NAME Key DATE _____ PERIOD _____

Algebra 2 Practice Final 2017

(Chapters 5-6)

SCORE _____

For Questions 1–2, simplify. Assume that no denominator equals 0.

1. $\sqrt{12} - \sqrt{18} + 3\sqrt{50} + \sqrt{75}$

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

3. Use synthetic division to find $(2x^3 - 5x^2 + 7x - 1) \div (x - 1)$.

4. Write the expression $m^{\frac{7}{9}}$ in radical form.

5. Solve $\sqrt{3x + 6} + 4 \leq 7$.

6. Find $p(-3)$ if $p(x) = x^5 + 3x^2$.

7. Solve $x^4 + 200 = 102x^2$.

8. Use synthetic substitution to find $f(-3)$ for $f(x) = 2x^3 - 6x^2 - 5x + 7$.

9. One factor of $f(x) = x^3 + x^2 - 22x - 40$ is $x + 4$. Find the other factors.

10. List all of the possible rational zeros of $f(x) = 3x^5 - 7x^3 + 2x - 15$.

11. If $f(x) = 3x$ and $g(x) = 4x - 3$, find $f[g(5)]$ and $g[f(5)]$.

12. Find the inverse of $f(x) = 7x - 2$.

13. Simplify $\frac{4xy^3}{z^2} \div \left(\frac{8x^2y}{z^3}\right)^2$.

14. Simplify $\frac{d}{d^2 - 9} + \frac{5}{2d + 6}$.

15. Find the LCM of $m^2 - 4m - 5$ and $m^2 + 8m + 7$.

1. $7\sqrt{3} + 12\sqrt{2}$

2. $\frac{-1+7i}{10}$

3. $2x^2 - 3x + 4 + \frac{5}{x-1}$

4. $\sqrt[9]{m^7}$

5. $-2 \leq x \leq 1$

6. -216

7. $x = \pm 10, \pm\sqrt{2}$

8. -116

9. $(x-5)(x+2)$

10. $\pm 1, \pm 3, \pm 5, \pm 15, \pm\frac{1}{3}, \pm\frac{5}{3}$

11. $f(g(5)) = 51$ $\quad g(f(5)) = 57$

12. $y = f^{-1}(x) = \frac{x+2}{7}$

13. $\frac{yz^4}{16x^3}$

14. $\frac{7d-15}{2(d+3)(d-3)}$

15. $(m-5)(m+1)(m+7)$

NAME Key DATE _____ PERIOD _____

Algebra 2 Practice Final 2017 *(continued)*

(Chapters 7-9)

16. Determine the equations of any vertical asymptotes and the value of x for any holes in the graph of $f(x) = \frac{x^2 - 11x + 18}{x - 2}$.

16. $x = 2$

17. If y varies jointly as x and z and $y = 100$ when $x = 10$ and $z = 5$, find y when $x = 12$ and $z = 6$.

$\frac{y}{xz} = \frac{100}{(10)(5)} = \frac{y}{(12)(6)} \Rightarrow \frac{2}{1}$ $y = 2.72$

17. $y = 144$

18. Solve $\frac{8}{t+5} = \frac{t-3}{t+5} + \frac{1}{3}$.

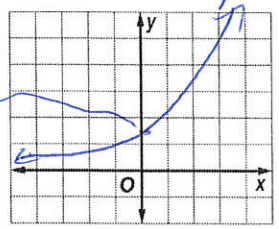
$8 = t - 3 + t + 5$

$8 = 2t + 2$

18. $t = 3$

19. Sketch the graph of $y = 1.5(2)^x$. Then state the function's domain and range.

19. D: $\mathbb{R}$ R: $y > 0$



1.5

20. Determine whether $y = 1.5\left(\frac{1}{6}\right)^x$ represents exponential *growth* or *decay*.

20. decay

For Questions 21-25, solve each equation or inequality. Round to four decimal places if necessary.

$x - 9 = 4^2$ | $x - 9 = 16$

$-t + 2 = 3$

21. $\left(\frac{1}{5}\right)^{t-2} = 125$

$t = -1$

$(t-9)(t+1) = 0$

22. $\log_4(x - 9) = 2$

$-(t-2) = 3$

$m - 4 = \frac{\ln 10.2}{\ln 3.9}$

23. $\log_4 z + \log_4(z - 3) = 1$

$z^2 - 3z = 4$ | $z^2 - 3z - 4 = 0$

24. $3.9^{m-4} = 10.21$

$(m-4)(\ln 3.9) = (\ln 10.2)$

25. $e^{3x} \geq 21$

$\ln e^{3x} \geq \ln 21$

$3x \geq \ln 21$

21. $t = -1$

22. $x = 25$

23. $-1, 4$

24. $\frac{\ln 10.2}{\ln 3.9} + 4 = m$

25. $x \geq \frac{\ln 21}{3}$

26. Use $\log_5 2 \approx 0.4307$ and $\log_5 3 \approx 0.6826$ to approximate the value of $\log_5 12$.

$2(0.4307) + (.6826)$

$\log_5 2 + \log_5 2 + \log_5 3$

26. 1.5449

27. Express $\log_6 19$ in terms of common logarithms. Then approximate its value to four decimal places.

27. $\frac{\log 19}{\log 6} \approx 3.78$

28. In a certain area, the sale price of new single-family homes has increased 4.1% per year since 1992. If a house was purchased in this area in 1992 for \$75,000 and the growth continues, what will the sale price be in 2010? Use $y = a(1 + r)^t$ and round to the nearest cent.

$75{,}000(1.041)^{18} \approx$

$75{,}000(1 + .041)^{18} =$

28. $\approx \$154587.50$