**GSE Algebra II**
**Radical, Absolute Value, & Piecewise Function Review**

Key

**Unit 4C Test**

**Simplify.**

1. $2a^3b^{-2}\cdot(2ab^2)^3$

$2a^3b^{-2}\cdot 8a^3b^6$

$=16a^6b^4$

2. $\dfrac{2^3x^4y^3}{2^2x^5}=\dfrac{\cancel{8}^{2}\,\cancel{x^4}\,y^3}{\cancel{4}\,\cancel{x^5}_{x}}$

$=\dfrac{2y^3}{x}$

3. $\left(\dfrac{x^7y^{-2}}{3y^{-3}}\right)^{-2}=\dfrac{x^{-14}y^4}{3^{-2}y^6}$

$=\dfrac{9}{x^{14}y^2}$

**Write each expression in exponential form.**

4. $\sqrt{5x}$

$(5x)^{1/2}$ or $5^{1/2}x^{1/2}$

5. $\left(\sqrt[4]{9x}\right)^3$

$(9x)^{3/4}$ or $9^{3/4}x^{3/4}$

6. $\sqrt[5]{a^7}$

$a^{7/5}$

**Write each expression in radical form.**

7. $y^{\frac{5}{3}}$

$\sqrt[3]{y^5}$ or $\sqrt[3]{y}^5$

8. $(6a)^{\frac{3}{4}}$

$\left(\sqrt[4]{6a}\right)^3$

9. $(xyz)^{\frac{5}{2}}$

$\sqrt{(xyz)^5}$

**Simplify.**

10. $\sqrt[4]{96m}$

$\sqrt[4]{16\cdot 6\cdot m}$

$=2\sqrt[4]{6m}$

11. $\sqrt[3]{-162x^8}$

$=\sqrt[3]{-27\cdot 6\cdot x^6\cdot x^2}$

$=-3x^2\sqrt[3]{6x^2}$

12. $\sqrt[4]{567p^5}$

$=\sqrt[4]{\cancel{81}\cdot 7\cdot p^4\cdot p^1}$

$=3p\sqrt[4]{7p}$

**Solve the following equations. Simplify answers completely. Check for extraneous solutions.**

13. $\left((x-7)^{\frac{2}{3}}\right)^{3/2}=9^{3/2}$

$x-7=(\sqrt{9})^3$

$x-7=3^3$

$x-\cancel{7}=27$
$\cancel{+7}\quad +7$

$x=34$

14. $5(x-28)^{\frac{5}{4}}-\cancel{2}=158$
$\cancel{+2}\quad +2$

$\dfrac{\cancel{5}(x-28)^{5/4}}{\cancel{5}}=\dfrac{160}{5}$

$\left((x-28)^{5/4}\right)^{4/5}=32^{4/5}$

$x-28=(\sqrt[5]{32})^4$

$x-28=2^4$

$x-\cancel{28}=16$
$\cancel{+28}\quad +28$

$x=44$

15. $\sqrt[4]{3x}+\cancel{5}=6$
$\cancel{-5}\quad -5$

$\sqrt[4]{3x}^4=1^4$

$3x=1$

$x=1/3$

16. $3\sqrt[3]{x+6} + 5 = 14$

$\cancel{+5} \quad -5$

