Algebra II Pre AP

Name Key

Per________Date____________

Test Review Square Root Functions

1. A television screen is measured by the length of its diagonal. The equation $d=\sqrt{2a}$ estimates the length of a diagonal, *d*, of a television screen with area, *a*. John wants to buy a new large screen television that has three times the area of his old screen which is 294 square inches.

A.) Express area, a, as a function of the distance, d.

$$(d)^2=(\sqrt{2a})^2 \Rightarrow \frac{d^2}{2}=\frac{2a}{2} \Rightarrow \boxed{\frac{d^2}{2}=a}$$

B.) What size screen should he buy?

$294 \times 3 = 982$

$$d=\sqrt{2\cdot(882)} \Rightarrow d=\sqrt{1764} \Rightarrow \boxed{d=42 \text{ sq. in}}$$

2. Todd was driving down Loop 1604 near US 281 when traffic came to a complete stop. Todd quickly applied his brakes. How far would Todd have gone when applying his brakes if he was driving 65 mph? Assume the pavement was dry and his brakes and tires were new. Use the formula **s** $= \sqrt{\mathbf{30d}}$, where s is the initial speed in miles per hour and **d** is the distance that the vehicle slides after the driver puts his foot on the brake. Support your answer with an algebraic problem and show your work.

$$s=\sqrt{30d}$$

$$(65)^2=(\sqrt{30d})^2$$

$$\frac{65^2}{30}=\frac{30d}{30}$$

$$\boxed{140.83=d}$$

3. If a pendulum has an equation $P=6\sqrt{\frac{L}{16}}$ where *P* is the pendulum's period in seconds and *L* is the length of the pendulum.

a) What is the value of L after a period of 1.8 seconds?

$$\frac{1.8}{6}=\frac{6\sqrt{\frac{L}{16}}}{6} \Rightarrow (.3)^2=\left(\sqrt{\frac{L}{16}}\right)^2 \Rightarrow 16(.09)=\frac{L}{16}\cdot 16 \Rightarrow \boxed{1.44=L}$$

b) What is period if the pendulum's length is 49?

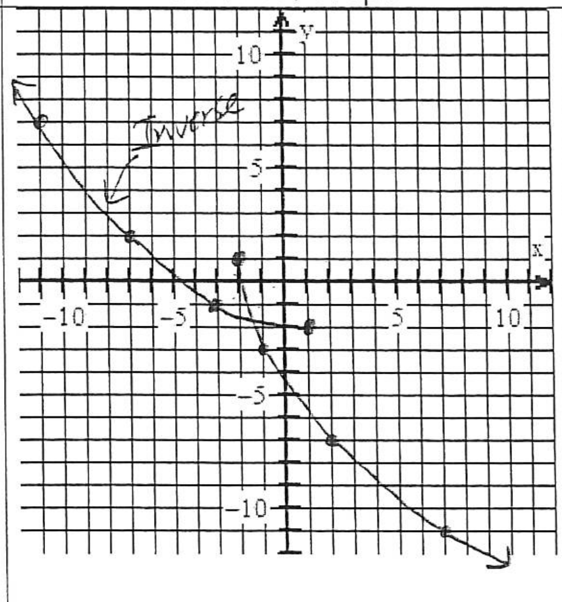
$$P=6\sqrt{\frac{49}{16}} \qquad \boxed{P=10.5}$$

c) What is the domain if the max pendulum's length is 49

Complete the table. Each change is based on the parent function. Also, graph the inverse and give the inverse domain and range.

