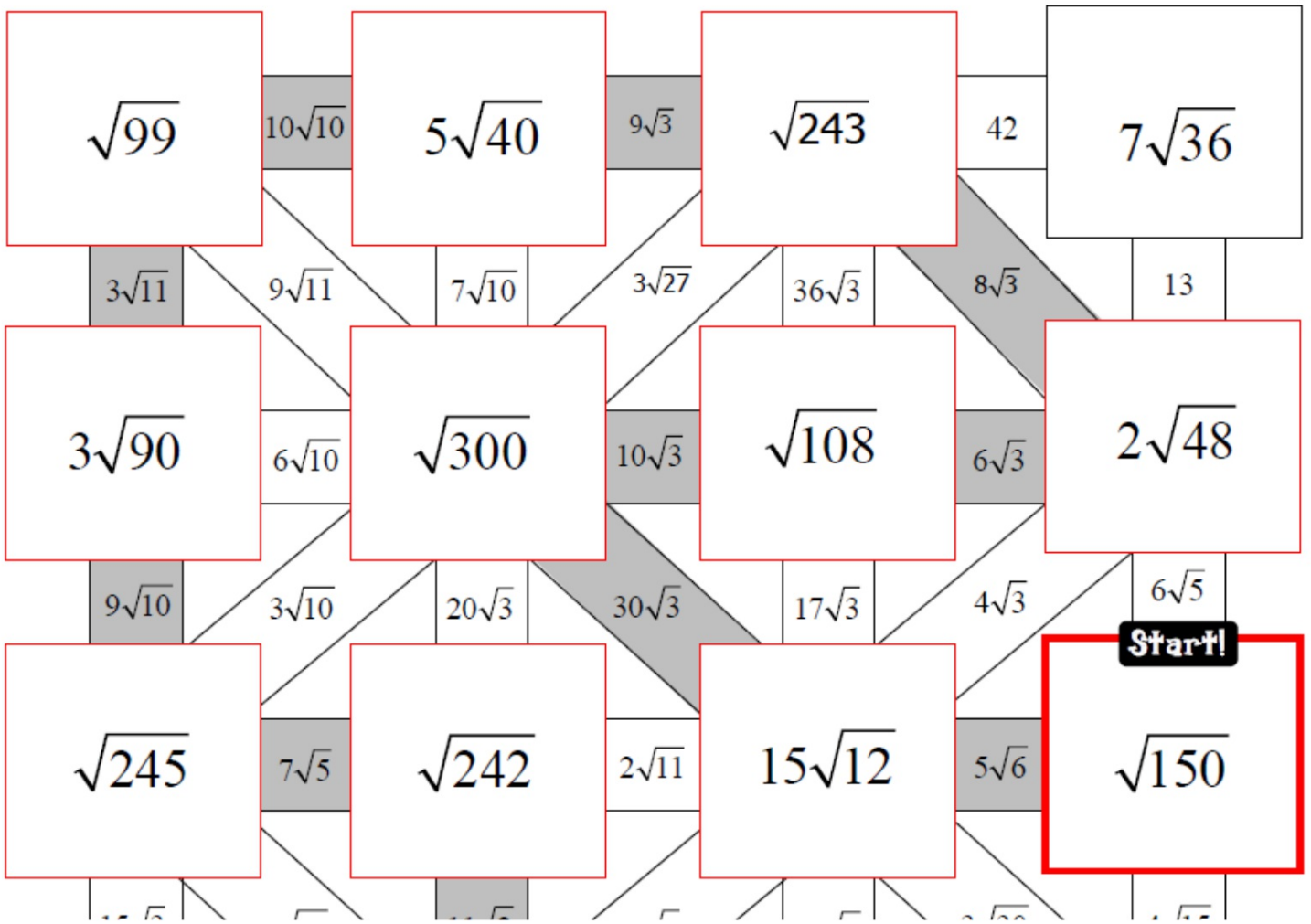


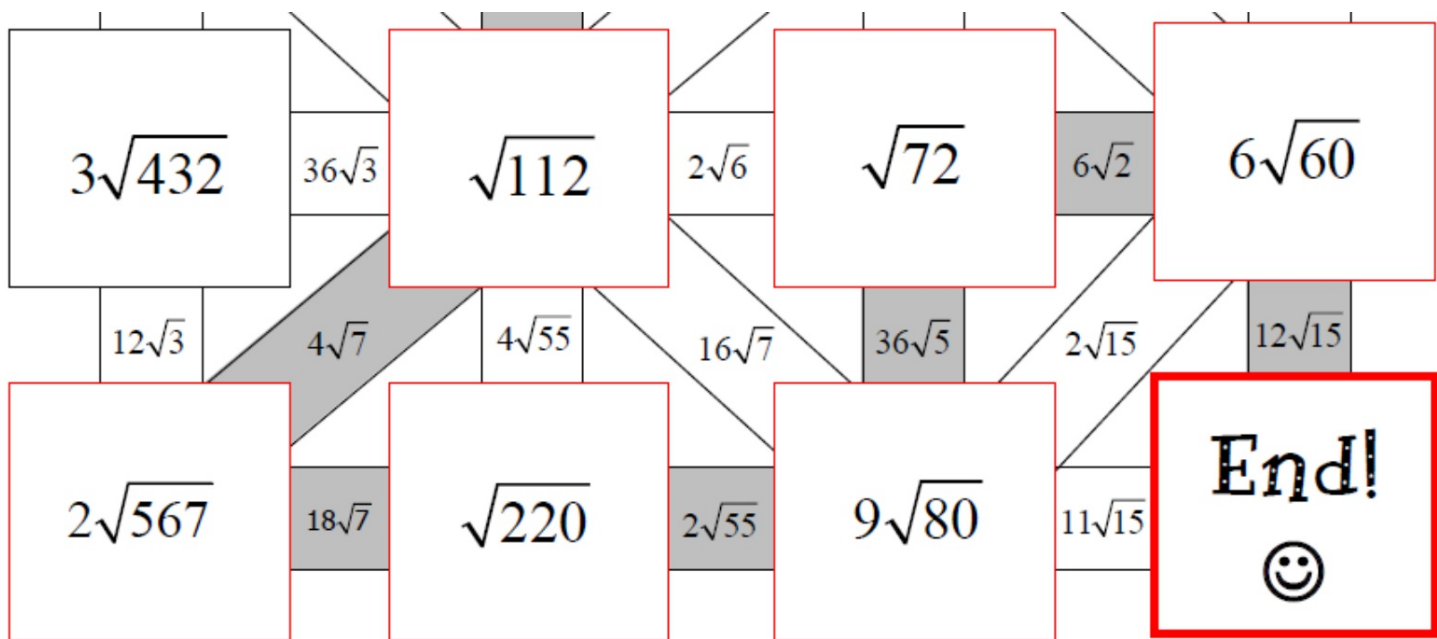
Bellwork: Algebra

1. Write down your homework for the night in your planner.
2. Take out your homework from last night and be ready to check.
3. You need your algebra nation book, your list of perfect squares, and a calculator. If you borrow one of mine, take the calculator with your seat number on it.
4. Answer the following question on your bellwork in the THURSDAY box:

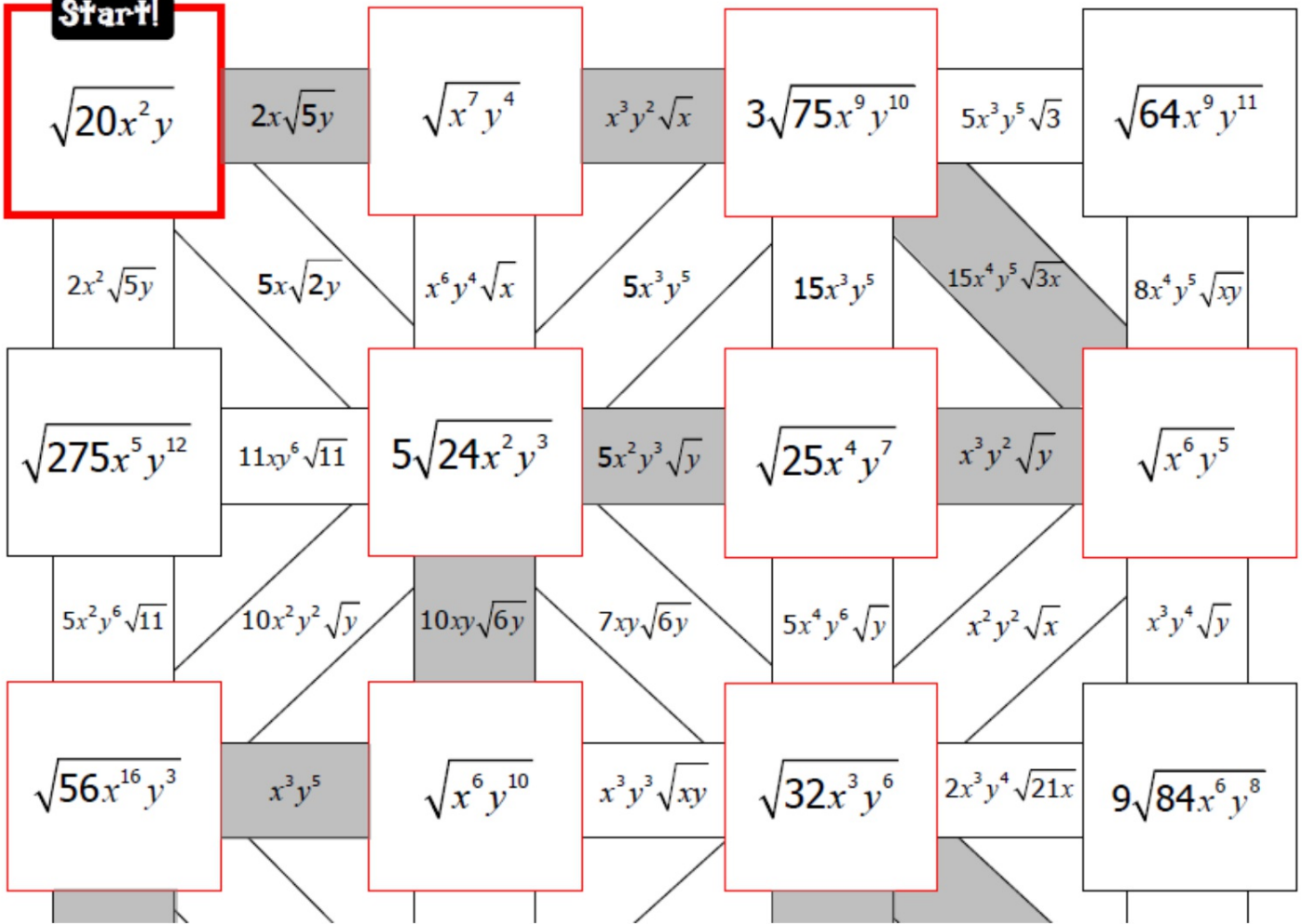
Simplify:

