

September 15, 2015

\* Quiz #3 - Wed  
 1.1 — 1.7  
 \* 1.4 — 1.7

\* Exam #1 → (a) 9/23 (Wed)  
 or  
 (b) 9/28 (Monday)  
 Chp #1, 2, 3

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2.1 & 2.2

Absolute Value

\* Key: Distance from zero and distance is always positive.

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Addition w/ opposite "Signs"

$-9 + 4$

①  $|-9| = 9$   
 ②  $|4| = 4$  } abs → magnitude

③  $4 < 9$  true

④ Subtract the smaller magnitude value from the larger and attach the "sign" that was attached to larger magnitude.  
 $9 - 4 = 5$

⑤ Put  $9 = |-9|$   
 $-5$

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$24 - 56 = 24 + (-56)$   
 \* Don't write  $24 + -56$

①  $|24| = 24$   
 \* ②  $|-56| = 56$   
 ③  $24 < 56$   
 ④  $56 - 24 = 32$   
 ⑤  $-32$

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$6 + (-2) - (-8) - 10$   
 $6 + (-2) (-1)(-8) - 10$   
 $6 + (-2) + 8 - 10$   
 $6 + (-2) + 8 + (-10)$   
 $4 + 8 + (-10)$   
 $12 + (-10)$   
 $2$

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$[-7 + 8] + (-9) + 12$   
 $1 + (-9) + 12$   
 $-8 + 12$   
 $4$

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# Multiplication (Division) of Integers

① Same "signs" → positive result

$$+5 \cdot +3 = +15$$

$$(-5) \cdot (-3) = +15$$

$$3 \cdot 3 = 9 \downarrow -3$$

$$3 \cdot 2 = 6 \downarrow -3$$

$$3 \cdot 1 = 3 \downarrow -3$$

$$3 \cdot 0 = 0 \downarrow -3$$

$$3 \cdot (-1) = -3 \downarrow -3$$

$$3 \cdot (-2) = -6$$

$$3 \cdot (-3) = -9$$

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$$-3 \cdot 3 = -9 \downarrow +3$$

$$-3 \cdot 2 = -6 \downarrow +3$$

$$-3 \cdot 1 = -3 \downarrow +3$$

$$-3 \cdot 0 = 0 \downarrow +3$$

$$-3 \cdot (-1) = 3 \downarrow +3$$

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Proof: neg times a neg is a positive.

Let  $x$  be a real number

①  $x = a \cdot b + (-a)(b) + (-a)(-b)$

$$= ab + -a(b+(-b))$$

$$= ab + -a(0)$$

$$= ab + 0$$

$$x = ab$$

②  $x = a \cdot b + (-a)(b) + (-a)(-b)$

$$= b(a+(-a)) + (-a)(-b)$$

$$= b(0) + (-a)(-b)$$

$$= 0 + (-a)(-b)$$

$$x = (-a)(-b)$$

①  $x = ab$

②  $x = (-a)(-b)$

$x = x$  true

$ab = (-a)(-b)$

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② opposite "signs" → negative result

$$5 \cdot (-3) = -15$$

$$-4 \cdot 6 = -24$$

$$\frac{-28}{7} = -4$$

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2.5  
#79)

$$|9(-3)| + 12(-2)$$

$$|-27| + 12(-2)$$

$$27 + (-24)$$

$$27 - 24$$

$$3$$

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2.5  
#86)

$$\frac{10^2 + 4^2}{1 - 6 \cdot 5}$$

$$\frac{100 + 16}{1 - 30}$$

$$\frac{116}{-29} = \frac{4}{-1} = -4$$

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### Fractions

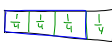
#### Fundamental Principle of Fractions

$$\frac{a}{b} \cdot \frac{c}{c} = \frac{ac}{bc}$$

"one"

$$= \frac{a}{b} \cdot 1 = \frac{a}{b}$$

②  $\frac{3}{4}$  of some whole  $\frac{4}{4}$



$$\frac{3}{4} \cdot \frac{7}{7} = \frac{21}{28}$$

"one"

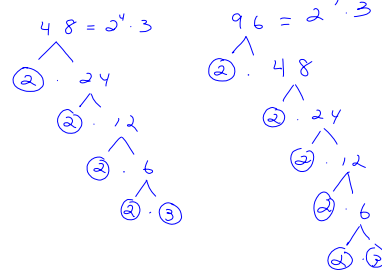
*Equivalent Fractions*

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*Equivalent*

$$\frac{48}{96} = \frac{2 \cdot 2 \cdot 2 \cdot 2 \cdot 3}{2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 3} = \frac{1 \cdot 1 \cdot 1 \cdot 1 \cdot 3}{1 \cdot 1 \cdot 1 \cdot 1 \cdot 2 \cdot 1} = \frac{1}{2}$$

$48 = 2^4 \cdot 3$   
 $96 = 2^5 \cdot 3$



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### Operations on Fractions

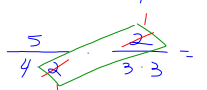
#### ① Multiplication

$$\frac{a}{b} \cdot \frac{c}{d} = \frac{ac}{bd}$$

②  $\frac{5}{7} \cdot \frac{3}{8} = \frac{15}{56}$

④  $\frac{5}{8} \cdot \frac{2}{9} = \frac{10}{72} = \frac{5}{36}$

$\frac{5}{4} \cdot \frac{2}{3} = \frac{5}{4} \cdot \frac{1}{3} = \frac{5}{12}$



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### Division

$$\frac{a}{b} \div \frac{c}{d} = \frac{a}{b} \cdot \frac{d}{c} = \frac{ad}{bc}$$

*Keep Change Flip to mult.*

$\frac{5}{11} \div \frac{1}{2} = \frac{5}{11} \cdot \frac{2}{1} = \frac{10}{11}$

*Complex Fractions*

$$\frac{\frac{5}{11}}{\frac{1}{2}} = \frac{5}{11} \cdot \frac{2}{1} = \frac{10}{11}$$

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#### ③ Addition w/ Like Denominators

$$\frac{a}{b} \pm \frac{c}{b} = \frac{a \pm c}{b}$$

$\frac{2}{13} + \frac{5}{13} = \frac{2+5}{13} = \frac{7}{13}$

$\frac{3}{5x} - \frac{8}{5x} = \frac{3-8}{5x} = \frac{-5}{5x} = \frac{-1}{x}$

FACT

$$-\frac{a}{b} = \frac{-a}{b} = \frac{a}{-b}$$

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