$\frac{\cancel{3}\sqrt[3]{x+6}}{\cancel{3}} = \frac{9}{3}$

$\sqrt[3]{x+6}^{\,3} = 3^3$

$x + 6 = 27$

$-6 \quad -6$

$x = 21$

17. $\sqrt{5x+1} = -6$

No Solution

18. $\sqrt{x-2}^{\,2} = (x-2)(x-2)$

$x - 2 = x^2 - 4x + 4$

$-x + 2 \quad -x + 2$

$0 = x^2 - 5x + 6$

$0 = (x-2)(x-3)$

$x = 2, 3$

19. $2|x+1| = 6$

$\frac{\cancel{2}|x+1|}{\cancel{2}} = \frac{6}{2}$

$|x+1| = 3$

$x + 1 = 3 \quad x + 1 = -3$

$-1 \quad -1 \quad -1 \quad -1$

$x = 2 \quad x = -4$

20. $\frac{-5 \cdot |x-2|}{-5} = 3 - 5$

$|x-2| = -15$

No Solution

21. $3|x-2| + 4 = 16$

$-4 \quad -4$

$\frac{\cancel{3}|x-2|}{\cancel{3}} = \frac{12}{3}$

$|x-2| = 4$

$x - 2 = 4 \quad x - 2 = -4$

$+2 \quad +2 \quad +2 \quad +2$

$x = 6 \quad x = -2$

**Evaluate the following for** $f(x) = \begin{cases} x^2 - 3, & x \le -2 \\ 5, & -2 < x \le 6 \\ 4x + 7, & x > 6 \end{cases}$ $\quad g(x) = \begin{cases} |x| - 1, & x < 5 \\ \frac{1}{2}\sqrt{x}, & x \ge 5 \end{cases}$

22. f(0)

$= 5$

23. f(8)

$= 4(8) + 7$

$= 32 + 7$

$= 39$

24. g(16)

$= \frac{1}{2}\sqrt{16}$

$= \frac{1}{2} \cdot 4$

$= 2$

25. g(-2)

$= |-2| - 1$

$= 2 - 1$

$= 1$

26. f(-2)

$= (-2)^2 - 3$

$= 4 - 3$

$= 1$

**Describe the transformations of the following functions from their parent functions.**

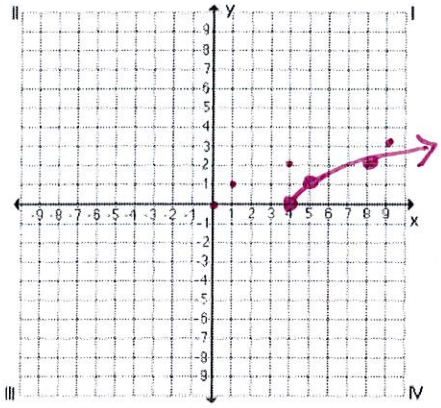
27. $g(x) = \sqrt[3]{x-3} + 4$ Right 3, up 4

28. $g(x) = -2\sqrt{x} - 5$ Reflect, stretch by 2, down 5

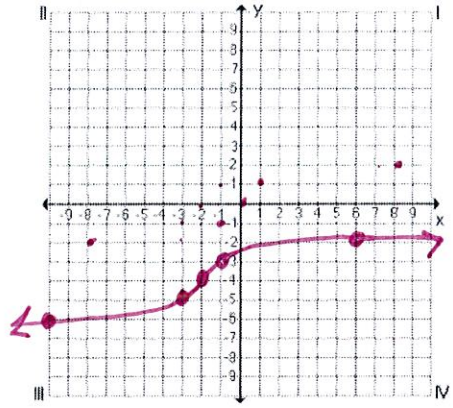
29. $g(x) = \frac{1}{2}|x+3|$ Shrunk by 1/2, left 3

**Sketch the parent and the new graph or show your t-chart.**

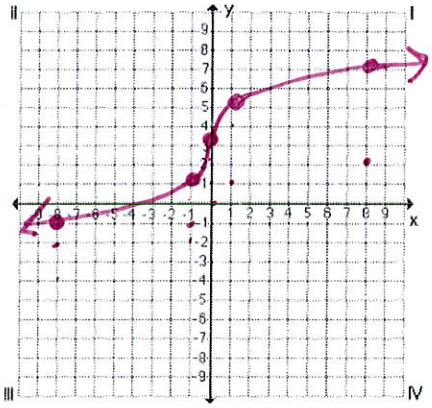
30. $y = \sqrt{x-4}$ Right 4



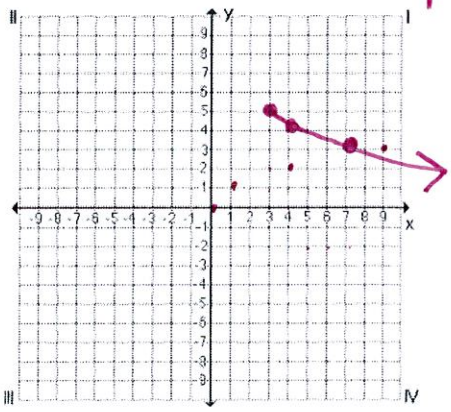
31. $y = \sqrt[3]{x+2} - 4$ left 2 down 4



