

Algebra II Trig Ch. 8: 8.5-8.8 Test Review

Solve each equation or inequality.

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

$$\begin{array}{r} x^2 - 1 = x^2 + x - 6 \\ \hline -x^2 \qquad \qquad -x^2 \\ \hline -1 = x - 6 \\ \hline +6 \qquad \qquad +6 \\ \hline 5 = x \end{array}$$

$$2. \frac{x-2}{x+2} < 3$$

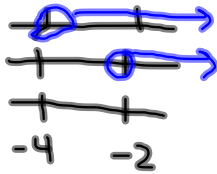
$$x-2 < 3x+6 \text{ AND } x+2 > 0 \text{ OR } x-2 > 3x+6 \text{ AND } x+2 < 0$$

$$\frac{-3x+2}{-3x+2}$$

$$\frac{-2}{-2}$$

$$\frac{-2x < 8}{-2}$$

$$x > -4 \text{ AND } x > -2 \text{ OR } x < -4 \text{ AND } x < -2$$



$$x > -2 \text{ OR } x < -4$$

3. Find the domain of  $f(x) = \sqrt{2x-8}$

$$2x - 8 \geq 0$$

+8   +8

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$$2x \geq 8$$

2   2

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$$x \geq 4$$

For each function, describe the transformations applied to  $f(x) = \sqrt{x}$

4.  $f(x) = \frac{1}{4}\sqrt{x+3} + 7$

Vertical compression by  $\frac{1}{4}$

horiz. Trans. 3 left

Vertical Trans 7 up

5. Find the inverse of  $y = x^2 + 4x$

$$\begin{array}{r} x = y^2 + 4y \\ \hline y^2 + 4y - x = 0 \end{array}$$

$$\begin{array}{l} a = 1 \\ b = 4 \\ c = -x \end{array}$$

$$y = \frac{-4 \pm \sqrt{4^2 - 4(1)(-x)}}{2(1)}$$

$$\begin{aligned} y &= \frac{-4 \pm \sqrt{16 + 4x}}{2} = \frac{-4 \pm \sqrt{4(4+x)}}{2} \\ &= \frac{-4 \pm 2\sqrt{x+4}}{2} \\ y &= -2 \pm \sqrt{x+4} \end{aligned}$$

Evaluate each expression. Give exact answers.

$$6. \quad \frac{3}{5} \sqrt[3]{-27} = \frac{3}{5} \cdot \frac{-3}{1} = \boxed{\frac{-9}{5}}$$

$$7. \frac{2}{3} \left( \sqrt[4]{\frac{21}{8}} \right)^4 + \frac{1}{4} \rightarrow \frac{\cancel{2}}{\cancel{3}} \cdot \frac{\overset{?}{\cancel{21}}}{\underset{4}{\cancel{8}}} + \frac{1}{4}$$

$$\frac{7}{4} + \frac{1}{4} = \frac{8}{4} = \boxed{2}$$

Solve and simplify

$$\begin{aligned} 8. \sqrt[3]{4x^5} \cdot \sqrt[3]{54xy^2} &= \sqrt[3]{216x^6y^2} \\ &= \sqrt[3]{6^3x^3x^3y^2} \\ &= \boxed{6x^2\sqrt[3]{y^2}} \end{aligned}$$

$$\begin{aligned}
 9. \quad \frac{\sqrt{15x^9y^3}}{\sqrt{5x^5y}} &= \sqrt{\frac{\cancel{3} \cancel{5} x^4 y^2}{\cancel{5} \cancel{x} \cancel{y}}} \\
 &= \sqrt{3x^4y^2} \\
 &= \sqrt{3x^2x^2y^2} \\
 &= \boxed{x^2y\sqrt{3}}
 \end{aligned}$$

$$\begin{aligned} 10. \quad (12 - \sqrt{2}) + (15 + \sqrt{2}) &= 12 - \sqrt{2} + 15 + \sqrt{2} \\ &= \boxed{27} \end{aligned}$$

$$\begin{aligned} 11. (9+2\sqrt{5})-(1+\sqrt{45}) &= 9+2\sqrt{5}-1-\sqrt{45} \\ &= 9+2\sqrt{5}-1-\sqrt{3^2 \cdot 5} \\ &= 9+2\sqrt{5}-1-3\sqrt{5} \\ &= \boxed{8-\sqrt{5}} \end{aligned}$$

12.  $(7-2\sqrt{6})(7+2\sqrt{6})$

$$49 - 4(6)$$

$$49 - 24$$

$$\boxed{25}$$

13.  $6\sqrt{3}(2\sqrt{5}+4\sqrt{6})$

$$12\sqrt{15} + 24\sqrt{18}$$

$$12\sqrt{15} + 24\sqrt{9 \cdot 2}$$

$$\boxed{12\sqrt{15} + 72\sqrt{2}}$$

Write each expression with a rational denominator and in its simplest form.

$$14. \frac{3}{\sqrt{15}} \cdot \frac{\sqrt{15}}{\sqrt{15}} = \frac{\cancel{3}\sqrt{15}}{\cancel{15}_5} = \boxed{\frac{\sqrt{15}}{5}}$$

$$\begin{aligned} 15. \quad \frac{5}{1-\sqrt{6}} \cdot \frac{1+\sqrt{6}}{1+\sqrt{6}} &= \frac{5+5\sqrt{6}}{1-6} \\ &= \frac{5+5\sqrt{6}}{-5} \\ &= \boxed{-1-\sqrt{6}} \end{aligned}$$

Solve

16.  $\sqrt{x^2 - 15} = 7$

$$x^2 - 15 = 49$$
$$\begin{array}{r} +15 \quad +15 \\ \hline \end{array}$$

$$\sqrt{x^2} = \sqrt{64}$$

$$x = \pm 8$$

17.  $\sqrt{2x+5}+4=3$

$-4-4$

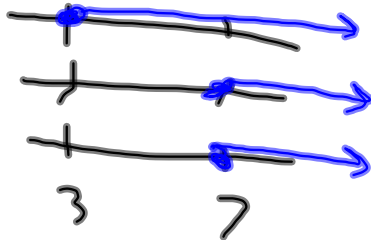
$\sqrt{2x+5} = -1$

No Solution

18.  $\sqrt{x-3} \geq 2$

$x-3 \geq 0$  AND  $x-3 \geq 4$   
+3 +3                      +3 +3

$x \geq 3$  AND  $x \geq 7$



19.  $\sqrt{3x-2} \leq -3$

No Solution