To Do...

1. Get out your books, calculator, homework

2. Try the problem below



By moving ONE glass, line them up so that full and empty ones alternate.

DO NOT SHARE YOUR ANSWERS!!!

## Check Your Understanding

1. Use mental math to calculate each root.

   a) $\sqrt{36}$  b) $\sqrt{144}$  c) $\sqrt[3]{27}$  d) $\sqrt[3]{-64}$

2. Use mental math to calculate each root.

   a) $\sqrt{3 \cdot 3 \cdot 3 \cdot 3}$  b) $\sqrt{2^{12}}$  c) $\sqrt[3]{5 \cdot 5 \cdot 5 \cdot 5 \cdot 5 \cdot 5}$  d) $\sqrt[3]{9^6}$

3. a) A square has an area of 196 cm². Calculate its side length.

   b) A cube has a volume of 216 cm³. Calculate its edge length.

   $\boxed{196\,cm^2}$   $A = s^2$
   $S = \sqrt{A}$  $S = 14 cm$

4. Use a calculator to calculate each square root.
   Write the answer to 2 decimal places where necessary.
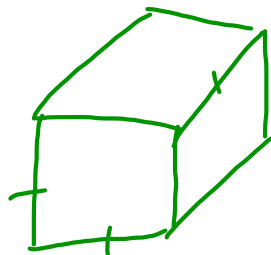
   a) $\sqrt{289}$  b) $\sqrt{3.24}$  c) $\sqrt{1000}$  d) $\sqrt{\dfrac{3}{5}}$

   17            1.8          31.62

   $V = s^3$

   $\sqrt[3]{V} = s$

   $\sqrt[3]{216} = 6 cm$

   $\sqrt{\dfrac{3}{5}}$

   $\sqrt{(3 \div 5)}$
   0.77

   $\sqrt{3 \text{ and } 5}$

   $\sqrt{25}$

   $\dfrac{\sqrt{3}}{\sqrt{5}}$

   $\sqrt{\dfrac{25}{64}} = \dfrac{5}{8}$

# Check Your Understanding
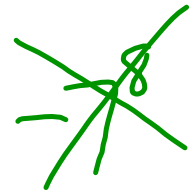
1. Write each expression as a power.
   a) $3 \cdot 3 \cdot 3 \cdot 3 \cdot 3 \cdot 3$ $= 3^6$
   b) $(-7)(-7)(-7)(-7)(-7)(-7)(-7)(-7)$ $(-7)^8$
   c) $10 \cdot 10 \cdot 10 \cdot 10$
   d) $(-5)(-5)(-5)$

2. Write each power as repeated multiplication.
   a) $7^6$      b) $(-17)^5$
   c) $100^3$      d) $(-99)^4$

   $7 \cdot 7 \cdot 7 \cdot 7 \cdot 7 \cdot 7$

   $(-17)(-17)(-17)(-17)(-17)$

3. Use mental math to calculate each power.
   a) $3^3$   $27$      b) $2^4$   $16$
   c) $(-5)^2$      d) $(-4)^3$

4. Use a calculator to calculate each power.
   a) $13^5$   $371293$      b) $72^4$   $26873856$
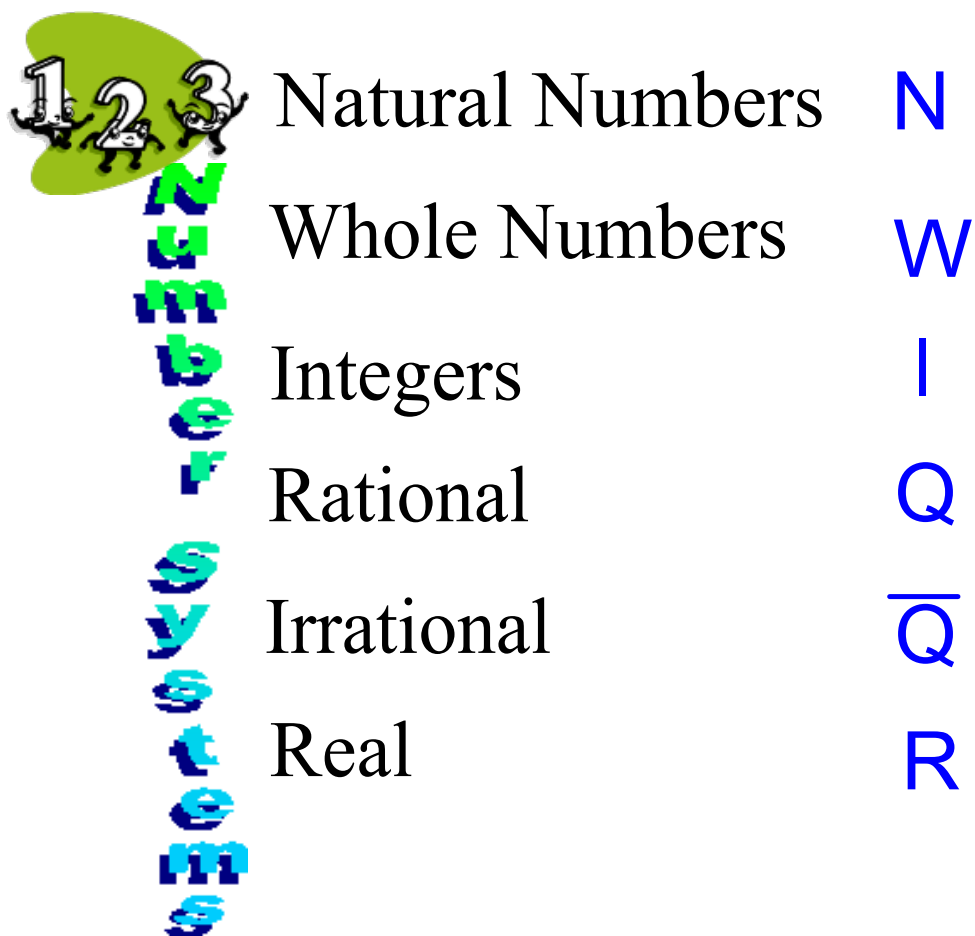   c) $(-24)^4$      d) $(-8)^9$

