

Algebra 1 – Unit 1 Study Packet

Verbal and Algebraic Expressions and Equations

Skill #1 – Verbal to Algebraic

1) The sum of x and nine $x + 9$	2) A number g less than 14 $14 - g$	3) The quotient of 36 and a number k $\frac{36}{k}$
4) Four times the difference of a number j and ten $4(j - 10)$	5) Three times the quantity of seven plus twice a number h $3(7 + 2h)$	6) The product of 16 and a number y increased by eight is 152 $16y + 8 = 152$
7) Each candy bar (c) costs \$1.75. $1.75c$	8) She is 8 more than 3 times his age (a) $8 + 3a$ or $3a + 8$	9) The product of 5 and the cube root of a number p $5\sqrt[3]{p}$

Skill #1 I can translate verbal expressions and equations into algebraic symbols.
 Need more practice (IXL – I.1, I.4)

Skill #2 – Algebraic to Verbal

1) $\frac{12}{x} + 7$ <i>*Answers may vary*</i> The quotient of 12 and a number plus 7	2) $4(t - 9)$ 4 times the difference of a number and 9	3) $5\sqrt[3]{r}$ The product of 5 and the cube root of r
4) $\sqrt{2x}$ The square root of the product of 2 and x	5) $4y^3 + 10$ Four times a number cubed plus 10	6) $\frac{1}{4}(2w + 3x)$ One fourth times the quantity of 2 times w plus 3 times x

7) Match the following:

$\frac{\sqrt{y}}{2}$		The square root of the product of two and y
$\sqrt{2y}$		The product of two and the cube root of y
$\sqrt[3]{2y}$		The quotient of the square root of y and 2
$2\sqrt[3]{y}$		The cube root of the product of two and y

Skill #2 I can translate algebraic symbols into verbal expressions and equations.
 Need more practice (IXL – I.1, I.4)

Skill #3 - Order of Operations

$$1) \frac{3}{4} \cdot (4^2 + -2^3)$$

$$\frac{3}{4} (16 + -8)$$

$$\frac{3}{4} \cdot 8 = \textcircled{6}$$

$$2) \sqrt[3]{-64} + |10^2|$$

$$-4 + |100|$$

$$-4 + 100 = \textcircled{96}$$

$$3) \sqrt{16} - (2 + 1^4) + \sqrt{100} + 9$$

$$4 - (2 + 1) + 10 + 9$$

$$\frac{4 - 2 + 10 + 9}{2 + 10 + 9} = \textcircled{21}$$

Skill #3 I can solve expressions using order of operations, which include absolute value, square roots, and cube roots
 Need more practice (IXL - I.7)

Skill #4 - Replacement Variables

1) What is the value of $\frac{5y - 6z}{4z}$
 if $y = 1$ and $z = -5$?

$$\frac{5(1) - 6(-5)}{4(-5)} = \frac{5 + 30}{-20} = \frac{35}{-20}$$

$$\textcircled{-1\frac{3}{4}}$$

$$\textcircled{-1.75}$$

2) What is the value of $t^2 - 9s$
 if $t = -2$ and $s = -1$?

$$(-2)^2 - 9(-1)$$

$$4 - (-9)$$

$$\textcircled{13}$$

3) The expression below has a value of 10.

$$\sqrt{m} - n$$

$$\sqrt{64} - (-2)$$

$$8 + 2 = 10$$

$$\sqrt{100} - 1$$

$$10 - 1$$

$$\sqrt{169} - (-3)$$

$$13 + 3$$

$$\sqrt{225} - 5$$

$$15 - 5 = 10$$

Identify each correct replacement set:

$$\textcircled{m = 64 \text{ and } n = -2}$$

$$m = 100 \text{ and } n = 1$$

$$m = 169 \text{ and } n = -3$$

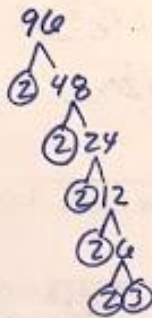
$$\textcircled{m = 225 \text{ and } n = 5}$$

Skill #4 I can solve expressions using order of operations, which include absolute value, square roots, and cube roots for given replacement values for variables.
 Need more practice (IXL - B.3, B.7, GG.8)

Skill #5 - Simplifying Radicals

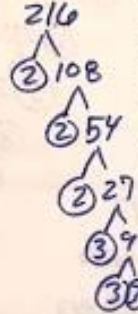
1) $\sqrt{96}$

$\sqrt{2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 3}$
 $4\sqrt{6}$



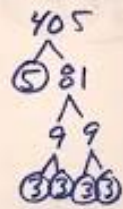
2) $\sqrt{216}$

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



3) $\sqrt{405}$

$\sqrt{3 \cdot 3 \cdot 3 \cdot 3 \cdot 5}$
 $3 \cdot 3 \sqrt{5}$
 $9\sqrt{5}$



4) What coefficient would be placed in the box shown?