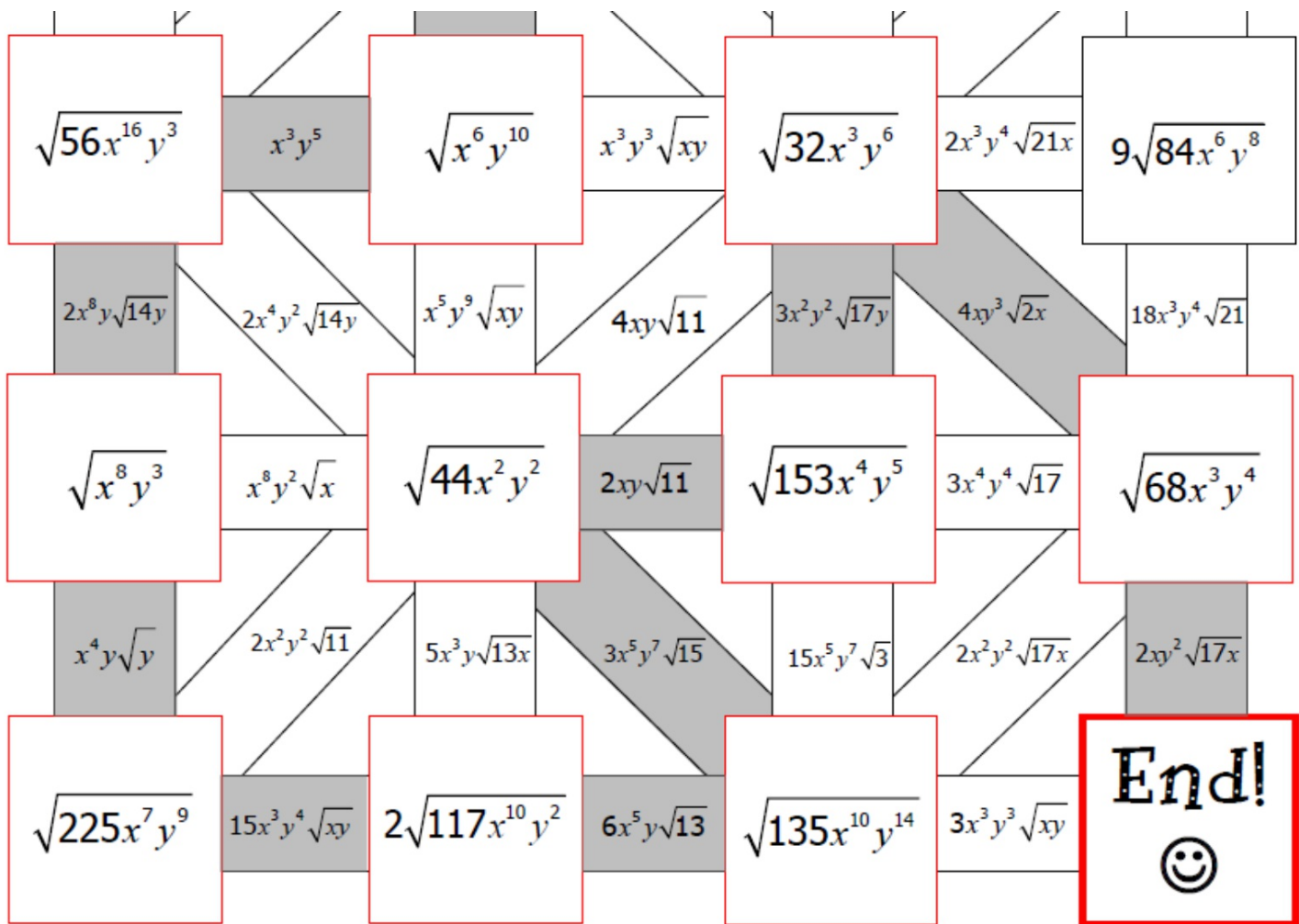
$$\begin{aligned} & 4\sqrt[4]{72xy^4z^9} \\ & \swarrow \quad \searrow \\ & \sqrt{36y^4z^8} \quad \sqrt{2xz} \\ & 6y^2z^4 \sqrt{2xz} \\ & 24y^2z^4 \sqrt{2xz} \end{aligned}$$





Start!

