Name: ______________________________ Period: __________ Date: ______________

# Unit 10 – Radical Expressions and Equations Test

**Find the distance between the points: A (2, -2) and B ( 5,2)**

**1.** $(x_1, y_1)$ $(x_2, y_2)$ $d = ?$

$(2, -2)$ $(5, 2)$

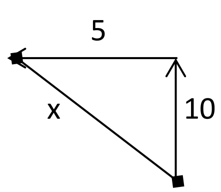
**Find the length of the missing side in the following example.**

**2.** $a = 9$ $b = ?$ $c = 20$

**Determine whether each set of numbers form a Pythagorean triple.**

**3.** $(6, 8, 10)$

**4. Andy walked 10 miles north and 5 miles west. How far is he from his starting point?**




**Simplify the following expressions.**

**5.** $\frac{5}{5+\sqrt{5}} =$ $\sqrt{36x^5y^8} =$

# Unit 10 – Radical Expressions and Equations Test

**6.** $\sqrt{6xy}^{2} = \sqrt{6^2x^2y^2} =$ $\qquad$ $\sqrt[3]{\sqrt{a^3b^2}} =$

**Simplify radicals and recognize like or unlike radicals.**

**7.** $\sqrt[3]{250}$; $\sqrt[3]{54}$; $\sqrt[3]{16}$

**Perform the indicated operations and simplify your answer. Assume that all variables represent positive real numbers.**

**8.** $\sqrt{\frac{16a^2}{5b}} + 4\sqrt{\frac{4a^2}{5b}} =$

**9.** $\frac{\sqrt{6}}{2} + \frac{2}{\sqrt{6}} =$

**10.** $(\sqrt{x} + \sqrt{y})^2 =$

**11.** $(\sqrt{5} + \sqrt{2})(\sqrt{5} - \sqrt{2}) =$

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# Unit 10 – Radical Expressions and Equations Test

**Solve the following radical equation.**

**12.** $\sqrt{x^2 + 35} - x + 5 = 0$

Checking solution:

**13.** $x = \dfrac{\sqrt{x + 3}}{2}$

Checking solution:

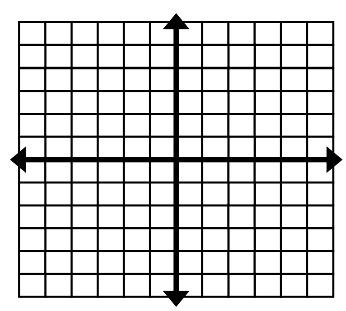
**Identify the domain and range of each function.**

**14.** $y = \sqrt{x - 14}$

**Domain** **Range**

**Graph square root function**

**15.** $y = \sqrt{x + 5} - 4$



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# Unit 10 – Radical Expressions and Equations Test

**Use the description to write the square root function $g(x)$.**

**16.** The parent function $f(x) = \sqrt{x}$ is reflected across the x-axis, and translated down 5 units.

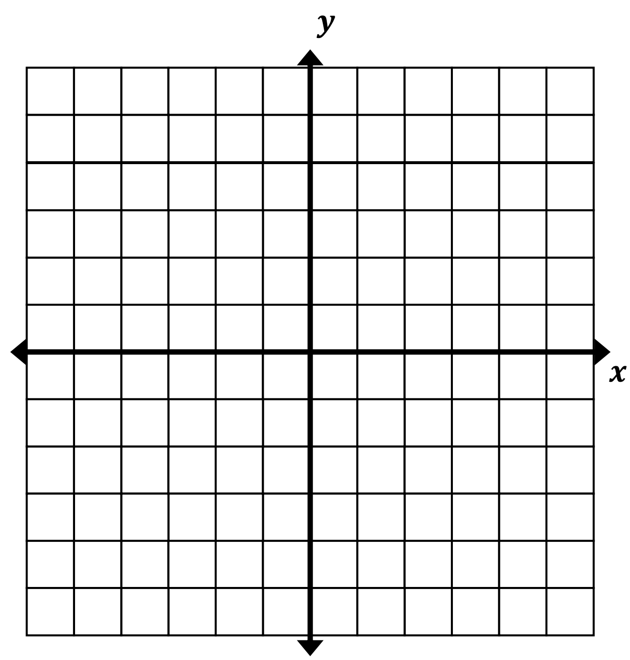
**Graph function and identify its domain and range.**

