

Name Kay
 Period _____
 Date _____

Algebra II
 Chapter 7 Review
 Form A

Please show all work for maximum credit. Answers should be exact or to two decimal places where appropriate and contain only positive exponents.

I. Solving Equations.

1. $\frac{5(n-7)^2}{5} = \frac{245}{5}$ (4 pts.)

$(n-7)^2 = 49$
 $n-7 = \pm 7$
 $n = 7 \pm 7$
 $n = 14, 0$

2. $\frac{4x^5}{4} = \frac{-972}{4}$ (4 pts.)

$x^5 = -243$
 $x = -3$

3. $\sqrt[3]{5x+4} - 1 = 3$ (4 pts.)

$(\sqrt[3]{5x+4})^3 = (4)^3$
 $5x+4 = 64$
 $-4 \quad -4$
 $5x = 60$
 $x = 12$

4. $(\sqrt[4]{4x+12})^4 = (\sqrt[4]{x-9})^4$ (4 pts.)

$4x+12 = x-9$
 $-x \quad -x$
 $3x = -21$
 $\frac{3}{3} \quad \frac{-21}{3}$
 $x = -7$

5. $3(x-1)^{\frac{2}{3}} - 24 = -12$ (4 pts.)

$3(x-1)^{\frac{2}{3}} = 12$
 $(x-1)^{\frac{2}{3}} = 4$
 $(x-1)^{\frac{2}{3}} = (8)^{\frac{2}{3}}$
 $x-1 = 8$
 $x = 9$

6. $\sqrt{2x-3} + 3 = x$ (4 pts.)

$(\sqrt{2x-3})^2 = (x-3)^2$
 $2x-3 = x^2 - 6x + 9$
 $0 = x^2 - 8x + 12$
 $(x-6)(x-2) = 0$
 $x = 6, x = 2$
 $\{2, 6\}$

II. Rational Exponents/Radicals. Perform the indicated operation and/or simplify completely. Answers should be in simplest exponent form with no negative exponents.

7. $\sqrt[3]{-8x^3y^6z^9}$ (4 pts.)

$-2xy^2z^3$

8. $\sqrt[3]{24x^7y^{15}z^{23}}$ (4 pts.)

$2x^2y^5z^7\sqrt[3]{3xz^2}$

9. $\left(\frac{4x^2y}{16xy^2}\right)^2$ (4 pts.)

$\frac{x^2}{16y^2}$

10. $\sqrt{98} + \sqrt{2}$ (4 pts.)

$7\sqrt{2} + \sqrt{2}$
 $8\sqrt{2}$

III. Function Operations. Find the function and state the domain.

11. If $f(x) = 3x - 8$ and $g(x) = 8x - 2$, find $f(x) - g(x)$. (4 pts.)

$$\begin{aligned} f(x) - g(x) &= 3x - 8 - (8x - 2) \\ &= 3x - 8 - 8x + 2 \\ &= -5x - 6 \end{aligned}$$

D: \mathbb{R}

12. If $h(x) = 7x^{\frac{5}{6}}$ and $j(x) = -3x^{\frac{1}{6}}$, find $h(x) \cdot j(x)$. (4 pts.)

$$\begin{aligned} h(x) \cdot j(x) &= -21x^{\frac{5}{6} + \frac{1}{6}} \\ &= -21x^{\frac{6}{6}} \\ &= -21x^1 \end{aligned}$$

D: non-neg \mathbb{R}

13. If $k(x) = -7x^5$ and $l(x) = 21x^{-3}$, find $\frac{k(x)}{l(x)}$. (4 pts.)

$$\frac{k(x)}{l(x)} = \frac{-7x^5}{21x^{-3}} = -\frac{x^8}{3}$$

D: \mathbb{R}

14. If $m(x) = x + 4$ and $n(x) = 3x - 5$, find $m(n(x))$. (4 pts.)

$$\begin{aligned} m(n(x)) &= 3x - 5 + 4 \\ &= 3x - 1 \end{aligned}$$

D: \mathbb{R}

IV. Inverses

Write the inverse of the following functions.