<table>
<tr><th>Function</th><th>Sketch of Graph</th><th>Domain & Range</th></tr>
<tr>
<td>4.
$y=-4\sqrt{x+2}+1$

x | -4y
0 | 0·-4 = 0
1 | 1·-4 = -4
4 | 2·-4 = -8
9 | 3·-4 = -12

Inverse
(-2,1) (1,-2)
(-1,-3) (-3,-1)
(2,-7) (-7,2)
(7,-11) (-11,7)</td>
<td>
</td>
<td>Square Root:
D: [-2,∞)

R: (-∞, 1]

With a stretch of 4

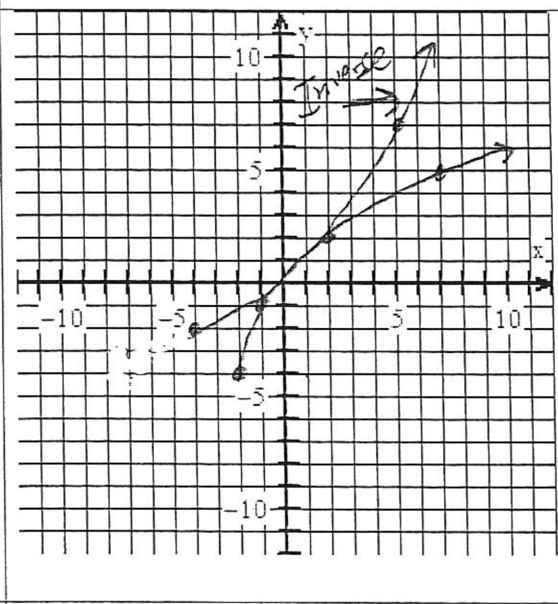
Inverse:

D: (-∞, 1]

R: [-2, ∞)</td>
</tr>
<tr>
<td>5.

$y=3\sqrt{x+2}-4$

x | 3y
0 | 0·3 = 0
1 | 1·3 = 3
4 | 2·3 = 6
9 | 3·3 = 9

Inverse
(-2,-4) (-4,-2)
(-1,-1) (-1,-1)
(2,2) (2,2)
(7,5) (5,7)</td>
<td>
</td>
<td>Square Root:
D: [-2, ∞)

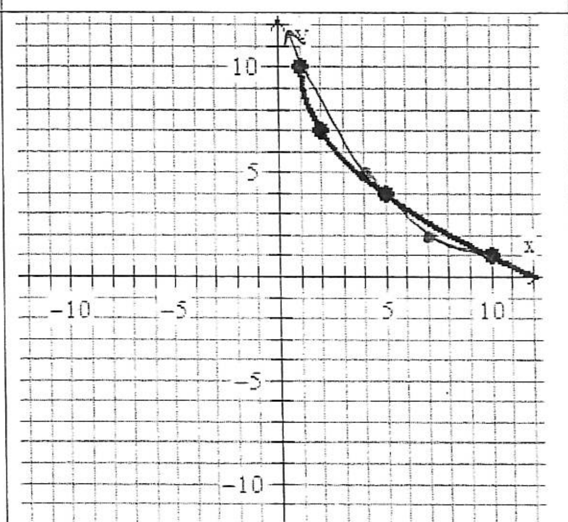
R: [-4, ∞)

Inverse:

D: [-4, ∞)

R: [-2, ∞)</td>
</tr>
<tr>
<td>6.
$y=-3\sqrt{x-1}+10$

x | -3y
0 | 0·-3 = 0
1 | 1·-3 = -3
4 | 2·-3 = -6
9 | 3·-3 = -9

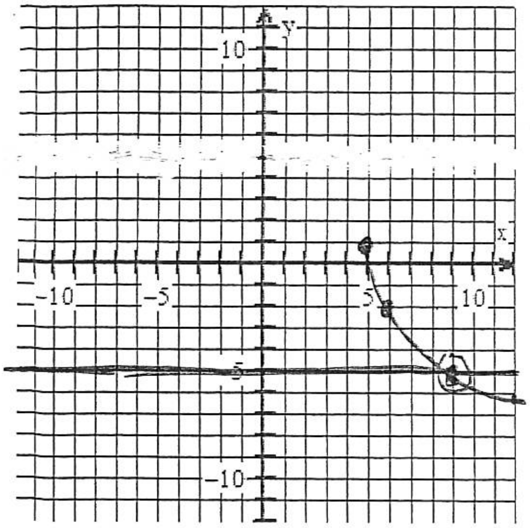
Inverse
(1,10) (10,1)
(2,7) (7,2)
(5,4) (4,5)
(10,1) (1,10)</td>
<td>
</td>
<td>Square Root:
D: [1, ∞)

