

Chapter 11 Review Packet

Graphing Square Root Functions

Big Idea 1

You can graph a square root function $y = a\sqrt{x - h} + k$ and compare its graph with the graph of the parent function, $y = \sqrt{x}$, based on the constants a , h , and k .

Constant	Comparison of graphs
a	<ul style="list-style-type: none">When $a > 0$, the graph is a vertical stretch or shrink of the parent graph.When $a < 0$, the graph is a vertical stretch or shrink with a reflection in the x-axis of the parent graph.
h	The graph is a horizontal translation of the parent graph.
k	The graph is a vertical translation of the parent graph.

Big Idea 2

Using Properties of Radicals in Expressions and Equations

You can use the properties of radicals to simplify radical expressions and to solve radical equations.

Product property of radicals	$\sqrt{ab} = \sqrt{a} \cdot \sqrt{b}$ where $a \geq 0$ and $b \geq 0$
Quotient property of radicals	$\sqrt{\frac{a}{b}} = \frac{\sqrt{a}}{\sqrt{b}}$ where $a \geq 0$ and $b > 0$

Big Idea 3

Working with Radicals in Geometry

You can use radicals to solve problems involving the following geometric theorems and formulas.

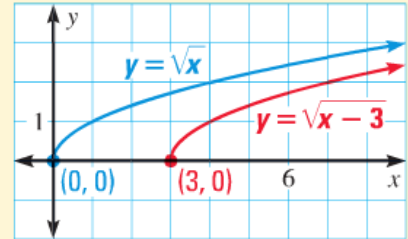
Distance formula	$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$
Midpoint formula	$M\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$

11.1 Graph Square Root Functions

Graph the function $y = \sqrt{x - 3}$ and identify its domain and range. Compare the graph with the graph of $y = \sqrt{x}$.

To graph the function, make a table, plot the points, and draw a smooth curve through the points. The domain is $x \geq 3$.

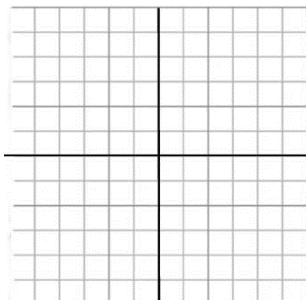
x	3	4	5	6
y	0	1	1.4	1.7



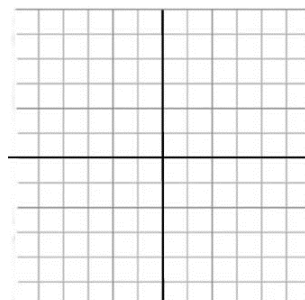
The range is $y \geq 0$. The graph of $y = \sqrt{x - 3}$ is a horizontal translation (of 3 units to the right) of the graph of $y = \sqrt{x}$.

Graph the function and identify its domain and range. Compare the graph with the graph of $y = \sqrt{x}$.

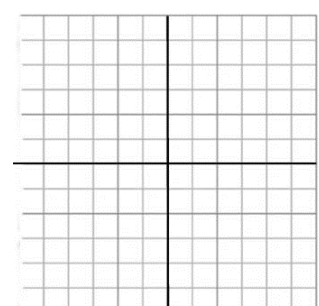
5. $y = -2\sqrt{x}$



6. $y = \sqrt{x} + 7$



7. $y = \sqrt{x + 7}$



11.2 Simplify Radical Expressions

Simplify $7\sqrt{5} - \sqrt{45}$.

$$\begin{aligned}7\sqrt{5} - \sqrt{45} &= 7\sqrt{5} - \sqrt{9 \cdot 5} \\ &= 7\sqrt{5} - \sqrt{9} \cdot \sqrt{5} \\ &= 7\sqrt{5} - 3\sqrt{5} \\ &= 4\sqrt{5}\end{aligned}$$

Factor using perfect square factor.

Product property of radicals

Simplify.

Simplify.

Simplify the expression.

8. $\sqrt{98}$

9. $\sqrt{121x^3}$

10. $\sqrt{7} \cdot \sqrt{21}$

11. $\sqrt{7x} \cdot 7\sqrt{x}$

12. $\sqrt{\frac{5}{x^2}}$

13. $\frac{2}{\sqrt{5}}$

14. $3\sqrt{2} - \sqrt{128}$

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

16. **GEOMETRY** The lateral surface area L of a square pyramid with height h and base length ℓ is given by $L = 2\ell\sqrt{0.25\ell^2 + h^2}$. Find L (in square feet) for a square pyramid that has a height of 4 feet and a base length of 4 feet

11.3 Solve Radical Equations

Solve $\sqrt{x + 90} = x$.

$$\sqrt{x + 90} = x$$

Write original equation.

$$(\sqrt{x + 90})^2 = x^2$$

Square each side.

$$x + 90 = x^2$$

Simplify.

$$0 = x^2 - x - 90$$

Write in standard form.

$$0 = (x - 10)(x + 9)$$

Factor.

$$x - 10 = 0 \quad \text{or} \quad x + 9 = 0$$

Zero-product property

$$x = 10 \quad \text{or} \quad x = -9$$

Solve for x.

► Checking 10 and -9 in the original equation shows that -9 is an extraneous solution. The only solution of the equation is 10.

Solve the equation. Check for extraneous solutions.

17. $\sqrt{x} - 28 = 0$

18. $8\sqrt{x - 5} + 34 = 58$

19. $\sqrt{5x - 3} = \sqrt{x + 17}$

11.5 Apply the Distance and Midpoint Formulas

Find the distance between $(-3, 8)$ and $(5, -12)$.

Let $(x_1, y_1) = (-3, 8)$ and $(x_2, y_2) = (5, -12)$.

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} \quad \text{Distance formula}$$

$$= \sqrt{(5 - (-3))^2 + (-12 - 8)^2} \quad \text{Substitute.}$$

$$= \sqrt{464} = 4\sqrt{29} \quad \text{Simplify.}$$

Find the distance between the two points.

30. $(-1, -3), (9, -13)$

31. $(-8, -4), (0, 2)$

32. $(7, 1), (4, -0.25)$

Find the midpoint of the line segment with the given endpoints.

33. $(-2, -4), (9, -4)$

34. $(-8, 0), (-8, 2)$

35. $(6, 1), (4, -5)$