Unit 1 – The Real Number System

(1) distributive property

Commutative property of addition

(2) a) R b) I c) R d) R

e) I f) R g) R h) I

(3) 0.8 is a rational and real number.

(4) $\sqrt{80}$ → $\sqrt{16}\sqrt{5}$ → $4\sqrt{5}$ or $\sqrt{80}$ → $\sqrt{4}\sqrt{20}$ → $2\sqrt{20}$ → $2\sqrt{4}\sqrt{5}$ → $2 \cdot 2\sqrt{5}$ → $4\sqrt{5}$

(5)

a) True

b) False, $\sqrt{3} + -\sqrt{3} = 0$

c) True

d) False, $\sqrt{3} \cdot \sqrt{3} = \sqrt{9} \rightarrow 3$

e) True

f) False, $0 \cdot \pi = 0$

NOTE: The product of any non-zero rational number and irrational number is always irrational.

(6)

#1) associative prop. of +

#2) commutative prop. of +

#3) commutative prop. of +

Unit 2 – Polynomial Expressions

(1) n = # of CD's Angela has

$n+3$ = # of CD's Colin has

$2(n+3)$ = # of CD's Harley has

(2)

a) cost of the groceries purchased

b) tax on the groceries

(3)

A. h = # of packages of hot dogs

B. amount of money spent on packages of hot dog buns

C. dollars

D. $3.99(7) + 2.19(10)$

$27.93 + 21.90$

$\$49.83$

(4)

a) A + B

$(5x^2+7x-5) + (-4x^2-8x+5)$

$5x^2 + 7x - 5 - 4x^2 - 8x + 5$

$x^2 - x$

b) A - B

$(5x^2+7x-5) - (-4x^2-8x+5)$

$5x^2 + 7x - 5 + 4x^2 + 8x - 5$

$9x^2 + 15x - 10$

(5)

$(x-2)^2 - 4(x+5)$

$(x-2)(x-2) - 4(x+5)$

$(x^2 - 2x - 2x + 4) - 4x - 20$

$x^2 - 4x + 4 - 4x - 20$

$x^2 - 8x - 16$

(6)

$(2x+7)(-x^2-x+3)$

$-2x^3 - 9x^2 - x + 21$

	$-x^2$	$-x$	$+3$
$2x$	$-2x^3$	$-2x^2$	$+6x$
$+7$	$-7x^2$	$-7x$	$+21$

(7)

$A = \frac{1}{2}bh$

$\frac{1}{2}(4x+10)(6x)$

$(2x+5)(6x)$

$12x^2 + 30x$ units^2

Unit 3 – Equations

(1)
$$x-(3x+2)=7-2x$$
$$x-3x-2=7-2x$$
$$-2x-2=7-2x$$
$$-2\neq 7$$
No solution

(2)
$$\tfrac{1}{2}(4x-2)=15$$
$$2x-1=15$$
$$2x=16$$
$$x=8$$

(3)
$$5(2x-4)=8(x-5)$$
$$10x-20=8x-40$$
$$2x-20=-40$$
$$2x=-20$$
$$x=-10$$

(4) LCD = 15
$$\cancel{15}^{5}\left(\frac{2x}{\cancel{3}_{1}}\right)-\cancel{15}^{3}\left(\frac{2}{\cancel{5}_{1}}\right)=15(14)$$
$$10x-6=210$$
$$10x=216$$
$$x=21.6$$

(5)
$$A=\tfrac{1}{2}b\boxed{h}$$
$$\frac{2A}{b}=\frac{bh}{b}$$
$$h=\frac{2A}{b}$$

(6)
$$\frac{P}{1}=\frac{r\boxed{v}^2}{3}$$
$$\frac{3P}{r}=\frac{rv^2}{r}$$
$$\frac{3P}{r}=v^2$$
$$\sqrt{\frac{3P}{r}}=v$$

(7)
addition prop. of equality
division prop. of equality

(8)
$$-\tfrac{3}{4}(x-8)=-\tfrac{1}{2}x$$
$$-\tfrac{3}{4}x+6=-\tfrac{1}{2}x$$
$$6=\tfrac{1}{4}x$$
$$24=x$$

$$-3(x-8)=-2x$$
$$-3x+24=-2x$$
$$24=x$$

Yes, the equations are equivalent because they have the same solution.