**17.** $y = \sqrt{x+2}$

1.
2. Table

| x | y |
|---|---|
| | |
| | |
| | |
| | |
| | |

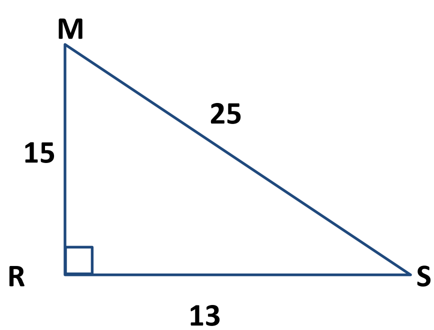
3. Graph




4. Domain                Range

**Find $sin\angle S$ , $cos\angle S$**

**18.**




**Find the value of $\alpha$ that makes each statement true.**

**19.** $sin\alpha = cos(\alpha - 48°)$

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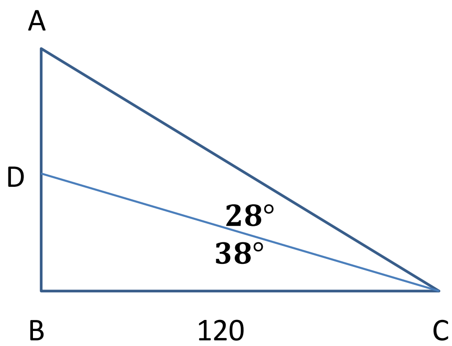
# Unit 10 – Radical Expressions and Equations Test

**20. How would you calculate the length of AB using the information provided? Show all your steps.**



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# Unit 10 – Radical Expressions and Equations Test

ANSWERS

**Find the distance between the points: A (2, -2) and B ( 5,2)**

**1.** $(x_1, y_1)$ $(x_2, y_2)$ $d = ?$
$(2, -2)$ $(5, 2)$

$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$ $d = \sqrt{(5-2)^2 + (2-(-2))^2}$

$d = \sqrt{3^2 + 4^2}$

$d = \sqrt{25}$

$d = 5$

**Find the length of the missing side in the following example.**

**2.** $a = 9$ $b = ?$ $c = 20$

$c^2 = a^2 + b^2$

$b^2 = 20^2 - 9^2$

$b^2 = 400 - 81$

$b^2 = 319$

$b = \sqrt{319}$

$b = 17.86$

**Determine whether each set of numbers form a Pythagorean triple.**

**3.** $(6, 8, 10)$

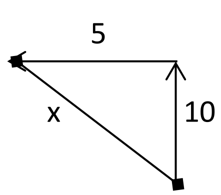
$10^2 = 6^2 + 8^2$

$100 = 36 + 64$

$100 = 100$

yes

**4. Andy walked 10 miles north and 5 miles west. How far is he from his starting point?**




$x^2 = 10^2 + 5^2$

$x^2 = 100 + 25$

$x^2 = 125$

$x = \sqrt{125}$

$x = 11.18$ miles

**Simplify the following expressions.**

**5.** $\frac{5}{5+\sqrt{5}} =$

$= \frac{5}{5+\sqrt{5}} = \frac{5}{5+\sqrt{5}} * \frac{5-\sqrt{5}}{5-\sqrt{5}} = \frac{5(5-\sqrt{5})}{5^2 - (\sqrt{5})^2} =$

$= \frac{5(5-\sqrt{5})}{20} = \frac{(5-\sqrt{5})}{4}$

$\sqrt{36x^5y^8} = \sqrt{6^2 * x * (x^2)^2 (y^4)^2} =$

$= 6x^2y^4\sqrt{x}$

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# Unit 10 – Radical Expressions and Equations Test

**6.** $\sqrt{6xy}^{2} = \sqrt{6^2x^2y^2} = \mathbf{6xy}$

$\sqrt[3]{\sqrt{a^3b^2}} = \sqrt[3*2]{a^3b^2} = \mathbf{\sqrt[6]{a^3b^2}}$

**Simplify radicals and recognize like or unlike radicals.**

**7.** $\sqrt[3]{250};\quad \sqrt[3]{54};\quad \sqrt[3]{16}$

$\sqrt[3]{2*5^3};\quad \sqrt[3]{2*3^3};\quad \sqrt[3]{2*2^3}$

$5\sqrt[3]{2};\qquad 3\sqrt[3]{2};\qquad 2\sqrt[3]{2}$

***LIKE RADICALS***

**Perform the indicated operations and simplify your answer. Assume that all variables represent positive real numbers.**