R: (-∞, 10]

Inverse:

D: (-∞, 10]
R:
[1, ∞)</td>
</tr>
</table>

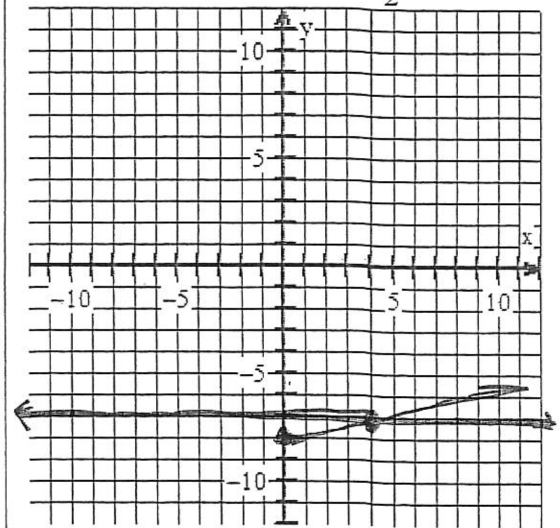
7. Solve graphically $-5=-3\sqrt{x-5}+1$



Intersection

(9, -5)

8. Solve graphically $-7=\frac{1}{2}\sqrt{x}-8$

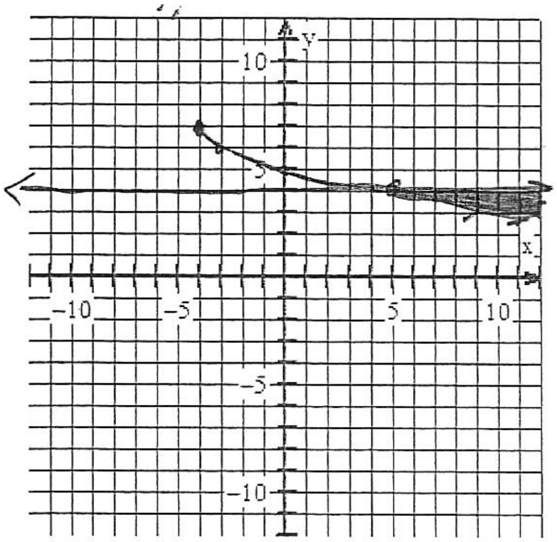


Intersection

(4, -7)

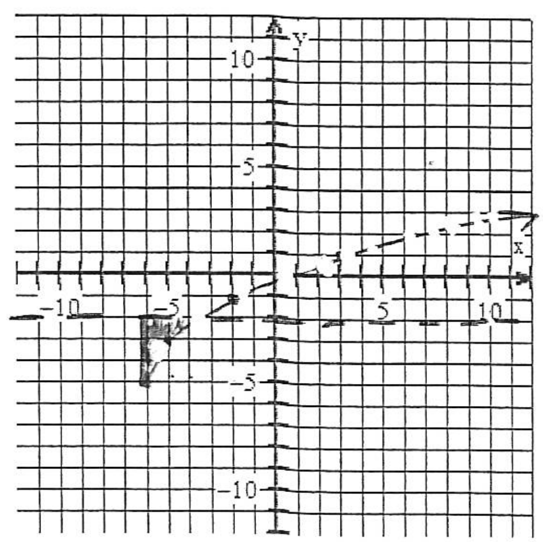
9. Graph the solution interval of?

