Do Now: what is the square root of 9?

Square root of 16?

Square root of 36?

Rational and Irrational Numbers:

Rational numbers terminate, can be written as a fraction $\frac{a}{b}$ $b \neq 0$

Ex: $3, 1.75, \frac{1}{5}$

Irrational numbers do not terminate

Ex: $\pi, 0.\overline{3}, \sqrt{6}$

R or I?

Ex:

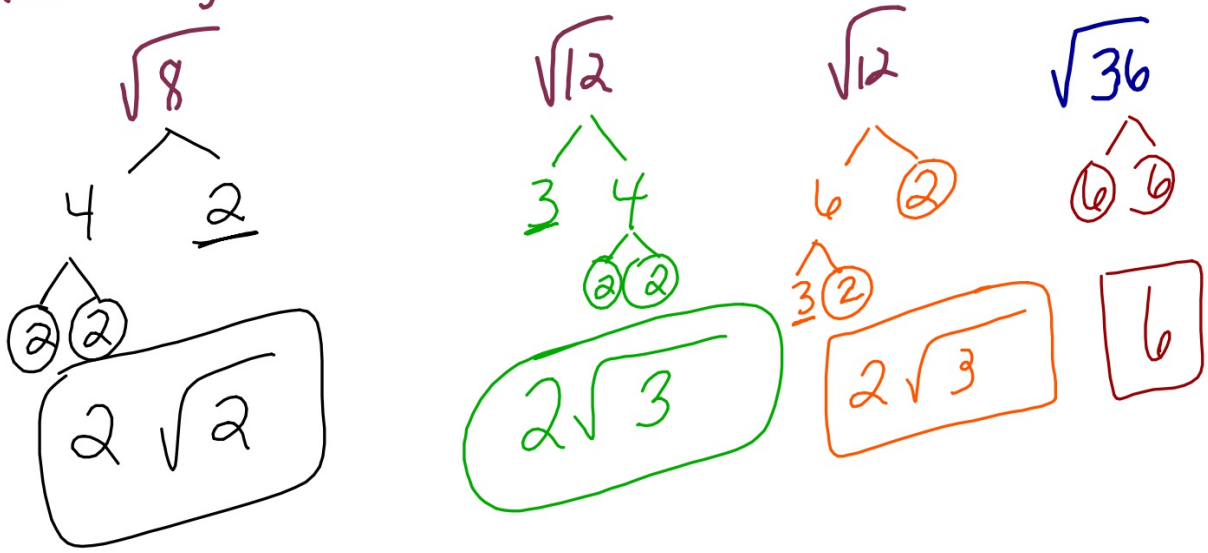
1. 9.05 R
2. $0.\overline{3}$ I
3. π ~~I~~
4. 1/5 R
5. $14.35\overline{17}$ I
6. 21.4375 R
7. 84/2 R
8. 1/9 R
9. $\sqrt{64}$ R
10. $\sqrt{8}$ I

Radical number under square root symbol $\sqrt{\ }$

2 ways to simplify radicals:

1. Factoring: exact answer (irrational #s)
2. Area model: approximate answers (rational #s)

Factoring Radicals:



Perfect Squares

$1^2 = 1$

$2^2 = 4$

$3^2 = 9$

$4^2 = 16$

$5^2 = 25$

$6^2 = 36$

$7^2 = 49$

$8^2 = 64$

$9^2 = 81$

$10^2 = 100$

$11^2 = 121$

$12^2 = 144$

Factoring:

$\sqrt{54}$

27 2

9 3

3 3

$3\sqrt{6}$

$\sqrt{54}$

6 9

3 2 3 3

$3\sqrt{6}$

$\sqrt{54}$

18 3

6 3

3 3

$3\sqrt{6}$

HW:

Factor to give exact answer:

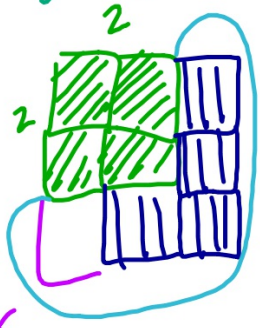
① $\sqrt{27}$

② $\sqrt{32}$

③ $\sqrt{192}$

Simplifying by Area Models:

$\sqrt{8}$

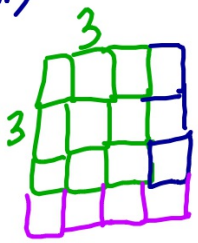


← add 4 (numerator) tiles to make the # in the radical

added to make a perfect square →

$2\ \frac{4}{5}$

$\sqrt{12}$



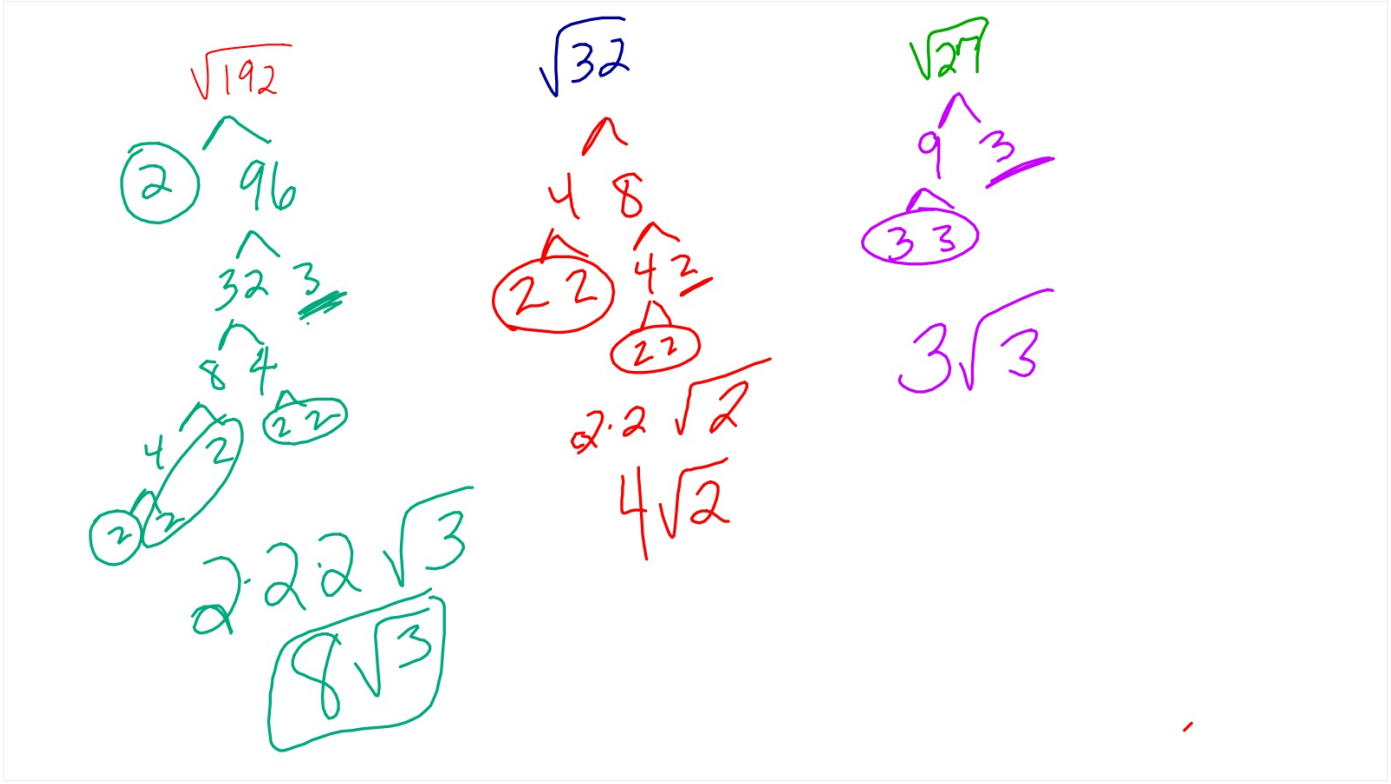
$3\ \frac{3}{7}$

8/12 Do Now:

Factor to find the exact answer:

① $\sqrt{56}$

② $\sqrt{28}$


√192
2 96
32 3
8 4
2 2
4 2
2 2
2·2·2√3
8√3
√32
4 8
2 2
4 2
2 2
2·2√2
4√2
√27
9 3
3 3
3√3

Adding and Subtracting Radicals:

- you must have common radicals to get an exact answer

Ex: $2\sqrt{5} + 3\sqrt{5}$; $11\sqrt{6} - 2\sqrt{6}$; $\sqrt{13} + 7\sqrt{13}$

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

$5\sqrt{5}$

$11\sqrt{6} - 2\sqrt{6}$

$9\sqrt{6}$

$\sqrt{13} + 7\sqrt{13}$

$8\sqrt{13}$

- What happens when the radicals are not common?
  1. Simplify radicals to make them common.
  2. If your radicals can't be made common, leave it!

