x^4y^6z^{10}}$

e. $\sqrt{242x} - \sqrt{162x} + \sqrt{18x}$

f. $\sqrt{27y} + \sqrt{48y} - \sqrt{3y}$

g. $(\sqrt{x}-7)(\sqrt{x}+7)$

h. $(\sqrt{2a}-1)^2$

i. $\frac{5}{\sqrt{15}}$

j. $\frac{6}{5-\sqrt{2}}$

5. Evaluate the following logarithms

a. $\log_6(1296)$

b. $\log_2(\sqrt{8})$

c. $\log_{11}(\log_7(\log_2(128)))$

6. Convert the following to radical form.

a. $(x^2y)^{\frac{3}{2}}$

b. $a^{\frac{3}{5}}b^{\frac{2}{5}}$

c. $\left(\frac{xy^8}{z^4}\right)^{\frac{1}{3}}$

7. Convert the following to logarithmic form.

a. $5^2 = 25$

b. $x^5 = 45$

c. $e^s = 10$

8. Convert the following to exponential form

a. $\log_3(x) = t$

b. $\log_y(6) = u$

c. $\log_{11}(y) = j + 8$

9. Solve the following equations. Check for extraneous solutions.

a. $3\sqrt{3x-5} = 12$

b. $4 - \sqrt[3]{2x-3} = 6$

c. $2 + 5e^{-4.3x} = -27$

d. $6 + 4(2)^{3.21x} = 11$

e. $\log_4(5x-2) = 3$

f. $\log_x(17) = 5$

g. $\frac{2}{x+1} + \frac{3}{x} = -2$

h. $\frac{1}{x-2} - 4 = \frac{3-x}{x-2}$

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10. Simplify the following.

a. $\frac{-x^2 + 5x + 6}{2x^2 - 2x - 4} \cdot \frac{x^2 - 4}{x^2 - 3x - 18}$

b. $\frac{x^2 + 4x + 4}{x^3 + 27} \div \frac{3x^2 - 12}{x^2 + 7x + 12}$

c. $\frac{4}{x^2 - 9} - \frac{7x}{3x^2 - 3x - 18}$

d. $\frac{2x}{x^2 + 7x - 8} + \frac{5}{2x^2 + 16x}$

11. For each function $f(x)$:

- Create tables for the functions.
- Find the inverse function $g(x)$.
- Sketch the inverse function.
- State the domain and range of $f(x)$ and $g(x)$.

a. $f(x) = 4^x$

b. $f(x) = \left(\frac{1}{3}\right)^x$

12. A company has a profit of \$45,000 during its first year of operation. Profits decrease by 2% each year after the first year.

- Write a formula showing the company's profits after n years.
- What profit does the company make in its 14th year?
- How much total profit has the company made over 14 years?

13. I open a lemonade stand, and make \$400 during my first summer of selling lemonade. Each year, I make \$27 less than I did during the previous year.

- Write a formula showing how much money I make in the n^{th} summer.
- How much money do I make during the 14th summer?
- How much total money have I made over 14 summers?

14. Solve the following inequalities. Graph the solution on the number line, and write the solution in interval notation.

a. $3|2 - 4x| - 9 < 21$

b. $5|7x + 3| + 6 \geq 31$

15. For the following, find the distance between the two points.

a. $(4, -5)$ and $(-7, 8)$

b. $(19, 32)$ and $(-9, 41)$

16. Find the equation for the following circles.

a. Center: $(4, -5)$; radius: $\sqrt{7}$

b. Center: $(11, -29)$; radius: 8

17. On wet concrete, if a car breaks and leaves skid marks L feet long, the speed of the car, in miles per hour, can be calculated by the formula $S = \sqrt{12L}$.

- If a car leaves skid marks of 50 feet, how fast was the car going when the driver stepped on the breaks.
- If a car is going 65 mph and steps on the breaks, how long will the skid marks be?

18. A computer's value decreases 21% yearly. I bought a computer in 2007 for \$1400.

- Write a formula that shows the value of the computer t years after 2003.
- What will the value of the computer be in 2010?
- When will the value of the computer be \$400?

19. For the following, find an exponential function and a square root function that go through the points given.

a. $(2, 4)$ and $(5, 2)$

b. $(7, 1)$ and $(11, 4)$