5. A shelf contains 8 boxes. Each box contains 8 cartons. Each carton contains 8 pens. Write the number of pens as a power. How many pens are on the shelf?

   $8 \cdot 8 = 64 \text{ cartons}$

   $8 \cdot 8 \cdot 8 = 8^3$

3

| | |
|---|---|
| Natural Numbers | N |
| Whole Numbers | W |
| Integers | I |
| Rational | Q |
| Irrational | $\overline{Q}$ |
| Real | R |

**Natural Numbers** :  Counting #s  Ex. 1, 2, 3 etc

Ex. 1, 2, 3, 4...

**Whole Numbers**: Counting numbers including zero.
Ex. 0, 1, 2, 3, etc

Ex. 0, 1, 2, 3....

**Integers:**  Are all positive and negative whole numbers.
(Remember zero is neither negative or positive)
Ex: ....3,2,1,0,-1-2,-3...

Ex.... -3, -2, -1, 0, 1, 2, 3...

$3\frac{1}{2}$

**Rational Numbers:** All whole numbers, fractions, mixed
numbers, decimals and their negatives
The decimal must repeat or terminate also.
Ex: 1/3,  4,  3/4

0.313131...

$0.\overline{719}$

0.25

$0.\overline{5}$

**Irrational Numbers:** Decimals that never terminate or repeat.
Ex:  √2

7.1476193......

$\sqrt{2}$    $\sqrt{58}$    $\pi$

**Real Numbers:**  All rational and irrational numbers are real
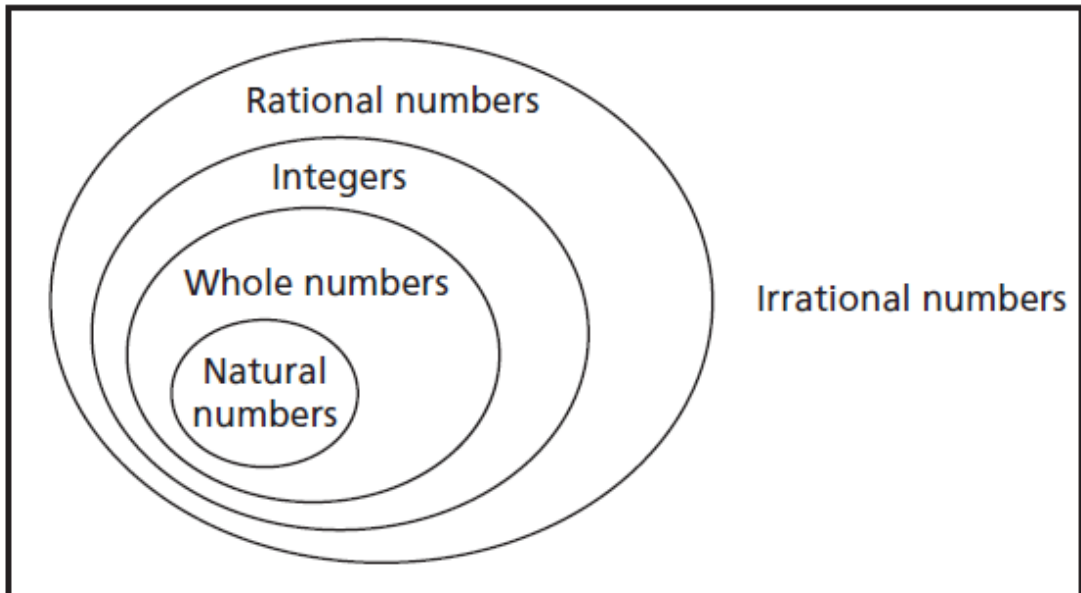numbers
Ex: All possible numbers

TITLE: Real #s

R

Q

I
include (−)