$4\geq-\sqrt{x+4}+7$



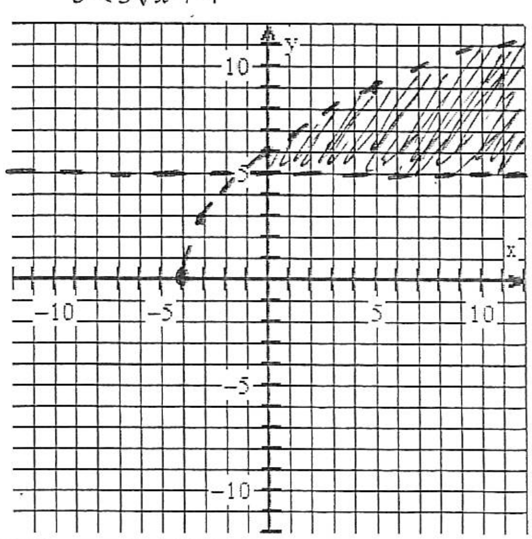
10. Graph the solution interval of?

$-2>2\sqrt{x+6}-5$



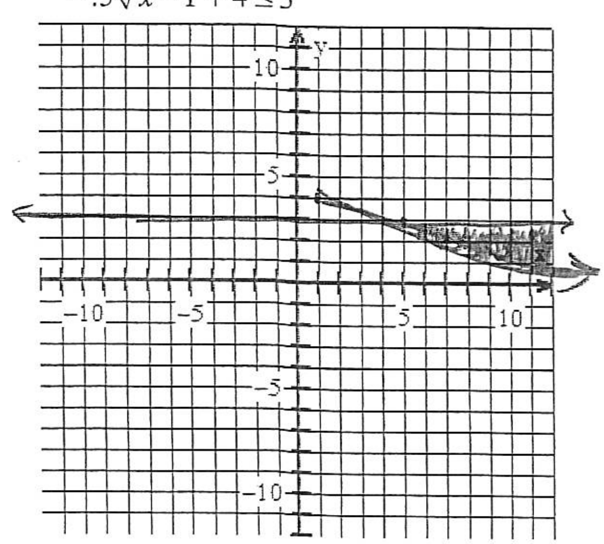
11. Graph the solution interval of?

$5<3\sqrt{x+4}$

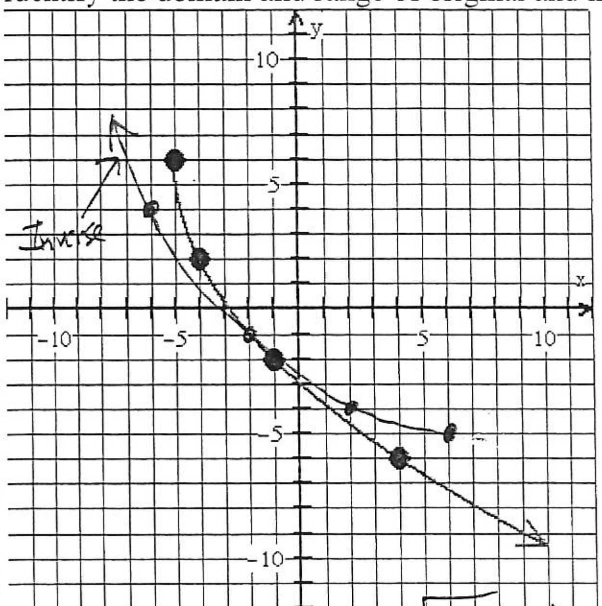


12. Graph the solution interval of?

$-.5\sqrt{x-1}+4\leq 3$



13. Give the following equation of the graph and graph its inverse.
Identify the domain and range of original and inverse.



