Chapter 12 Test Review

Name: KEY

Section 12.1: *Functions Involving Square Roots*

Find the domain of the function.

1.) $y = 6\sqrt{x}$

$x \geq 0$

2.) $y = \sqrt{x} + 4$

$x \geq 0$

3.) $y = 3\sqrt{x-1}$

$x - 1 \geq 0$

$x \geq 1$

4.) $y = \sqrt{x+2}$

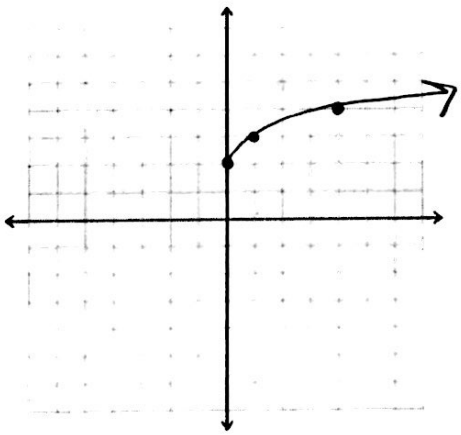
$x + 2 \geq 0$

$x \geq -2$

Graph the function. Find the domain and range.

5.) $y = \sqrt{x} + 2$

x	y
0	2
1	3
4	4
9	5
16	6

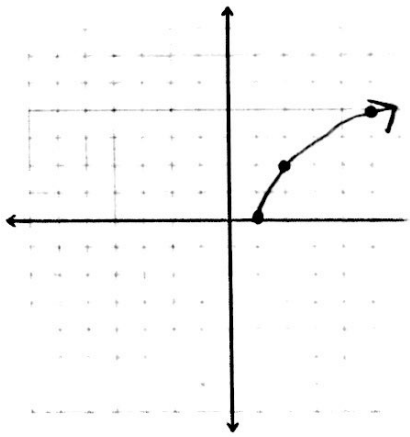


Domain: $x \geq 0$

Range: $y \geq 2$

6.) $y = 2\sqrt{x-1}$

x	y
1	0
2	2
5	4
10	6
17	8



Domain: $x \geq 1$

Range: $y \geq 0$

$x - 1 \geq 0$

$x \geq 1$

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Section 12.2: *Operations with Radical Expressions*

Simplify the expression.

7.) $5\sqrt{7} + 2\sqrt{7}$

$\boxed{7\sqrt{7}}$

8.) $2\sqrt{6} - \sqrt{6}$

$\boxed{1\sqrt{6}}$ OR $\boxed{\sqrt{6}}$

9.) $\sqrt{18} \cdot \sqrt{5}$

$\sqrt{90}$

$\sqrt{9}\ \sqrt{10}$

$\boxed{3\sqrt{10}}$

10.) $\sqrt{3} \cdot \sqrt{75}$

$\sqrt{225}$

$\boxed{15}$

11.) $\sqrt{6}(7\sqrt{3} + \sqrt{6})$

$7\sqrt{18} + \sqrt{36}$

$\sqrt{9}\ \sqrt{2}$

$7 \cdot 3 \cdot \sqrt{2} + 6$

$\boxed{21\sqrt{2} + 6}$

12.) $\sqrt{2}(\sqrt{8} - 4)$

$\sqrt{16} - 4\sqrt{2}$

$\boxed{4 - 4\sqrt{2}}$

13.) $\frac{5}{\sqrt{7}} \cdot \frac{\sqrt{7}}{\sqrt{7}}$

$\frac{5\sqrt{7}}{\sqrt{49}}$

$\boxed{\frac{5\sqrt{7}}{7}}$

14.) $\sqrt{\frac{10}{3}}$ $\frac{\sqrt{10}}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}}$

$\frac{\sqrt{30}}{\sqrt{9}}$

$\boxed{\frac{\sqrt{30}}{3}}$

Section 12.3: *Solving Radical Equations*

Solve the radical equation. Check for extraneous soultions.

15.) $2\sqrt{x} + 7 = 19$

$-7 \quad -7$

$\frac{2\sqrt{x}}{2} = \frac{12}{2}$

$\sqrt{x} = 6$

$(\sqrt{x})^2 = (6)^2$

$\boxed{x = 36}$

check:

$2\sqrt{36} + 7 = 19$

$2 \cdot 6 + 7 = 19$

$12 + 7 = 19$ ✓

16.) $\frac{4\sqrt{3x+3}}{4} = \frac{24}{4}$

$\sqrt{3x+3} = 6$

$(\sqrt{3x+3})^2 = (6)^2$

$3x + 3 = 36$

$-3 \quad -3$

$\frac{3x}{3} = \frac{33}{3}$

$\boxed{x = 11}$

check:

$4\sqrt{3(11)+3} = 24$

$4\sqrt{33+3} = 24$

$4\sqrt{36} = 24$

$4 \cdot 6 = 24$ ✓

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17.) $\sqrt{6x-2}-3=7$

$+3 \quad +3$

$\sqrt{6x-2}=10$

$(\sqrt{6x-2})^2=(10)^2$

$6x-2=100$

$+2 \quad +2$

$\frac{6x}{6}=\frac{102}{6}$

$\boxed{x=17}$

Check:

$\sqrt{6(17)-2}-3=7$

$\sqrt{102-2}-3=7$

$\sqrt{100}-3=7$

$10-3=7$ ✓

18.) $(\sqrt{3x+8})^2=(\sqrt{x+4})^2$

$3x+8=x+4$

$-x \quad -x$

$2x+8=4$

$-8 \quad -8$

$\frac{2x}{2}=\frac{-4}{2}$

$\boxed{x=-2}$

Check:

$\sqrt{3(-2)+8}=\sqrt{-2+4}$

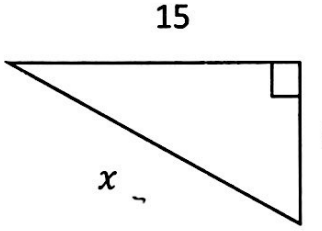
$\sqrt{-6+8}=\sqrt{2}$

$\sqrt{2}=\sqrt{2}$ ✓

Section 12.6: *The Pythagorean Theorem and Its Converse*

Find the missing side length of the right triangle.

19.)



$8^2+15^2=x^2$

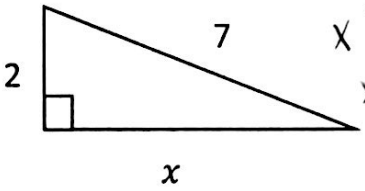
$64+225=x^2$

$289=x^2$

$\sqrt{289}=\sqrt{x^2}$

$\boxed{x=17}$

20.)



$x^2+2^2=7^2$

$x^2+4=49$

$x^2=45$

$\boxed{x=\sqrt{45}}$

Let a and b represent the lengths of the legs of a right triangle and let c represent the length of the hypotenuse. Find the unknown length.

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

21.) $a=14, c=21$

$14^2+b^2=21^2$

$196+b^2=441$

$b^2=245$

$\boxed{b=\sqrt{245}}$

22.) $a=10, b=24$

$10^2+24^2=c^2$

$100+576=c^2$

$676=c^2$

$\boxed{c=26}$

Determine whether the triangle with the given side lengths is a right triangle.

23.) 3, 9, 10

$3^2+9^2=10^2$

$9+81=100$

$90 \neq 100$

$\boxed{\text{NO}}$

24.) 12, 16, 20

$12^2+16^2=20^2$

$144+256=400$

$400=400$

$\boxed{\text{Yes}}$

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Section 12.7/8: *The Distance and Midpoint Formula*

Find the distance between the two points.

25.) $(-6,-2),(-3,-5)$ $\quad x_1\ y_1\ x_2\ y_2$

$d=\sqrt{(-3-(-6))^2+(-5-(-2))^2}$

$d=\sqrt{(3)^2+(-3)^2}$

$d=\sqrt{9+9}$

$d=\boxed{\sqrt{18}}$

26.) $(-5,8),(2,4)$ $\quad x_1\ y_1\ x_2\ y_2$

$d=\sqrt{(2-(-5))^2+(4-8)^2}$

$d=\sqrt{(7)^2+(-4)^2}$

$d=\sqrt{49+16}$

$d=\boxed{\sqrt{65}}$

27.) $(7,12),(-7,-4)$ $\quad x_1\ y_1\ x_2\ y_2$

$d=\sqrt{(-7-7)^2+(-4-12)^2}$

$d=\sqrt{(-14)^2+(-16)^2}$

$d=\sqrt{196+256}$

$d=\boxed{\sqrt{452}}$

28.) $(-1,9),(0,7)$ $\quad x_1\ y_1\ x_2\ y_2$

$d=\sqrt{(0-(-1))^2+(7-9)^2}$

$d=\sqrt{(1)^2+(-2)^2}$

$d=\sqrt{1+4}$

$d=\boxed{\sqrt{5}}$

Find the midpoint between the two endpoints.

29.) $(5,1),(1,-5)$ $\quad x_1\ y_1\ x_2\ y_1$

$\left(\frac{5+1}{2},\frac{1+-5}{2}\right)$

$\left(\frac{6}{2},\frac{-4}{2}\right)$

$\boxed{(3,-2)}$

30.) $(2,3),(4,1)$ $\quad x_1\ y_1\ x_2\ y_2$

$\left(\frac{2+4}{2},\frac{3+1}{2}\right)$

$\left(\frac{6}{2},\frac{4}{2}\right)$

$\boxed{(3,2)}$

31.) $(-3,-3),(6,7)$ $\quad x_1\ y_1\ x_2\ y_2$

$\left(\frac{-3+6}{2},\frac{-3+7}{2}\right)$

$\left(\frac{3}{2},\frac{4}{2}\right)$

$\boxed{(1.5,2)}$

32.) $(-4,-2),(10,-6)$ $\quad x_1\ y_1\ x_2\ y_2$

$\left(\frac{-4+10}{2},\frac{-2+-6}{2}\right)$

$\left(\frac{6}{2},\frac{-8}{2}\right)$

$\boxed{(3,-4)}$

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

$$\left(\frac{x_1+x_2}{2},\frac{y_1+y_2}{2}\right)$$

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