15. $f(x) = \frac{2}{5}x - 8$ (4 pts.)

$$y = \frac{2}{5}x - 8$$

$$x = \frac{2}{5}y - 8$$

$$x + 8 = \frac{2}{5}y$$

$$\frac{5x + 40}{2} = \frac{2y}{2}$$

$$\frac{5}{2}x + 20 = y$$

$$f^{-1}(x) = \frac{5}{2}x + 20$$

16. $f(x) = x^4 - 9$ (4 pts.)

$$y = x^4 - 9$$

$$y + 9 = x^4$$

$$\sqrt[4]{y + 9} = \sqrt[4]{x^4}$$

$$f^{-1}(x) = \sqrt[4]{x + 9}$$

17. Verify that $f(x)$ and $g(x)$ are inverse functions. (Hint: show $f(g(x))$ and $g(f(x))$ both equal x). Must show work. (4 pts.)

$$f(x) = 3x + 12$$

$$g(x) = \frac{1}{3}x - 4$$

$$\begin{aligned} f(g(x)) &= 3\left(\frac{1}{3}x - 4\right) + 12 \\ &= x - 12 + 12 \\ &= x \checkmark \end{aligned}$$

$$\begin{aligned} g(f(x)) &= \frac{1}{3}(3x + 12) - 4 \\ &= x + 4 - 4 \\ &= x \checkmark \end{aligned}$$

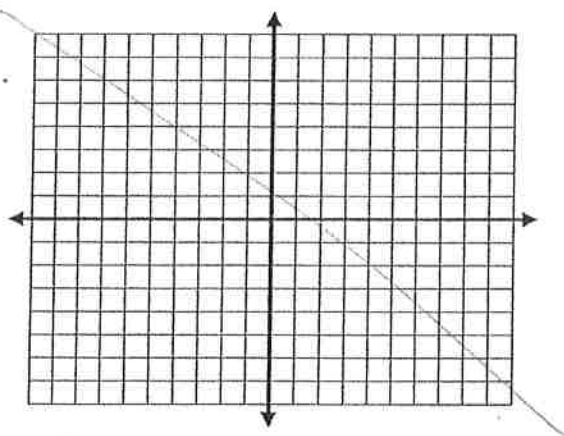
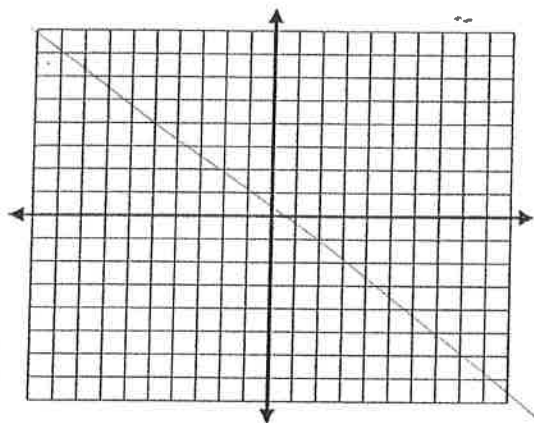
V. Graphing Skip

Graph each function. Show at least five points. Then, state the domain and range.

18. $f(x) = \sqrt{x+3}$ (6 pts.)

19. $f(x) = \sqrt[3]{x-4}$ (6 pts.)

YES!!!



Domain:

Skip

Range:

Domain:

Skip

Range:

Problem Solving

(6 points)

20. A stone is dropped from a height of 100 feet. The time it takes for the stone to reach a height of h feet is given by the function $t = \frac{1}{4}\sqrt{100-h}$ where t is time in seconds. What is the height of the stone after $\frac{2}{t}$ seconds?

Find Inverse to make it easiest!

$$4(t) = \sqrt{100-h}$$

$$(4t)^2 = (\sqrt{100-h})^2$$

$$16t^2 = 100-h$$

$$16t^2 - 100 = -h$$

$$h = -16t^2 + 100$$

$$h = -16(4) + 100$$

$$= -64 + 100$$

$$= \boxed{36\text{ft}}$$