Ex: $3\sqrt{8} + 12\sqrt{2}$

$8 = 4 \cdot 2$

$4 = 2 \cdot 2$

$3 \cdot 2\sqrt{2}$

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

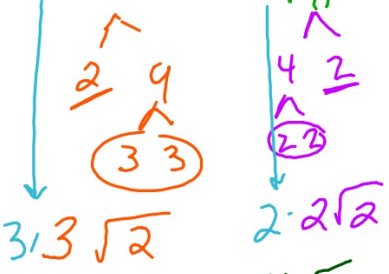
$18\sqrt{2}$

Ex: $2\sqrt{15} + 3\sqrt{5}$

$15 = 3 \cdot 5$

$2\sqrt{15} + 3\sqrt{5}$

① $3\sqrt{18} - 2\sqrt{8}$



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

$9\sqrt{2} - 4\sqrt{2}$

$5\sqrt{2}$

② $\sqrt{5} + 5$

$\sqrt{5} + 5$

③ $4\sqrt{24} + 8\sqrt{6}$

$4 \quad 6$

$2 \cdot 2 \quad 3 \cdot 2$

$4 \cdot 2\sqrt{6}$

$8\sqrt{6} + 8\sqrt{6}$

$16\sqrt{6}$

④ $\sqrt{52} + \sqrt{144}$

$26 \quad 2$

$13 \quad 2$

12

$2\sqrt{13} + 12$

Steps to Multiplying Radicals:

① Multiply the #s on the outside of the radical together.

② Multiply the # on the inside of the radical together.

③ Simplify.