**8.** $\sqrt{\frac{16a^2}{5b}} + 4\sqrt{\frac{4a^2}{5b}} = 4a\sqrt{\frac{1}{5b}} + 8a\sqrt{\frac{1}{5b}} = 12a\sqrt{\frac{1}{5b}} = 12a\frac{\sqrt{1}}{\sqrt{5b}} * \frac{\sqrt{5b}}{\sqrt{5b}} = \frac{12a}{5b}\sqrt{5b}$

**9.** $\frac{\sqrt{6}}{2} + \frac{2}{\sqrt{6}} = \frac{\sqrt{6}}{2} + \frac{2}{\sqrt{6}} * \frac{\sqrt{6}}{\sqrt{6}} = \frac{\sqrt{6}}{2} + \frac{2\sqrt{6}}{6} = \frac{3\sqrt{6}}{6} + \frac{2\sqrt{6}}{6} = \frac{5\sqrt{6}}{6}$

**10.** $\left(\sqrt{x} + \sqrt{y}\right)^2 =$

$= \left(\sqrt{x} + \sqrt{y}\right) * \left(\sqrt{x} + \sqrt{y}\right) =$

$= \sqrt{x} * \sqrt{x} - \sqrt{x} * \sqrt{y} - \sqrt{y} * \sqrt{x} + \sqrt{y} * \sqrt{y}$

$= x - \sqrt{xy} - \sqrt{xy} + y$

$= x - 2\sqrt{xy + y}$

**11.** $\left(\sqrt{5} + \sqrt{2}\right)\left(\sqrt{5} - \sqrt{2}\right) =$

$= \sqrt{5} * \sqrt{5} - \sqrt{5} * \sqrt{2} + \sqrt{2} * \sqrt{5} - \sqrt{2} * \sqrt{2} =$

$= 5 - \sqrt{10} + \sqrt{10} - 2 =$

$= 5 - 2 =$

$= 3$

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# Unit 10 – Radical Expressions and Equations Test

**Solve the following radical equation.**

**12.** $\sqrt{x^2+35}-x+5=0$

$\sqrt{x^2+35}=x-5$

$\left(\sqrt{x^2+35}\right)^2=(x-5)^2$

$x^2+35=x^2-10x+25$

$10x=-10$

$x=-1$

Checking solution:

$x=-1$

$\sqrt{(-1)^2+35}-(-1)+5=0$

$\sqrt{36}+1+5=0$

$6\neq-6$

$x=-1$ is an extraneous solution of this equation

**13.** $x=\frac{\sqrt{x+3}}{2}$

$2x=\sqrt{x+3}$

$(2x)^2=\left(\sqrt{x+3}\right)^2$

$4x^2=x+3$

$4x^2-x-3=0$

$(x-1)\left(x+\frac{3}{4}\right)=0$

$x_1=1$

$x_2=-\frac{3}{4}$

$x_1=1$

$1=\frac{\sqrt{1+3}}{2}$

$1=1$

$x_1=1$ is a solution of this equation

$x_2=-\frac{3}{4}$

$-\frac{3}{4}=\frac{\sqrt{\left(-\frac{3}{4}\right)+3}}{2}$

$-\frac{1}{5}\neq\frac{1}{4}$

$x_2=-\frac{3}{4}$ is an extraneous solution of this equation

$\{1\}$

**Identify the domain and range of each function.**

**14.** $y=\sqrt{x-14}$

**Domain**

$x-14\geq0$

$x\geq14$

$D:[14,\infty]$

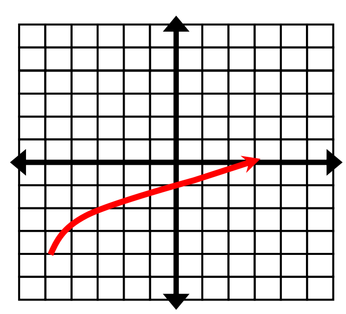
**Range**

$y\geq0$

$R:[0,\infty]$

**Graph square root function**

**15.** $y=\sqrt{x+5}-4$



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# Unit 10 – Radical Expressions and Equations Test

