Academic/Career & Technical Related/Demonstration Lesson Plan

Instructor ___Sara Haldi_____   **Date** __Blizzard Bag 2_____

Program/Class _____Math 4_____   **Period** _____2, 3_____

State Indicator/Competency:

1. Use rational approximations of irrational numbers to compare the size of irrational numbers, locate them approximately on a number line diagram, and estimate the value of expressions (e.g., π2). *For example, by truncating the decimal expansion of √2, show that √2 is between 1and 2, then between 1.4 and 1.5, and explain how to continue on to get better approximations.*
2. Evaluate square roots of small perfect squares and cube roots of small perfect cubes. Know that the square root of 2 is irrational.

Instructional Objective(s):

1.3 Square Roots

1. Students will be able to estimate square roots with 80% accuracy.
2. Students will be able to simplify square roots with 75% accuracy.
3. Students will be able to use the Product Property of Square Roots and the Quotient Property of Square Roots to simplify square roots with 80% accuracy.
4. Students will be able to simplify square roots by rationalizing the denominator with 80% accuracy.

Materials: Blizzard bag 2, calculator

Method of Instruction: Independent

Activities:

COMPLETE BLIZZARD BAG ASSIGNMENT 2 DUE in TWO WEEKS

Radical Symbol – $\sqrt{}$

Radicand – *the number or expression under the radical symbol*

Principal Root –*the positive square root*

Index – *in the radical $\sqrt[n]{x}$, which represents the nth root of x, n is the index*

Perfect Squares:

$1^2 =$	1	$2^2 =$	4
$3^2 =$	9	$4^2 =$	16
$5^2 =$	25	$6^2 =$	36
$7^2 =$	49	$8^2 =$	64
$9^2 =$	81	$10^2 =$	100

$11^2 =$ 121	$12^2 =$ 144

Perfect Square Roots:

$\sqrt{1} =$ 1	$\sqrt{4} =$ 2
$\sqrt{9} =$ 3	$\sqrt{16} =$ 4
$\sqrt{25} =$ 5	$\sqrt{36} =$ 6
$\sqrt{49} =$ 7	$\sqrt{64} =$ 8
$\sqrt{81} =$ 9	$\sqrt{100} =$ 10
$\sqrt{121} =$ 11	$\sqrt{144} =$ 12

Estimating Square Roots

1. Estimate $\sqrt{34}$ to the nearest tenth.
   Answer: $\sqrt{25} = 5$ and $\sqrt{36} = 6$ so the answer would be 5.8 or 5.9

Simplifying Square Roots

2. Simplify each square root.
   a. $\sqrt{50}$ $\sqrt{25}\sqrt{2} = 5\sqrt{2}$
   b. $\sqrt{216}$ $\sqrt{36}\sqrt{6} = 6\sqrt{6}$
   c. $\sqrt{117}$ $\sqrt{9}\sqrt{13} = 3\sqrt{13}$
   d. $3\sqrt{152}$ $\sqrt{4}\sqrt{38} = 3 \cdot 2\sqrt{38}$ $3 = 6\sqrt{38}$
   e. $\sqrt{75}$ $\sqrt{25}\sqrt{3} = 5\sqrt{3}$
   f. $\sqrt{88}$ $\sqrt{4}\sqrt{22} = 2\sqrt{22}$
   g. $6\sqrt{212}$ $6\sqrt{4}\sqrt{53} = 6 \cdot 2\sqrt{53} = 12\sqrt{53}$
   h. $\sqrt{32}$ $\sqrt{16}\sqrt{2} = 4\sqrt{2}$

WORDS	NUMBERS	ALGEBRA
Product Property of Square Roots *The square root of a product is equal to the product of the square roots of the factors.*	$\sqrt{12} = \sqrt{4 \cdot 3} = 2\sqrt{3}$ $\sqrt{8} \cdot \sqrt{2} = \sqrt{16} = 4$	$\sqrt{ab} = \sqrt{a} \cdot \sqrt{b}$ $\sqrt{a} \cdot \sqrt{b} = \sqrt{ab}$
Quotient Property of Square Roots *The square root of a quotient is equal to the quotient of the square roots of the dividend and the divisor.*	$\sqrt{\frac{25}{16}} = \frac{\sqrt{25}}{\sqrt{16}} = \frac{5}{4}$ $\frac{\sqrt{18}}{\sqrt{2}} = \sqrt{\frac{18}{2}} = \sqrt{9} = 3$	$\sqrt{\frac{a}{b}} = \frac{\sqrt{a}}{\sqrt{b}}$ $\frac{\sqrt{a}}{\sqrt{b}} = \sqrt{\frac{a}{b}}$

