S-A2 Algebra 2 Session 2 6/5

Find the opposite reciprocal.

a) 8 opp → -8 rec → $\boxed{-\frac{1}{8}}$

b) $-\frac{4}{3}$ opp → $\frac{4}{3}$ rec → $\boxed{\frac{3}{4}}$

Rational

number that can be put into a fraction

Irrational

number that cannot be put into a fraction.

Rational Numbers

Counting Numbers - 1, 2, 3, 4, 5, ...

whole Numbers - 0, 1, 2, 3, 4, 5, ...

Integer - All whole numbers and their opposites

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

$0.45\square$ terminal decimal $\quad \frac{45}{100} \overset{\div 5}{=} \frac{9}{20}$ Rational

$0.\overline{4444}... = \frac{4}{9}$ single repeating – Rational decimal

$0.3333... = \frac{3}{9} \overset{\div 3}{=} \frac{1}{3}$

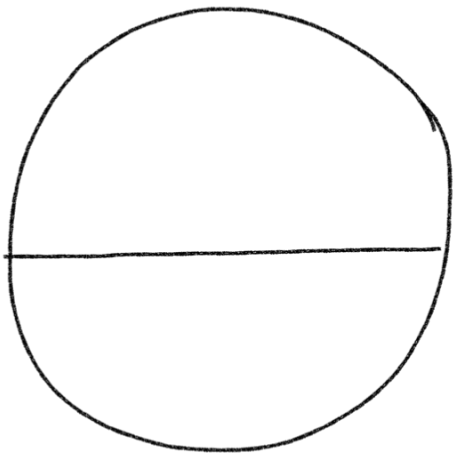
$0.\overline{234}\underline{234}\overline{234}...$ $\quad \frac{234}{999}$ group repeating – Rational decimal

$0.12444... = 0.12\overline{4}$ repeating decimal – Rational

$0.123456....$ irrational – no repeat.

π – pi irrational number

$3.141592....$



π represents the number of times the diameter can be wrapped around a circle.

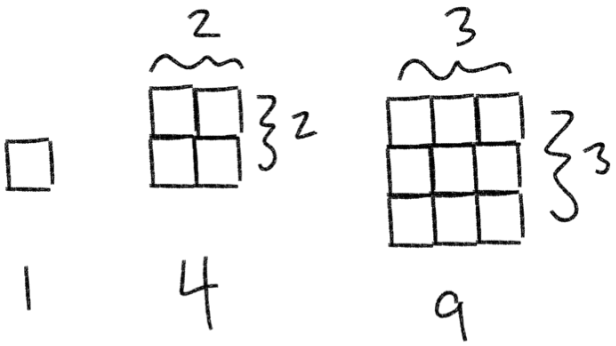
$C = \pi d \quad \pi = \frac{C}{d} \rightarrow$ irrational...?

Rational Numbers

Perfect Square $\sqrt{36} = \pm 6$

$6 * 6 = 36$

$-6 * -6 = 36$



$\sqrt{4} = 2$ $\sqrt{9} = 3$

Consecutive odd numbers

Perfect Squares

$\sqrt{0} = 0$

1 → $\sqrt{1} = \pm 1$

3 → $\sqrt{4} = \pm 2$

5 → $\sqrt{9} = \pm 3$

7 → $\sqrt{16} = \pm 4$

9 → $\sqrt{25} = \pm 5$

11 → $\sqrt{36} = \pm 6$

13 → $\sqrt{49} = \pm 7$

15 → $\sqrt{64} = \pm 8$

$\sqrt{40}$ not a perfect square

irrational

1.) 4 Rational

Counting, whole, integer

2.) -7 Rational

integer

3.) 0.8888... Rational

repeating

4.) 0.143143... Rational

terminal

5.) 0.347348... irrational

6.) 0.428428... Rational

repeating

7.) $\sqrt{81}$ Rational

perfect square

8.) $\sqrt{200}$ irrational

Commutative Property

$8+3 = 3+8$

$11 = 11$

$8*3 = 3*8$

$24 = 24$

Add/Mult order does not matter

Associative Property

$(3+4)+5 = 3+(4+5)$

$7+5 = 3+9$

$12 = 12$

$(3*4)*5 = 3*(4*5)$

$12*5 \quad 3*20$

$60 = 60$

You can shift parentheses when you are all adding or multiplying.

Identity Property

Add: $3+0=3$

$a+0=a$

Mult: $3*1=3$

$a*1=a$

Inverse Property

Add: $4+(-4)=0$

$a+(-a)=0$

Add opposites = 0

Mult: $4*\left(\frac{1}{4}\right)=1$

$a*\frac{1}{a}=1 \quad a\neq 0$

Mult by inverses = 1

$$x + 4 = 5$$
$$-4 \quad -4$$

$$x + 4 + (-4) = 5 + (-4)$$

inverse property

$$x + 0 = 1$$

identity property

$$x = 1$$

Distributive Property

$$4(5+3) = 4(5) + 4(3)$$

$$4(8) = 20 + 12$$

$$32 = 32$$

Needham Slap!

$$3(a+b)$$

$$3a + 3b$$

1.) $9 = b + 0$ identity

2.) $5(a - bc) = 5a - 5bc$ distributive

3.) $c + (-c) = 0$ inverse

4.) $a + (b+c) = (a+b) + c$ associative

5.) $abc = cab$ commutative

$a*b*c = c*a*b$

Algebraic Expressions → No equal sign!

$(4x+1) + 2x$ $x = 3$ Substitute

$(4(3)+1) + 2(3)$ Input → 3

$(12+1) + 2(3)$ Output → 19

$13 + 6 = \boxed{19}$

$6p^2 - (3p^2 + 2q^2)$ $p = 1$ $q = 5$

↓

Follow PEMDAS!

$6(1)^2 - (3(1)^2 + 2(5)^2)$

$6(1) - (3(1) + 2(25))$

output → -47

$6 - (3 + 50)$

$6 - 53 = -47$

$2(m - n^2) - 6(n^2 + 3m)$ "simplify"

$2m - 2n^2 \quad - 6n^2 - 18m$

combine like terms

$2m - 18m \qquad -2n^2 - 6n^2$

$-16m \quad - 8n^2$