$4\sqrt{3}$

Ex: $(\sqrt{6})(\sqrt{8})$

$\sqrt{48}$

6 8

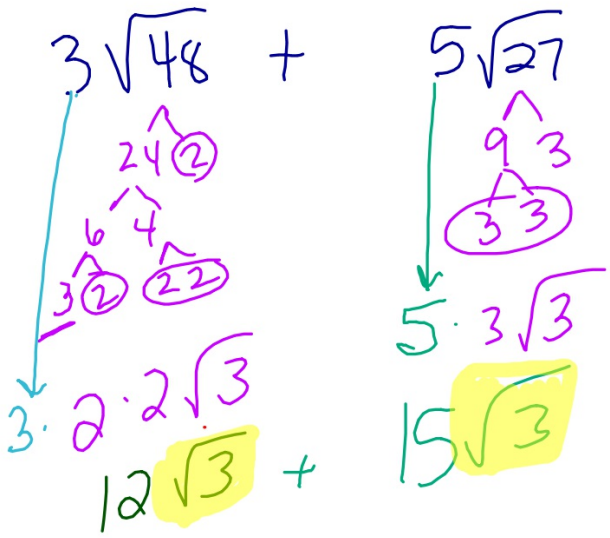
3 ② 4 ②

2 2

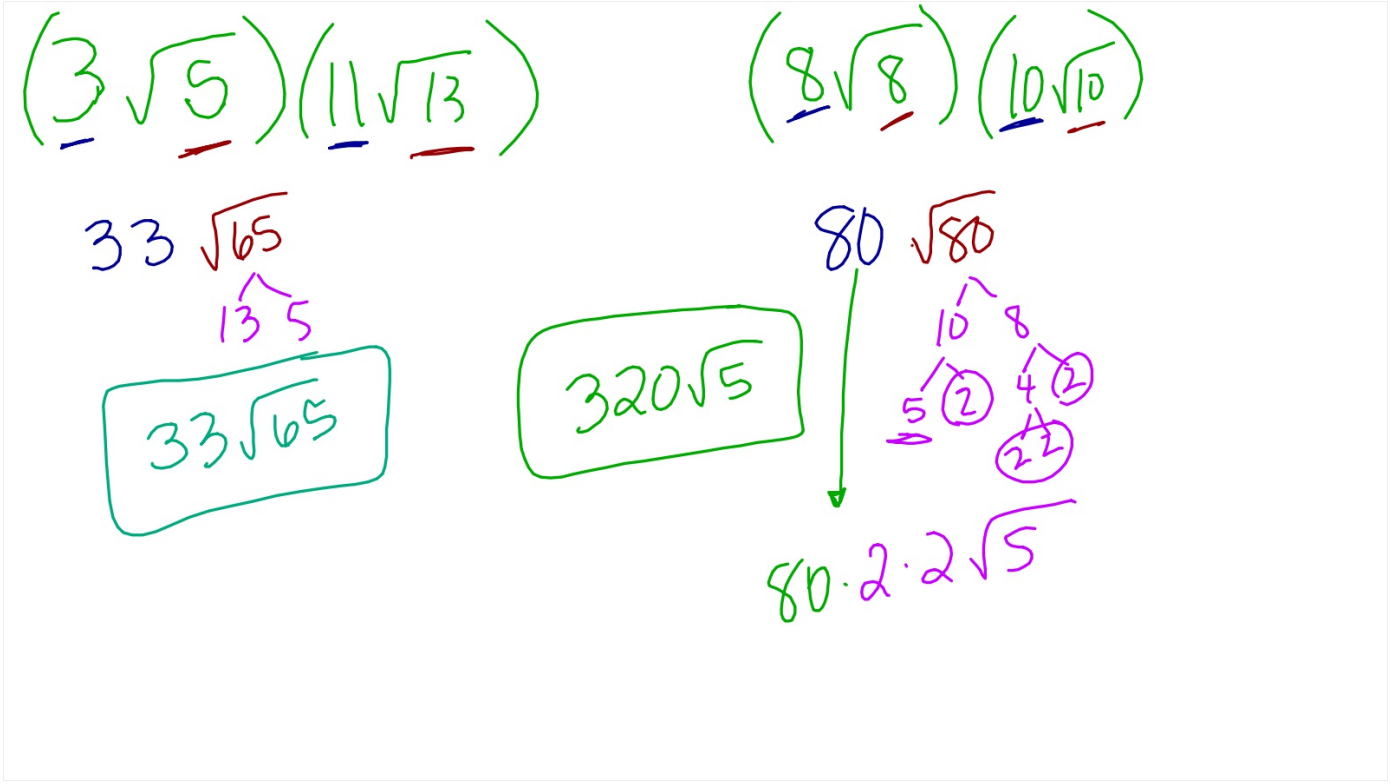
$2 \cdot 2\sqrt{3}$

Do Now:

$3\sqrt{48} + 5\sqrt{27}$

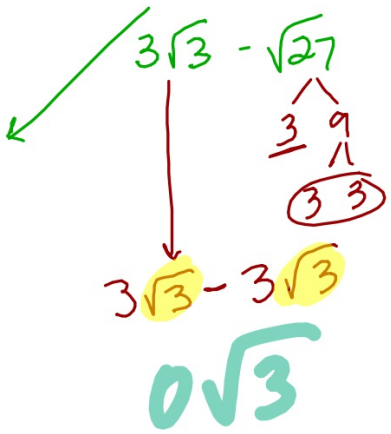


$27\sqrt{3}$


(3√5)(11√13)
33√65
13 5
33√65
(8√8)(10√10)
80√80
10 8
5 2 4 2 2 2
80·2·2√5
320√5

Addition / Subtraction

1. $-\sqrt{6}$
2. $\sqrt{7}$
3. $-22\sqrt{21}$
4. $\sqrt{15}$
5. $2\sqrt{7}$
6. $-7\sqrt{17}$
7. $-21\sqrt{11}$
8. $7\sqrt{3}$
9. $-2\sqrt{6}$
10. $11\sqrt{6}$
11. $\sqrt{3}$
12. 0



① $3\sqrt{6} - 4\sqrt{6}$

$-1\sqrt{6}$

$-\sqrt{6}$