Equation of Graph: $y = -4\sqrt{x+5} + 6$

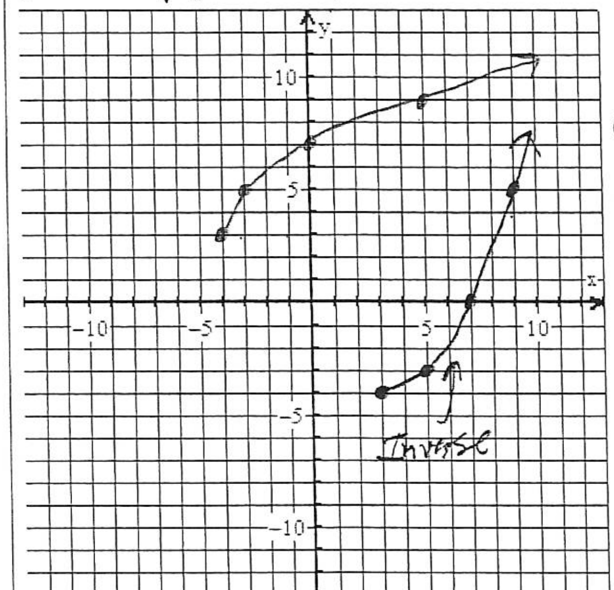
Original Domain: $[-5, \infty)$ Range: $(-\infty, 6]$

Inverse Domain: $(-\infty, 6]$ Range: $[-5, \infty)$

	Inverse
(-5,6)	(6,-5)
(-4,2)	(2,-4)
(-1,-2)	(-2,-1)
(4,-6)	(-6,4)

14. Graph the following equation and its inverse.
Identify the domain and range of original and inverse.

$$y = 2\sqrt{(x+4)} + 3$$



x	2y	
0	0·2	0
1	1·2	2
4	2·2	4
9	3·2	6

	Inv
(-4,3)	(3,-
(-3,5)	(5,-
(0,7)	(7,
(5,9)	(9,5

Original Domain: $[-4, \infty)$ Range: $[3, \infty)$

Inverse Domain: $[3, \infty)$ Range: $(-4, \infty)$

Directions: Multiply the following. Use FOIL.