**Use the description to write the square root function $g(x)$.**

**16.** The parent function $f(x) = \sqrt{x}$ is reflected across the x-axis, and translated down 5 units.

$g(x) = -\sqrt{x} - 5$

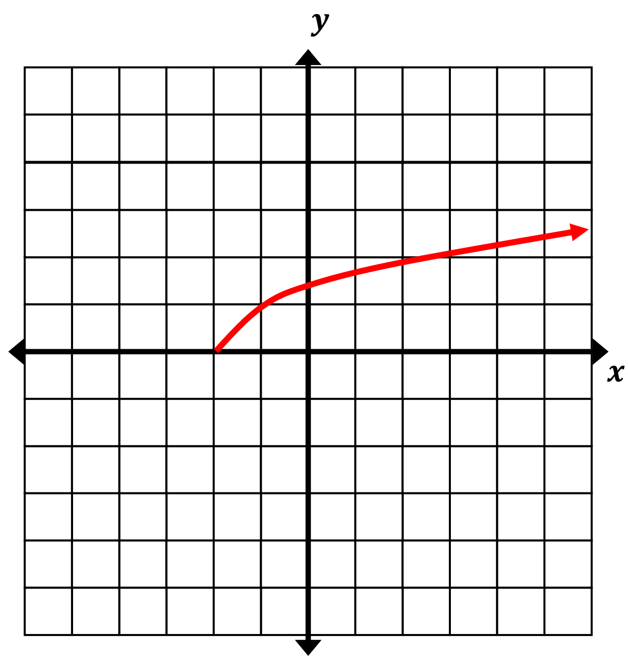
**Graph function and identify its domain and range.**

**17.** $y = \sqrt{x+2}$

5. Horizontal Shift: Left 2, No Vertical Shift
6. Table

| x | y |
|---|---|
| -2 | 0 |
| **-1** | **1** |
| 0 | 1,41 |
| 2 | 2 |
| 6 | 2,82 |

7. Graph




8. Domain

$x + 2 \geq 0$

$x \geq -2$

$\mathbf{D}: [-2, \infty]$

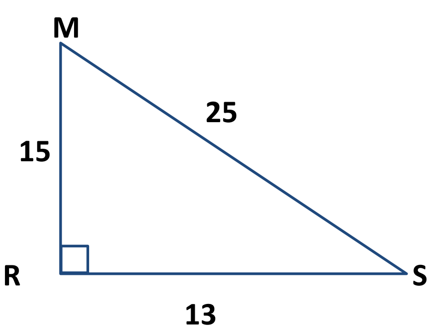
Range

$y \geq 0$

$\mathbf{R}: [0, \infty]$

**Find $sin\angle S$ , $cos\angle S$**

**18.**




$sin\angle S = \frac{\overline{RM}}{\overline{MS}}$

$sin\angle S = \frac{15}{25}$

$sin\angle S = 0,6$

$cos\angle S = \frac{\overline{SR}}{\overline{MS}}$

$cos\angle S = \frac{13}{25}$

$cos\angle S \approx 0,52$

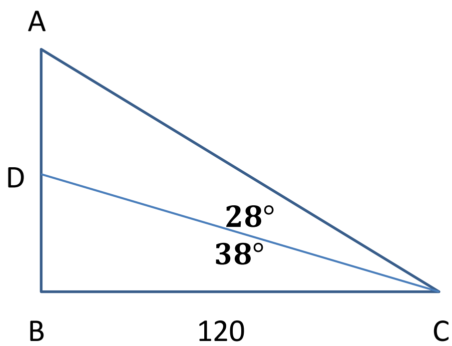
**Find the value of $\alpha$ that makes each statement true.**

**19.** $sin\alpha = cos(\alpha - 48°)$

$$sin\alpha = cos(\alpha - 48°)$$
$$cos(90° - \alpha) = cos(\alpha - 48°)$$
$$90° - \alpha = \alpha - 48°$$
$$2\alpha = 138°$$
$$\alpha = 69°$$

# Unit 10 – Radical Expressions and Equations Test

**20. How would you calculate the length of AB using the information provided? Show all your steps.**




$$\boldsymbol{tan66° = \frac{AB}{120}}$$
$$\boldsymbol{AB = 120 * tan66°}$$
$$\boldsymbol{AB = 120 * 2,25}$$

$$\boldsymbol{AB = 269.52}$$