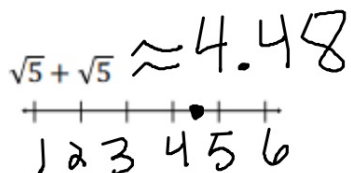
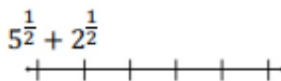
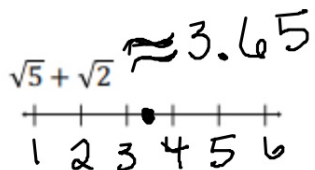




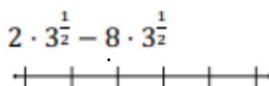
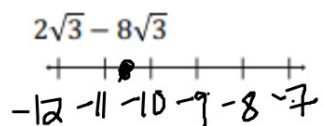
Section 1 – Topic 7

Adding Expressions with Radicals and Rational Exponents

Let's explore operations with radical expressions and expressions with rational exponents. For each expression, label approximately where the answer would be found on the number line.



$3.46 - 13.84 \approx -10.38$



$\sqrt{2} \approx 1.41$

$\sqrt{5} \approx 2.24$

$\sqrt{3} \approx 1.73$

Let's Practice!

1. Perform the following operations.

a. $\sqrt{12} + \sqrt{3}$

b. $12^{\frac{1}{2}} + 3^{\frac{1}{2}}$

$\sqrt{4} \sqrt{3}$

$2x + x = 3x$ $2\sqrt{3} + 1\sqrt{3} = 3\sqrt{3}$

c. $\sqrt{72} + \sqrt{15} + \sqrt{18}$

d. $72^{\frac{1}{2}} + 15^{\frac{1}{2}} + 18^{\frac{1}{2}}$

$\sqrt{36} \sqrt{2}$ $\sqrt{9} \sqrt{2}$

$\underline{6\sqrt{2}} + \sqrt{15} + \underline{3\sqrt{2}}$
 $9\sqrt{2} + \sqrt{15}$

$\underline{6x} + 15y + \underline{3x}$
 $9x + 15y$

e. $\sqrt{32} + \sqrt[3]{16}$

f. $32^{\frac{1}{2}} + 16^{\frac{1}{3}}$

$x + x^2$

Not like terms (roots)

Try It!

2. Perform the following operations.

a. $\sqrt{6} + 3\sqrt{6}$

$$4\sqrt{6}$$

b. $6^{\frac{1}{2}} + 3 \cdot 6^{\frac{1}{2}}$

c. $\sqrt{50} + \sqrt{18} + \sqrt{10}$

$$\sqrt{25} \sqrt{2} + \sqrt{9} \sqrt{2} + \sqrt{10}$$

$$5\sqrt{2} + 3\sqrt{2} + \sqrt{10}$$

$$\boxed{8\sqrt{2} + \sqrt{10}}$$

d. $50^{\frac{1}{2}} + 18^{\frac{1}{2}} + 10^{\frac{1}{2}}$

e. $\sqrt[3]{2} + \sqrt[3]{8} + \sqrt[3]{16}$

f. $2^{\frac{1}{3}} + 8^{\frac{1}{3}} + 16^{\frac{1}{3}}$

BEAT THE TEST!

1. Which of the following expressions are equivalent to $3\sqrt{2}$?
Select all that apply.

~~$3^{\frac{1}{2}} + 2^{\frac{1}{2}}$~~ = $\sqrt{3} + \sqrt{2}$ $\sqrt{18}$

$8^{\frac{1}{2}} + 2^{\frac{1}{2}}$ $\sqrt{8} + \sqrt{2}$ $\sqrt{9} \sqrt{2}$

$3 \cdot 2^{\frac{1}{2}}$ $3\sqrt{2}$ $3\sqrt{2}$

$\sqrt{18}$ $\sqrt{4} \sqrt{2}$

~~$2\sqrt{18}$~~

$\sqrt{8} + \sqrt{2}$ $2\sqrt{2} + \sqrt{2} = 3\sqrt{2}$

2. Miguel completed a proof to show that $\sqrt{27} + \sqrt{3} = 4 \cdot 3^{\frac{1}{2}}$:

$$\begin{aligned} & \sqrt{27} + \sqrt{3} \\ &= 27^{\frac{1}{2}} + 3^{\frac{1}{2}} \\ &= \underline{\hspace{2cm}} \\ &= 3 \cdot 3^{\frac{1}{2}} + 3^{\frac{1}{2}} \\ &= 4 \cdot 3^{\frac{1}{2}} \end{aligned}$$