15. $(5+\sqrt{7})(2-\sqrt{3})$

$10 - 5\sqrt{3} + 2\sqrt{7} - \sqrt{21}$

$\boxed{10 - 5\sqrt{3} + 2\sqrt{7} - \sqrt{21}}$

16. $(\sqrt{7}+\sqrt{2})^2$

$(\sqrt{7}+\sqrt{2})(\sqrt{7}+\sqrt{2})$

$7 + \sqrt{14} + \sqrt{14} + 2$

$\boxed{9 + 2\sqrt{14}}$

17. $(\sqrt{x+5}+7)^2$

$(\sqrt{x+5}+7)(\sqrt{x+5}+7)$

$x+5 + 7\sqrt{x+5} + 7\sqrt{x+5} + 49$

$\boxed{x + 54 + 14\sqrt{x+5}}$

18. $(6\sqrt{11}+\sqrt{2})^2$

$(6\sqrt{11}+\sqrt{2})(6\sqrt{11}+\sqrt{2})$

$36 \cdot 11 + 6\sqrt{22} + 6\sqrt{22} + 2$

$396 + 12\sqrt{22} + 2$

$\boxed{398 + 12\sqrt{22}}$

19. Find the inverse.

a) $y=\frac{2}{3}(x-4)^2+8$

$x=\frac{2}{3}(y-4)^2+8$

$\frac{3}{2}(x-8)=\frac{2}{3}(y-4)^2\cdot\frac{3}{2}$

$\frac{3}{2}(x-8)=(y-4)^2$

$\sqrt{\frac{3}{2}(x-8)}=y-4$

$\boxed{\sqrt{\frac{3}{2}(x-8)}+4=y}$

b) $y=\frac{(x-4)^2}{6}+8$

$x=\frac{(y-4)^2}{6}+8$

$6(x-8)=(y-4)^2$

$\sqrt{6(x-8)}=y-4$

$\boxed{\sqrt{6(x-8)}+4=y}$

c) $y=\frac{3}{4}\sqrt{2(x-3)}+\frac{3}{4}$

$x=\frac{3}{4}\sqrt{2(y-3)}+\frac{3}{4}$

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

$\left[\frac{4}{3}\left(x-\frac{3}{4}\right)\right]^2=2(y-3)$

$\frac{\left[\frac{4}{3}\left(x-\frac{3}{4}\right)\right]^2}{2}=y-3$

$*$ square $4/3$

$\frac{\left[\frac{4}{3}\left(x-\frac{3}{4}\right)\right]^2}{2}+3=y$

$\boxed{y=\frac{\left[\frac{16}{9}\left(x-\frac{3}{4}\right)^2\right]}{2}+3}$

d) $y=-5\sqrt{x-7}+16$

$x=-5\sqrt{y-7}+16$

$\frac{x-16}{-5}=\sqrt{y-7}$

rewrite

$-\frac{1}{5}(x-16)=\sqrt{y-7}$

$\left[-\frac{1}{5}(x-16)\right]^2=y-7$

$\left[-\frac{1}{5}(x-16)\right]^2+7=y$

$\boxed{\frac{1}{25}(x-16)^2+7=y}$

20. Find the solutions to the following equations. Please make sure you check each solution, as you might have an "extraneous solution."

$(\sqrt{x}+1)(\sqrt{x}+1)$

a) $\sqrt[3]{5x-1} = 4$

$(\sqrt[3]{5x-1})^3 = (4)^3$

$5x-1 = 64$
$+1 \quad +1$

$\frac{5x}{5} = \frac{65}{5}$

$\boxed{x=13}$

Check!

$\sqrt[3]{5(13)-1} = 4$

$4 = 4$ ✓

b) $\sqrt{x+11} - \sqrt{3x-9} = 0$

$(\sqrt{x+11})^2 = (\sqrt{3x-9})^2$

$x+11 = 3x-9$

$11 = 2x - 9$
$+9 \quad +9$

$\frac{20}{2} = \frac{2x}{2}$

$\boxed{x=10}$

Check!

$\sqrt{10+11} = \sqrt{3(10)-9}$

$\sqrt{21} = \sqrt{21}$ ✓

c) $\sqrt{x+7} - 1 = \sqrt{x}$

$(\sqrt{x+7})^2 = (\sqrt{x}+1)^2$

$x+7 = x+\sqrt{x}+\sqrt{x}+1$

$\cancel{x}+7 = \cancel{x}+2\sqrt{x}+1$

$7 = 2\sqrt{x}+1$
$-1 \quad -1$

$\frac{6}{2} = \frac{2\sqrt{x}}{2}$

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

$\boxed{9=x}$

Check:

$\sqrt{9+7} - 1 = \sqrt{9}$

$4-1 = 3$

$3=3$ ✓

d) $\sqrt{6x^2-3x-7} - \sqrt{2x^2-10x-1} = 0$

$(\sqrt{6x^2-3x-7})^2 = (\sqrt{2x^2-10x-1})^2$

$6x^2-3x-7 = 2x^2-10x-1$
$-2x^2+10x+1 \quad -2x^2+10x+1$

$4x^2+7x-6=0$

24
1 | 24
2 | 12
3 | 8
4 | 6

no factors work

$\frac{-7 \pm \sqrt{(7)^2-4(4)(-6)}}{2(4)}$

$\frac{-7 \pm \sqrt{145}}{8}$

$\boxed{\frac{-7 \pm \sqrt{145}}{8}}$

e) $\sqrt{5x^3+8x^2-14x} - \sqrt{4x^3+11x^2+6x} = 0$

$(\sqrt{5x^3+8x^2-14x})^2 = (\sqrt{4x^3+11x^2+6x})^2$

$5x^3+8x^2-14x = 4x^3+11x^2+6x$
$-4x^3-11x^2-6x \quad -4x^3-11x^2-6x$

$x^3-3x^2-20x = 0$

$x(x^2-3x-20) = 0$

$\boxed{x=0}$

$x^2-3x-20=0$

20
1 | 20
2 | 10
4 | 5

$\frac{-(-3) \pm \sqrt{(-3)^2-4(1)(-20)}}{2(1)}$

$\boxed{\frac{3 \pm \sqrt{89}}{2}}$