

Unit 3 Review

1. Simplify:

a) $\sqrt{12x^6y^7}$

$2x^3y^3\sqrt{3y}$

b) $\sqrt[4]{x^5y^{10}z}$

$xy^2\sqrt[4]{xy^2z}$

c) $\sqrt[3]{8x^8y^2z^6}$

$2x^2z^2\sqrt[3]{x^2y^2}$

d) $\sqrt{75a^{11}b^4c^7}$

$5a^5b^2c^3\sqrt{3ac}$

2. Write in exponential form

a) $\sqrt{x^3}$
 $x^{\frac{3}{2}}$

b) $\sqrt[4]{x^3y^6z^8}$

$x^{\frac{3}{4}}y^{\frac{3}{2}}z^2$

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

$9x^{\frac{2}{3}}$

d) $(\sqrt[3]{2x^2})^5$

$2^{\frac{5}{3}}x^{\frac{10}{3}}$

3. Write in radical form

a) $(x^3)^{\frac{2}{5}}$

$x\sqrt[5]{x}$

b) $(x^{\frac{1}{4}}y^{\frac{2}{5}})$

$\sqrt[20]{x^5y^8}$

c) $3x^{\frac{2}{5}}$

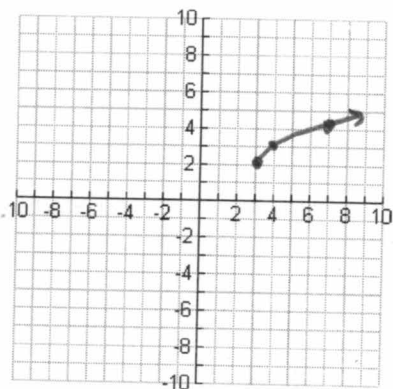
$3\sqrt[5]{x^2}$

d) $(3x)^{\frac{2}{5}}$

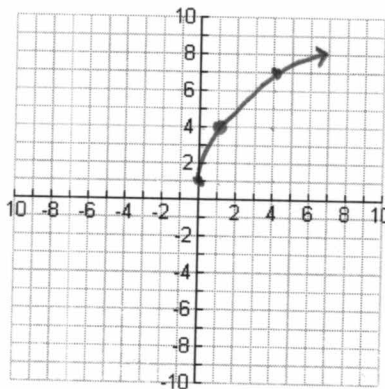
$\sqrt[5]{9x^2}$

4. Graph. State the transformations in order. State the Domain and Range.

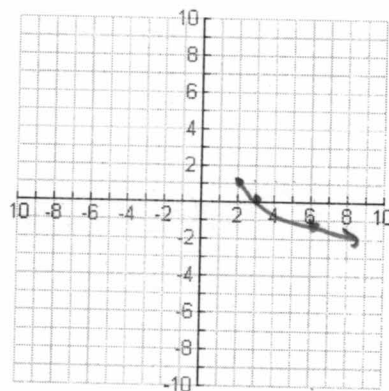
a) $y = \sqrt{x-3} + 2$



b) $y = 3\sqrt{x+1}$



c) $y = -\sqrt{x-2} + 1$



5. Working backwards: Writing the equation when given a translation.

a) The parent function $y = \sqrt{x}$ is translated 2 units to the left and one unit down. $y = \sqrt{x+2} - 1$

b) The parent function $y = \sqrt{x}$ is translated 3 units to the right. $y = \sqrt{x-3}$

c) The parent function $y = \sqrt{x}$ is compressed vertically by a factor of $\frac{1}{2}$ and then translated 2 units up. $y = \frac{1}{2}\sqrt{x} + 2$

6. Solve each radical equation.

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

$x = 48$

b) $5\sqrt{x+7} = 25$

$x = 18$

c) $\sqrt{x+8} + 4 = x$

$x = 8$

d) $10 - 2\sqrt{3x-1} = -14$

$x = \frac{115}{3}$

e) $\sqrt[3]{x+1} = 4$

$x = 63$

f) $\sqrt{3x-1} = \sqrt{2x+4}$

$x = 5$

g) $x^{\frac{5}{6}} = 32$

$x = 64$

h) $(2x+5)^{\frac{2}{3}} = 16$

$x = \frac{59}{2}$ or $-\frac{69}{2}$

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

No solution

j) $(4x+8)^{\frac{1}{2}} = 2x$

$x = 2$

k) $\sqrt{2x+3} = 3 - \sqrt{2x}$ $x = \frac{1}{2}$

Write an equation of variation to represent the situation and solve for the missing information.

- The volume V of a gas kept at a constant temperature varies inversely as the pressure p . If the pressure is 24 pounds per square inch, the volume is 15 cubic feet. What will be the volume when the pressure is 30 pounds per square inch? 12 cubic feet
- The time to complete a project varies inversely with the number of employees. If 3 people can complete the project in 7 days, how long will it take 5 people? 4.2 days
- The time needed to travel a certain distance varies inversely with the rate of speed. If it takes 8 hours to travel a certain distance at 36 miles per hour, how long will it take to travel the same distance at 60 miles per hour? 4.8 hours

4. The number of revolutions made by a tire traveling over a fixed distance varies inversely to the radius of the tire. A 12-inch radius tire makes 100 revolutions to travel a certain distance. How many revolutions would a 16-inch radius tire require to travel the same distance? *75 rev.*
5. For a fixed number of miles, the gas mileage of a car (miles/gallon) varies inversely with the number of gallons used. One year an employee driving a truck averaged 24 miles per gallon and used 750 gallons of gas. If the next year, to drive the same number of miles the employee drove a compact car averaging 39 miles per gallon, how many gallons of gas would be used?

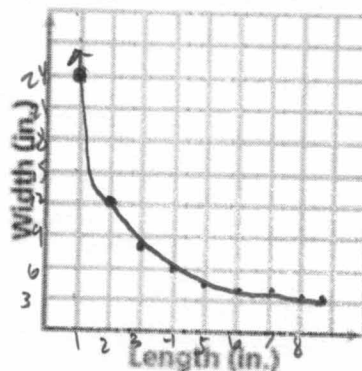
461.54 gal

Inverse Variation Modeling:

1. Complete the table.

Length (in.)	1	2	3	4	5	6	7	8
Width (in.)	<i>24</i>	<i>12</i>	<i>8</i>	<i>6</i>	<i>4.8</i>	<i>4</i>	<i>3.43</i>	<i>3</i>

Rectangles With Area 24 in.²



2. Plot your data on the grid. Then, draw a line or curve that seems to model the pattern in the data.

3. Describe the pattern of change in the width as the length increases. Is the relationship between length and width linear? *inverse*

4. Write an equation that shows how the width w depends on the length l for rectangles with an area of 24 square inches.

$$y = \frac{24}{x}$$

Solve

$$1) \frac{k+4}{4} + \frac{k-1}{4} = \frac{k+4}{4k}$$

$$x = -2, 1$$

$$2) \frac{1}{2m^2} = \frac{1}{m} - \frac{1}{2} \quad x = 1$$

$$9) \frac{1}{r+3} = \frac{r+4}{r-2} + \frac{6}{r-2}$$

$$x = -8, -4$$

~~$$10) \frac{a^2 - 4a - 12}{a^2 - 10a + 25} = \frac{6}{a-5} + \frac{a-3}{a-5}$$~~

$$13) \frac{1}{k} = 5 + \frac{1}{k^2 + k}$$

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

$$14) \frac{1}{p^2 - 4p} + 1 = \frac{p-6}{p}$$

$$x = \frac{23}{6}$$