Unit 4 – Applications with Equations

(1) x = 1st odd integer
$x+2$ = 2nd odd integer

9
11

$$2x = x + 2 + 7$$
$$2x = x + 9$$
$$x = 9$$

(2)

	Value	Qty	Tot Val
nickels	5	x	$5x$
dimes	10	$84-x$	$10(84-x)$

$$5x + 10(84-x) = 715$$
$$5x + 840 - 10x = 715$$
$$840 - 5x = 715$$
$$-5x = -125$$
$$x = 25$$
$$84 - x = 59$$

25 nickels and 59 dimes

(3)

	Now	Future (+15)
Anne	x	$x+15$
Carl	$x+7$	$(x+7+15)$ $x+22$

Carl's future age $= 2($Anne's future age$) - 33$

$$x+22 = 2(x+15) - 33$$
$$x+22 = 2x + 30 - 33$$
$$x+22 = 2x - 3$$
$$22 = x - 3$$
$$25 = x$$
$$25+7 = 32$$

Carl is 32 years old

(4)

	Value	Qty	Tot Val
Student	2	$4x+4$	$2(4x+4)$
Non-student	5	x	$5x$

$$2(4x+4) + 5x = 1022$$
$$8x+8 + 5x = 1022$$
$$13x + 8 = 1022$$
$$13x = 1014$$
$$x = 78$$
$$4(78)+4 = 316$$

316 student tickets

(5) z = number of ounces

D $\quad 0.46 + 0.20(z-1) = 1.26$

0.46: cost of 1st oz. $\quad$ $0.20(z-1)$: cost of additional ounces

Station 5 – Mixed Review

(1)

I. $-\frac{1}{2} \cdot \frac{2}{5} = -\frac{1}{5}$
Rational

II. $\sqrt{5} \cdot \sqrt{5}$
$\sqrt{25} = 5$
Rational

III. $\frac{1}{3} \cdot \sqrt{8}$
$\frac{1}{3} \cdot \sqrt{4} \cdot \sqrt{2}$
$\frac{2}{3}\sqrt{2}$
Irrational

IV. $-2 \cdot \sqrt{81}$
$-2 \cdot 9 = -18$
Rational

Ans: C I, II, IV

(2) I agree with Betty. The product of two irrational numbers can be either rational or irrational.
Example: $\sqrt{2} \cdot \sqrt{2} = \sqrt{4}$
$= 2$ (Rational)

(3) $(3x-4)(2+x) - x^2 - 5$
$6x + 3x^2 - 8 - 4x - x^2 - 5$
$\boxed{2x^2 + 2x - 13}$

(4) $(w-6)(-w^2+4w+6)$
$-w^3 + 4w^2 + 6w + 6w^2 - 24w - 36$
$\boxed{-w^3 + 10w^2 - 18w - 36}$

(5)

a) $P = 2y + x$
$\frac{P-x}{2} = \frac{2y}{2}$
$\boxed{\frac{P-x}{2} = y}$

b) $16 = 2y + 6$
$-6 \quad -6$
$\frac{10}{2} = \frac{2y}{2}$
$\boxed{y = 5}$
or
$\frac{16-6}{2} = y$
$\frac{10}{2} = y$
$\boxed{y = 5}$

(6)

a) $7 \cdot x = 7\left(\frac{1}{7}pm^2\right)$
$\frac{7x}{p} = \frac{pm^2}{p}$
$\sqrt{\frac{7x}{p}} = \sqrt{m^2}$
$\sqrt{\frac{7x}{p}} = m$

b) $x = \frac{1}{7}pm^2$
$7(x) = 7\left(\frac{1}{7}pm^2\right)$
$\frac{7x}{m^2} = \frac{pm^2}{m^2}$
$p = \frac{7x}{m^2}$