Name: _____ **Hour:** _____

Algebra 2 Semester 2 Exam Review

Evaluate:

1. $81^{3/4}$

2. $16^{-5/4}$

3. Let $r(x) = x^2 - 3$ and $s(x) = x - 6$.

   Find r(s(x)).

   Find $r(s(-1))$.

4. Let $f(x) = 16x^2$ and $g(x) = 2x^3$. Find the following:

   a. $f(x) \cdot g(x)$

   b. $\frac{f(x)}{g(x)}$

   c. the domains of $f \cdot g$ and $\frac{f}{g}$

5. Which is an equation for the inverse of the relation $y = 4x + 2$?

   a. $y = 2x + 4$

   b. $y = \frac{4x - 2}{4}$

   c. $y = \frac{x + 2}{4}$

   d. $y = \frac{x - 2}{4}$

Solve the equation. Check for extraneous solutions.

6. $3x^{3/4} = 192$

7. $(3x - 8)^{1/2} = 5$

8. $\sqrt{7x + 15} = x + 1$

9. The projected worth (in millions of dollars) of a large company is modeled by the equation $y = 241(1.04)^x$. The variable x represents the number of years since 1997. What is the projected annual percent of growth, and what should the company be worth in 2001?

a. 14%; $293.21 million
b. 4%; $271.09 million
c. 14%; $250.64 million
d. 4%; $281.94 million

10. A piece of equipment costs $85,000 new but depreciates 15% per year in each succeeding year. Find its value after 10 years.

11. Evaluate without using a calculator. $\log_2 16$

12. Evaluate without using a calculator. $\log_7 \frac{1}{49}$

13. Solve. $10^{3x} + 4 = 9$

Solve the equation. Check for extraneous solutions.

14. $5\log_3(x) - 2 = 18$

15. The price per person of renting a bus varies inversely with the number of people renting the bus. It costs $12 per person if 66 people rent the bus. About how much will it cost per person if 77 people rent the bus?

Simplify the rational expression, if possible.

16. $\frac{n^2 + 2n - 24}{n^2 - 11n + 28}$

Multiply the expressions. Simplify the result.

17. $\frac{(x+2)^2}{x-5} \cdot \frac{x^2 - 2x}{x^2 - 4}$

Divide the expressions. Simplify the result.

18. $\frac{x^2 + 9x + 18}{x^2 - 9} \div \frac{x+6}{x-6}$

Perform the indicated operation(s) and simplify.

19. $\frac{4}{x+8} + \frac{1}{x-8}$

Solve the equation. Check for extraneous solutions.

20. $\frac{x+2}{4x} - \frac{3}{2x} = \frac{1}{8}$

21. $\frac{k}{k+1} + \frac{1}{k-1} = \frac{4k-3}{(k+1)(k-1)}$

22. Find the distance between point $C(-8, -1)$ and point $G(6, 2)$, then find the midpoint of $\overline{CG}$.

23. Open-ended Problem: Compare the quiz grades of the two algebra classes shown in the table by comparing the measures of central tendency and variation of the two data sets.

First Period	10	5	6	5	6	7	8	5	6	2
Second Period	2	10	10	4	2	5	1	10	9	7

24. Last year, the personal best high jumps of track athletes in a nearby state were normally distributed with a mean of 221 cm and a standard deviation of 11 cm. What is the probability that a randomly selected high jumper has a personal best between 199 and 210 cm?

25. The duration of routine operations in a certain hospital has approximately a normal distribution with an average of 125 minutes and a standard deviation of 15 minutes. What percentage of operations last longer than 155 minutes?

26. Convert 48° to radian measure.

Evaluate the function without using a calculator.

27. $\sin\frac{3\pi}{2}$

a. $-\frac{\sqrt{2}}{2}$

b. 0

c. -1

d. $\frac{\sqrt{2}}{2}$

28. Without using a calculator, find the exact value of $\sin^{-1}\left(-\frac{\sqrt{2}}{2}\right)$.

a. $\frac{1}{3}\pi$

b. $\frac{1}{2}\pi$

c. $-\frac{3}{4}\pi$

d. $-\frac{1}{4}\pi$

29. Given triangle *ABC* with $a = 7$, $C = 37°$, and $B = 18°$, find *c*. Round the answer to two decimal places.

30. Given triangle *ABC* with $b = 8$, $c = 5$, and $A = 58°$, find *a.* Round the answer to two decimal places.

31. Solve triangle *ABC* given that $a = 12$, $b = 18$, and $c = 19$.

32. Write the equation of the resulting graph when $y = \sin x$ has an amplitude of 4, a period of π, is translated two units up, and shifted 5 units left.