Simplifying Square-Root Expressions

1. Simplify each expression

a. $-\sqrt{50} = -\sqrt{25} \cdot \sqrt{2} = -5\sqrt{2}$

b. $\sqrt{\frac{49}{81}} = \frac{\sqrt{49}}{\sqrt{81}} = \frac{7}{9}$

c. $\sqrt{2} \cdot \sqrt{18} = \sqrt{2 \cdot 18} = \sqrt{36} = 6$

d. $\frac{\sqrt{96}}{\sqrt{6}} = \sqrt{\frac{96}{6}} = \sqrt{16} = 4$

e. $\sqrt{48} = \sqrt{16} \cdot \sqrt{3} = 4\sqrt{3}$

f. $\sqrt{\frac{36}{16}} = \frac{\sqrt{36}}{\sqrt{16}} = \frac{6}{4} = \frac{3}{2}$

g. $\sqrt{5} \cdot \sqrt{20} = \sqrt{5 \cdot 20} = \sqrt{100} = 10$

h. $\frac{\sqrt{147}}{\sqrt{3}} = \sqrt{\frac{147}{3}} = \sqrt{49} = 7$

Rationalizing the Denominator – *A process of removing a radical from the denominator of a fraction.*

Multiply both the numerator and denominator by a number that produces a perfect square under the radical sign of the denominator.

2. Simplify by rationalizing each denominator

a. $\frac{2\sqrt{2}}{\sqrt{3}} = \frac{2\sqrt{2}}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{2\sqrt{6}}{\sqrt{9}} = \frac{2\sqrt{6}}{3}$

b. $\frac{\sqrt{8}}{\sqrt{18}} = \frac{\sqrt{4} \cdot \sqrt{2}}{\sqrt{9} \cdot \sqrt{2}} = \frac{2}{3}$

c. $\frac{3\sqrt{5}}{\sqrt{7}} = \frac{3\sqrt{5}}{\sqrt{7}} \cdot \frac{\sqrt{7}}{\sqrt{7}} = \frac{3\sqrt{35}}{\sqrt{49}} = \frac{3\sqrt{35}}{7}$

d. $\frac{5}{\sqrt{10}} = \frac{5}{\sqrt{10}} \cdot \frac{\sqrt{10}}{\sqrt{10}} = \frac{5\sqrt{10}}{\sqrt{100}} = \frac{5\sqrt{10}}{10} = \frac{\sqrt{10}}{2}$

Assessment: Blizzard Bag 2 WS (10 pts)

Simplify each expression.

1. $\sqrt{20}$

$\sqrt{4 \cdot 5}$

$\sqrt{4} \cdot \underline{\hspace{1.5cm}}$

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2. $\sqrt{63}$

$\sqrt{9 \cdot \underline{\hspace{1.5cm}}}$

$\sqrt{9} \cdot \underline{\hspace{1.5cm}}$

_____

3. $\sqrt{80}$

$\sqrt{16 \cdot \underline{\hspace{1.5cm}}}$

$\sqrt{16} \cdot \underline{\hspace{1.5cm}}$

_____

4. $\sqrt{3} \cdot \sqrt{12}$

$\sqrt{\underline{\hspace{2cm}} \cdot \underline{\hspace{2cm}}}$

_____

5. $\sqrt{\dfrac{64}{25}}$

$\dfrac{\sqrt{\underline{\hspace{1.5cm}}}}{\sqrt{\underline{\hspace{1.5cm}}}}$

_____

6. $\dfrac{\sqrt{200}}{\sqrt{8}}$

$\dfrac{\sqrt{\underline{\hspace{1.5cm}}}}{\sqrt{\underline{\hspace{1.5cm}}}}$

_____

7. $\sqrt{6} \cdot \sqrt{24}$

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8. $\dfrac{\sqrt{448}}{\sqrt{7}}$

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9. $\sqrt{\dfrac{49}{100}}$

_____

Simplify by rationalizing each denominator.

10. $\dfrac{4}{\sqrt{5}}$

$\dfrac{4}{\sqrt{5}} \cdot \dfrac{\sqrt{5}}{\sqrt{5}}$

_____

11. $\dfrac{1}{\sqrt{6}}$

$\dfrac{1}{\sqrt{6}} \cdot \underline{\hspace{2cm}}$

_____

12. $\dfrac{3\sqrt{2}}{\sqrt{8}}$

$\dfrac{3\sqrt{2}}{\sqrt{8}} \cdot \underline{\hspace{2cm}}$

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