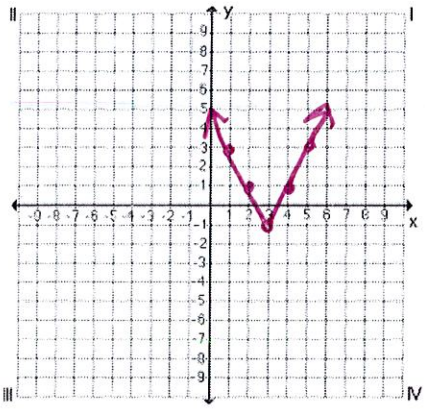
32. $y = 2\sqrt[3]{x} + 3$ stretch 2 up 3



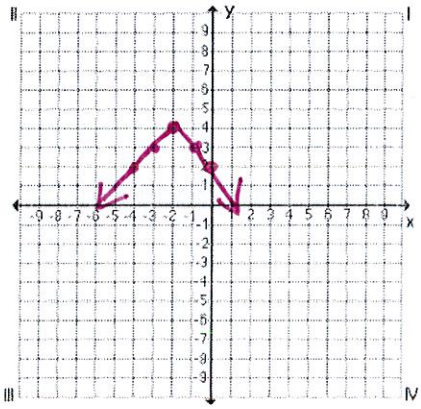
33. $y = -\sqrt{x-3} + 5$ reflect right 3 up 5



34. $y = 2|x-3| - 1$



35. $y = -|x+2| + 4$



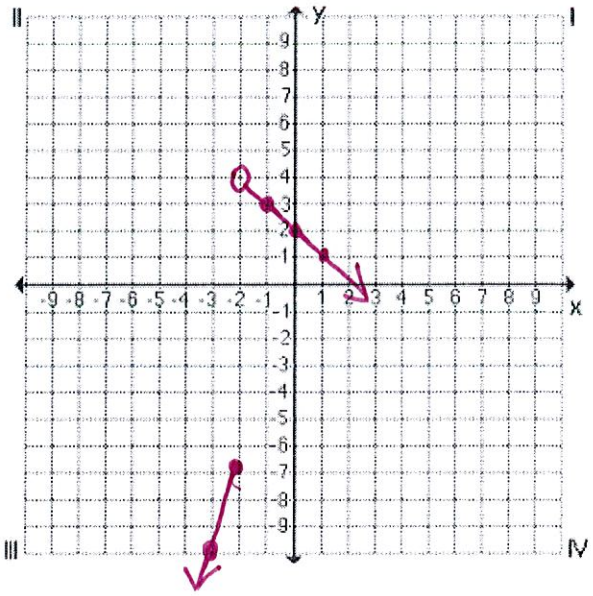
36. $y = \begin{cases} 3x - 1, & x \le -2 \\ -x + 2, & x > -2 \end{cases}$

$3x-1$

| | x | y |
|---|---|---|
| • | -2 | -7 |
| | -3 | -10 |
| | -4 | -13 |
| | -5 | -16 |

$-x+2$

| | x | y |
|---|---|---|
| o | -2 | 4 |
| | -1 | 3 |
| | 0 | 2 |
| | 1 | 1 |




37. $y = \begin{cases} x + 4, & x < 3 \\ \frac{1}{2}x, & x \ge 3 \end{cases}$

$x+4$

| | x | y |
|---|---|---|
| o | 3 | 7 |
| | 2 | 6 |
| | 1 | 5 |
| | 0 | 4 |

$\frac{1}{2}x$

| | x | y |
|---|---|---|
| • | 3 | 1½ |
| | 4 | 2 |
| | 5 | 2½ |
| | 6 | 3 |