W
include 0

N
Counting

fractions
decimal that
stop or repeat

$\overline{Q}$  $\sqrt{2}$  $3\sqrt{25}$
$\pi$

non-terminating
non-repeating
decimals.
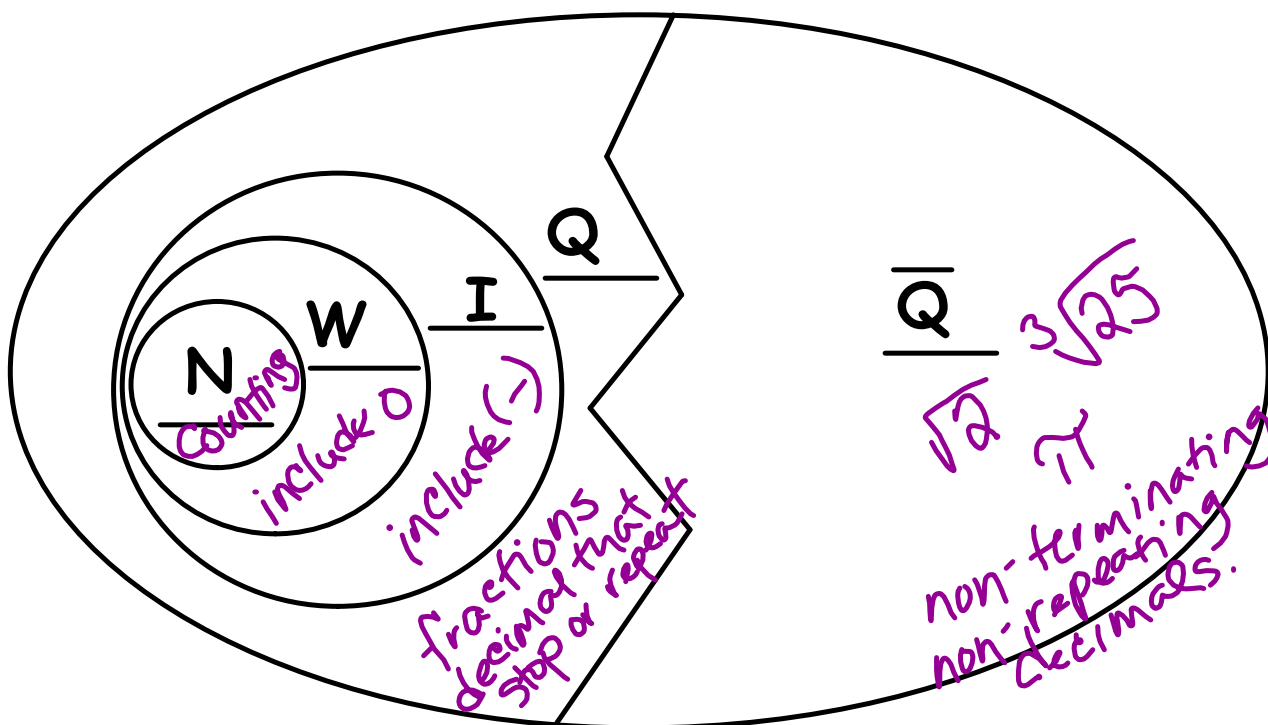
Real Numbers

$\sqrt{9}$

| These are rational numbers. | These are not rational numbers. |
|---|---|
| $\sqrt{100}$  $\sqrt{0.25}$  $\sqrt[3]{8}$   0.5 | $\sqrt{0.24}$      $\sqrt[3]{9}$       $\sqrt{2}$ |
| 10          0.5      2 | |
| $\dfrac{5}{6}$   $\sqrt{\dfrac{9}{64}}$   $0.8^2$   $\sqrt[5]{-32}$ | $\sqrt{\dfrac{1}{3}}$     $\sqrt[4]{12}$ |
| 0.64          $-2$ | |

$$\frac{\sqrt{9}}{\sqrt{64}} = \frac{3}{8}$$

$$2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 = 32$$

## WHICH OF THE FOLLOWING RADICALS ARE:
### RATIONAL?         IRRATIONAL?

$$\overset{Q}{\sqrt{1.44}}, \quad \overset{\frac{8}{9} \quad Q}{\sqrt{\frac{64}{81}}}, \quad \sqrt[3]{\overset{-3 \quad Q}{-27}}, \quad \overset{\overline{Q}}{\sqrt{\frac{4}{5}}}, \quad \overset{\overline{Q}}{\sqrt{5}}$$

$\underline{\quad Q \quad}$ rational

$\underline{\quad \overline{Q} \quad}$ irrational

**Exercise**

Complete the table

1 4 9 16...

| | N | W | I | Q | $\overline{Q}$ | R |
|---|---|---|---|---|---|---|
| 5 | ✓ | ✓ | ✓ | ✓ | | ✓ |
| -2 | | | ✓ | ✓ | | ✓ |
| $\frac{3}{4}$ | | | | ✓ | | ✓ |
| -1.3 | | | | ✓ | | ✓ |
| $\sqrt{7}$ | | | | | ✓ | ✓ |
| $\sqrt{95}$ | | | | | ✓ | ✓ |
| $\sqrt{25}$ (5) | ✓ | ✓ | ✓ | ✓ | | ✓ |