Part A: Which expression can be placed in the blank to correctly complete Miguel's proof?

- (A) $3^{\frac{1}{2}}(9^{\frac{1}{2}} + 3^{\frac{1}{2}})$
- (B) $(9 \cdot 3)^{\frac{1}{2}} + 3^{\frac{1}{2}}$

Section 1 – Topic 8

More Operations with Radicals and Rational Exponents

Let's explore multiplying and dividing expressions with radicals and rational exponents.

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

$$10^{\frac{1}{2}} \cdot 2^{\frac{1}{2}}$$

$$\begin{array}{l} \sqrt{20} \quad 2\sqrt{5} \\ \swarrow \quad \searrow \\ \sqrt{4} \quad \sqrt{5} \end{array}$$

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

$$\rightarrow 2^{\frac{1}{2}} \cdot 2^{\frac{1}{3}}$$

$$(\sqrt[6]{2})^5 = 2^{\frac{5}{6}}$$

$$\frac{1}{2} + \frac{1}{3} =$$

$$\frac{3}{6} + \frac{2}{6} = \frac{5}{6}$$

$$\frac{\sqrt{10}}{\sqrt{2}}$$

$$\frac{10^{\frac{1}{2}}}{2^{\frac{1}{2}}}$$

$$\sqrt{5}$$

Let's Practice!

1. Use the properties of exponents to perform the following operations.

a. $(x^{\frac{1}{3}})^{\frac{1}{2}}$ $\frac{1}{3} \cdot \frac{1}{2} = X^{\frac{1}{6}} = \sqrt[6]{X}$

b. $(\sqrt{7})^3 = 7^{\frac{3}{2}}$

c. $(a^{\frac{1}{2}}b^{\frac{2}{5}}) \cdot (a^{\frac{2}{3}}b^{\frac{1}{2}})$

$a^{\frac{1}{2} + \frac{2}{3}}$ $b^{\frac{2}{5} + \frac{1}{2}}$

$a^{\frac{7}{6}}$ $b^{\frac{9}{10}}$

d. $\frac{\sqrt[4]{8}}{\sqrt{8}}$

$$8^{-\frac{1}{4}} = \frac{1}{8^{\frac{1}{4}}} = \frac{8^{\frac{1}{4}}}{8^{\frac{1}{2}}}$$

$$\frac{1}{4} - \frac{1}{2} = \frac{1}{4} - \frac{2}{4} = -\frac{1}{4}$$

Try III!

2. Use the properties of exponents to perform the following operations.

a. ~~$(n^0 n^2)^{\frac{1}{5}}$~~

$$n^{\frac{2}{5}}$$

$$\frac{2 \cdot 1}{1 \cdot 5} = \frac{2}{5}$$

c. $\sqrt[4]{4} \cdot \sqrt[3]{4}$

b. $(\sqrt{8} \cdot \sqrt[3]{3})^{\frac{2}{3}}$

d. $(3 \cdot \sqrt[6]{27})^{\frac{1}{2}}$

BEAT THE TEST!

1. Which of the following expressions are equivalent to $2^{\frac{1}{2}}$?
Select all that apply.

- $\sqrt[3]{4}$
- $\sqrt[3]{8}$
- $\sqrt[4]{4}$
- $\sqrt[6]{8}$
- $\sqrt[6]{16}$