Name _____

• Products of Square Roots

Property of Square Roots

$$\sqrt{ab} = \sqrt{a}\sqrt{b}$$

This property means that square roots can be factored.

This property also means square roots can be multiplied.

This property can help you solve problems with square roots.

Simplify: $\sqrt{5} \cdot \sqrt{5}$

$\sqrt{5} \cdot \sqrt{5} = \sqrt{25}$

$\sqrt{25} = 5$

Simplify: $\sqrt{8} \cdot \sqrt{18}$

$\sqrt{8} \cdot \sqrt{18} = \sqrt{144}$

$\sqrt{144} = 12$

Simplify: $\sqrt{10} \cdot \sqrt{14}$

$\sqrt{10} \cdot \sqrt{14} = \sqrt{140}$

$\sqrt{140} = \sqrt{2 \cdot 2 \cdot 5 \cdot 7}$

$\sqrt{140} = \sqrt{2^2} \cdot \sqrt{5 \cdot 7}$

$\sqrt{140} = 2\sqrt{35}$

Practice:

1. $\sqrt{8}\sqrt{2}$ _____

2. $\sqrt{12}\sqrt{3}$ _____

3. $\sqrt{27} \cdot \sqrt{49}$ _____

4. $\sqrt{3} \cdot \sqrt{6}$ _____

5. $\sqrt{3} \cdot \sqrt{3}$ _____

6. $\sqrt{5} \cdot \sqrt{50}$ _____

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• Transforming Formulas

Standard formulas are expressed with one variable isolated. You can transform, or rearrange, formulas before you solve a problem when you want to isolate a different variable.

Example: The formula for distance can be transformed to solve the equation to find the time:

Step	Justification
$d = rt$	Distance formula
$\frac{d}{r} = \frac{rt}{r}$	Divided both sides by r
$\frac{d}{r} = t$	Simplified
$t = \frac{d}{r}$	Symmetric property

Example: Solve for x: $w = x + b$

$w = x + b$	Equation
$w - b = x$	Subtracted b from both sides
$x = w - b$	Symmetric property of equality

Practice:

1. Solve $A = lw$ for width. _____

2. Solve $c = \pi d$ for the diameter. _____

3. Solve $c^2 = a^2 + b^2$ for a. _____

4. Transform this formula to solve for c. $a = bc$ _____

5. Solve $d = rt$ for time. Then use your transformed formula to solve the following problem. Jan traveled a distance of 90 miles at the rate of 40 mph. How long did it take her to travel the 90 miles?

_____

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• Adding and Subtracting Mixed Measures Polynomials

To add mixed measures, combine the units separately and then make adjustments.

Example:
$$\begin{array}{r} 13 \text{ minutes } 41 \text{ seconds} \\ +\ 9 \text{ minutes } 31 \text{ seconds} \\ \hline 22 \text{ minutes } 72 \text{ seconds} \end{array} = 23 \text{ min } 12 \text{ sec}$$

When subtracting, you may need to regroup.

Example:
$$\begin{array}{r} 14 \text{ pounds } 3 \text{ ounces} \\ -\ 10 \text{ pounds } 9 \text{ ounces} \\ \hline \end{array} \longrightarrow \begin{array}{rr} 13 \text{ pounds} & 19 \text{ ounces} \\ 10 \text{ pounds} & 9 \text{ ounces} \\ \hline 3 \text{ pounds} & 10 \text{ ounces} \end{array}$$

Polynomials are algebraic expressions with one or more terms. Monomials (one term), binomials (two terms), and trinomials (three terms) are types of polynomials.

Practice:

1. Add:

a.
$$\begin{array}{r} 2 \text{ hr } 25 \text{ min } 18 \text{ sec} \\ +\ 4 \text{ hr } 51 \text{ min } 22 \text{ sec} \\ \hline \end{array}$$

_____

b.
$$\begin{array}{r} 3 \text{ ft } 8 \text{ in.} \\ +\ 4 \text{ ft } 10 \text{ in.} \\ \hline \end{array}$$

_____

2. Subtract:

a.
$$\begin{array}{r} 9 \text{ hr } 12 \text{ min } 18 \text{ sec} \\ -\ 2 \text{ hr } 21 \text{ min } 45 \text{ sec} \\ \hline \end{array}$$

_____

b.
$$\begin{array}{r} 10 \text{ lbs } 3 \text{ oz} \\ -\ 4 \text{ lbs } 12 \text{ oz} \\ \hline \end{array}$$

_____

3. Identify each polynomial below as a monomial, binomial, or trinomial.

a. $3x + 7y - 2$

_____

b. $x + 4y + 4$

_____

c. $4xy^3$

_____

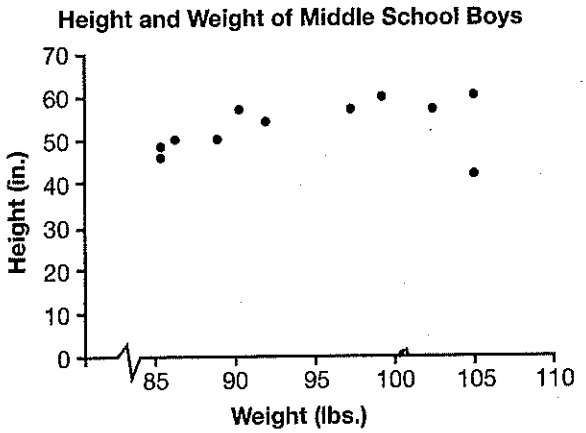
d. $x^2 - 2y$

_____

• Scatterplots

Scatterplots can show if there is a relationship between two sets of data. Below is a chart of the height and weight of a group of middle school boys and a scatterplot of the same data.

Height (in.)	Weight (lbs)
60	98
58	102
63	105
57	90
55	92
50	88
50	86
48	85
57	97
58	102
45	85
45	105



Although the points do not lie on a straight line, we see that the points have a somewhat linear relationship. A **line of best fit** can be drawn on the graph that passes near all of the points. This means that a **correlation** exists between the height and weight of this group of middle school boys. Quantities can be positively correlated, like the above correlation; negatively correlated; or not correlated.

Practice:

1. Carlandra wants to determine if there is a correlation between the heights of fathers and sons at a certain age. Make a scatterplot of the data. Are the quantities positively or negatively correlated? Sketch a line of best fit.

Fathers' heights (in.)	Sons' heights (in.)
72	46
72	54
66	44
70	48
68	42
64	40
64	44
66	42
72	50
74	52
74	54