

I. Simplify

1.  $\sqrt{288p^4q^3}$

$12p^2q\sqrt{2q}$

2.  $\sqrt{2x^2y^3} \cdot \sqrt{8x^5y^5}$

$\sqrt{16x^7y^8}$   
 $4x^3y^4\sqrt{x}$

3.  $3\sqrt{13} - 5\sqrt{13} + 4\sqrt{13}$

$2\sqrt{13}$

4.  $(2 + \sqrt{8}) - (1 - 3\sqrt{2})$

$1 - \sqrt{2}$

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

$(3 - 2\sqrt{7})(3 - 2\sqrt{7})$

$9 - 6\sqrt{49} + 4 \cdot 7$

$37 - 12\sqrt{7}$

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

$16 - 4 \cdot 3$

$16 - 12 = 4$

$\left(\frac{9 - 3\sqrt{6}}{2 - \sqrt{2}}\right) \left(\frac{2 + \sqrt{2}}{2 + \sqrt{2}}\right) \rightarrow$

$\frac{18 + 9\sqrt{2} - 6\sqrt{6} - 3\sqrt{12}}{4 - 2} = \frac{18 + 9\sqrt{2} - 6\sqrt{6} - 6\sqrt{2}}{2}$

II. Solve each of the following radical equations.

8.  $\sqrt{5x+1} = \sqrt{4x+3}$

$5x+1 = 4x+3$

$x = 2$

$\sqrt{5 \cdot 2 + 1} = \sqrt{4 \cdot 2 + 3}$   
 $\sqrt{11} = \sqrt{11}$

9.  $5 - 6\sqrt{x+2} = -19$

$-6\sqrt{x+2} = -24$

$\sqrt{x+2} = 4$

$x+2 = 4^2$

$x = 16 - 2 = 14$

$5 - 6\sqrt{14+2} = -19$

$5 - 6\sqrt{16} =$

$5 - 24 = -19$

10.  $\sqrt{x^2+6} = x-4$

$x^2+6 = x^2-8x+16$

$0 = -8x + 10$

$8x = 10$

~~$x = \frac{5}{4}$~~

$\frac{5}{4} - 4 = -2.75$

No Solution

11.  $\sqrt{3x+1} = x-3$

$3x+1 = x^2-6x+9$

$0 = x^2-9x+8$

$0 = (x-8)(x-1)$

~~$x = 8$~~

$\sqrt{3 \cdot 8 + 1} = 8 - 3$

$5 = 5$

$\sqrt{3 \cdot 1 + 1} = 1 - 3$   
 $2 \neq -2$

III. Determine the domain and range for each function.

12.  $H(x) = \sqrt{x+6}$

D:  $[-6, \infty)$   
R:  $[0, \infty)$

13.  $A(x) = -\sqrt{3x-21} = -\sqrt{3(x-7)}$

D:  $[7, \infty)$   
R:  $(-\infty, 0]$

14.  $V(x) = \sqrt{-x+7} = \sqrt{-(x-7)}$

D:  $(-\infty, 7]$   
R:  $[0, \infty)$

15.  $E(x) = \sqrt{x^2-9}+2 = \sqrt{(x+3)(x-3)} + 2$

D:  $(-\infty, -3] \cup [3, \infty)$   
R:  $[2, \infty)$

IV. State how the graph shifted from  $y = \sqrt{x}$ .

16.  $F(x) = \sqrt{x+5}+7$

left 5  
up 7

17.  $U(x) = \sqrt{-x+2}-6$

$\sqrt{-(x-2)} - 6$   
right 2  
down 6

18.  $N(x) = -\sqrt{-2x+6}+1$

$-\sqrt{-2(x-3)} + 1$   
reflected over x-axis  
right 3  
up 1