$\sqrt{12} = \square\sqrt{3}$

a) 1
 b) 2
 c) 3
 d) 4

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

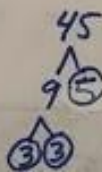
Skill #5

- Express the square root of a whole number in simplest form.
- Need more practice (IXL - EE.1)

Skill #6 - Simplifying Radicals with Variables

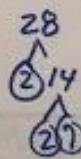
1) $\sqrt{45p^2}$

$\sqrt{3 \cdot 3 \cdot 5 \cdot p \cdot p}$
 $3p\sqrt{5}$



2) $\sqrt{28m^2n^3}$

$\sqrt{2 \cdot 2 \cdot 7 \cdot m \cdot m \cdot n \cdot n \cdot n}$
 $2mn\sqrt{7n}$



3) $\sqrt{r^4s^5}$

$\sqrt{r \cdot r \cdot r \cdot r \cdot s \cdot s \cdot s \cdot s \cdot s}$
 $r \cdot r \cdot s \cdot s \sqrt{s}$
 $r^2s^2\sqrt{s}$

Skill #6

- Express the principal square root of a monomial algebraic expression in simplest form where variables are assumed to have positive values.
- Need more practice (IXL - EE.2)

Skill #7 - Simplifying Cube Roots

1) $\sqrt[3]{1080}$

$$\sqrt[3]{2 \cdot 2 \cdot 2 \cdot 3 \cdot 3 \cdot 3 \cdot 5}$$

$$\boxed{6} \sqrt[3]{5}$$

$$1080$$

$$\begin{array}{l} \nearrow 2 \quad 540 \\ \nearrow 2 \quad 270 \\ \nearrow 2 \quad 135 \\ \nearrow 5 \quad 27 \\ \nearrow 3 \quad 9 \\ \nearrow 3 \quad 3 \end{array}$$

2) What coefficient will be placed in the box?

$$\sqrt[3]{540} = \boxed{} \sqrt[3]{20}$$

$$\sqrt[3]{2 \cdot 2 \cdot 3 \cdot 3 \cdot 3 \cdot 5}$$

$$\boxed{3} \sqrt[3]{20}$$

3) $\sqrt[3]{1372k^4p^5}$

$$\sqrt[3]{2 \cdot 2 \cdot 7 \cdot 7 \cdot 7 \cdot k \cdot k \cdot k \cdot p \cdot p \cdot p \cdot p \cdot p}$$

$$7kp \sqrt[3]{4kp^2}$$

$$1372$$

$$\begin{array}{l} \nearrow 2 \quad 686 \\ \nearrow 2 \quad 343 \\ \nearrow 7 \quad 49 \\ \nearrow 7 \quad 7 \end{array}$$

4) What coefficient will be placed in the box?

$$\sqrt[3]{1512} = \boxed{} \sqrt[3]{7}$$

$$\sqrt[3]{2 \cdot 2 \cdot 2 \cdot 3 \cdot 3 \cdot 3 \cdot 7}$$

$$\boxed{6} \sqrt[3]{7}$$

$$1512$$

$$\begin{array}{l} \nearrow 2 \quad 756 \\ \nearrow 2 \quad 378 \\ \nearrow 2 \quad 189 \\ \nearrow 3 \quad 63 \\ \nearrow 3 \quad 21 \\ \nearrow 3 \quad 7 \end{array}$$

Skill #7 Express the cube root of an integer in simplest form.
 Need more practice (IXL - A.7)

Skill #8 - Add, Subtract, and Multiply Radical Expressions

1) $\sqrt{14} \cdot \sqrt{21}$

$$\sqrt{294}$$

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

$$\boxed{7} \sqrt{6}$$

$$294$$

$$\begin{array}{l} \nearrow 2 \quad 147 \\ \nearrow 3 \quad 49 \\ \nearrow 7 \quad 7 \end{array}$$

2) $2\sqrt{10} \cdot \sqrt{6}$

$$2\sqrt{60}$$

$$2\sqrt{2 \cdot 2 \cdot 3 \cdot 5}$$

$$\boxed{4} \sqrt{15}$$

$$60$$

$$\begin{array}{l} \nearrow 2 \quad 30 \\ \nearrow 2 \quad 15 \\ \nearrow 3 \quad 5 \end{array}$$

3) $\sqrt[3]{9} \cdot \sqrt[3]{15}$

$$\sqrt[3]{135}$$

$$\sqrt[3]{3 \cdot 3 \cdot 3 \cdot 5}$$

$$\boxed{3} \sqrt[3]{5}$$

$$135$$

$$\begin{array}{l} \nearrow 3 \quad 27 \\ \nearrow 3 \quad 9 \\ \nearrow 3 \quad 3 \end{array}$$

4) $-2\sqrt{11} + 2\sqrt{44}$

$$-2\sqrt{11} + 2\sqrt{2 \cdot 2 \cdot 11}$$

$$-2\sqrt{11} + 2 \cdot 2\sqrt{11}$$

$$-2\sqrt{11} + 4\sqrt{11}$$

$$\boxed{2} \sqrt{11}$$

$$44$$

$$\begin{array}{l} \nearrow 4 \quad 11 \\ \nearrow 2 \quad 2 \end{array}$$

5) $5\sqrt{24} - \sqrt{150}$

$$5\sqrt{2 \cdot 2 \cdot 2 \cdot 3} - \sqrt{2 \cdot 3 \cdot 5 \cdot 5}$$

$$10\sqrt{6} - 5\sqrt{6}$$

$$\boxed{5} \sqrt{6}$$

$$24 \quad 150$$

$$\begin{array}{l} \nearrow 4 \quad 6 \\ \nearrow 2 \quad 2 \quad 3 \\ \nearrow 2 \quad 2 \quad 3 \end{array} \quad \begin{array}{l} \nearrow 15 \quad 10 \\ \nearrow 3 \quad 5 \quad 5 \end{array}$$

6) $\sqrt{12} + 2\sqrt{27}$

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

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

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

$$\boxed{8} \sqrt{3}$$

$$12 \quad 27$$

$$\begin{array}{l} \nearrow 2 \quad 6 \\ \nearrow 2 \quad 3 \end{array} \quad \begin{array}{l} \nearrow 3 \quad 9 \\ \nearrow 3 \quad 3 \end{array}$$

Skill #8 Add, subtract, and multiply two monomial radical expressions limited to a numerical radicand.
 Need more practice (IXL - EE.4, EE.5)