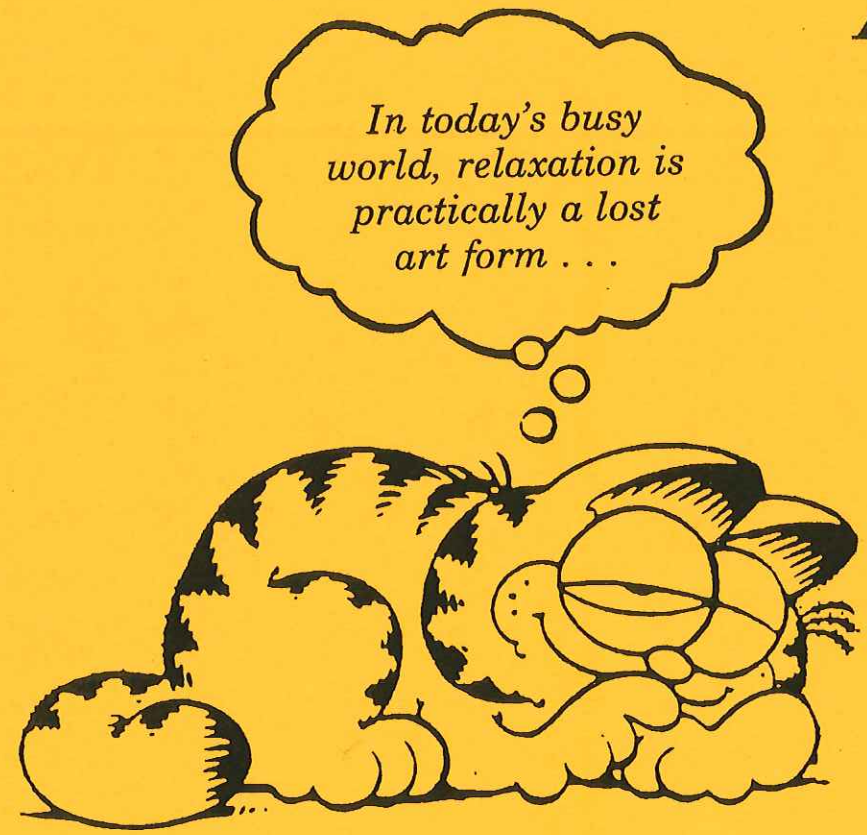
Friendship Jr. High School
Accelerated Math Program

Algebra 1



UNIT #1
Foundation Skills

UNIT #2
Solving Equations

UNIT #3
Solving Inequalities

1.1

Answer Key

① Transitive Property of Equality

② Additive Identity

③ Associative Property of Multiplication

④ Commutative Property of Addition

⑤ Reflexive Property of Equality

⑥ Multiplicative Inverse

⑦ Distributive Property

⑧ Symmetric Property of Equality

⑨ Zero Property

⑩ Closure

⑪ Substitution Property of Equality

⑫ Commutative Property of Multiplication

⑬ Additive Inverse

⑭ Associative Property of Addition

⑮ Multiplicative Identity

⑯ Commutative Property of Addition

⑰ Transitive Property of Equality

⑱ Associative Property of Multiplication

⑲ Reflexive Property of Equality

⑳ Distributive Property

㉑ Zero Property

㉒ Substitution Property of Equality

㉓ Additive Inverse

㉔ Multiplicative Identity

㉕ Commutative Property of Addition

㉖ Commutative Property of Multiplication

㉗ Associative Property of Addition

㉘ Closure

㉙ Symmetric Property of Equality

㉚ Multiplicative Inverse

㉛ Commutative Property of Addition

㉜ Additive Identity

㉝ Substitution Property of Equality

㉞ Reflexive Property of Equality

㉟ Transitive Property of Equality

1.2

Answer Key

① $n-9$

② $2n+14$

③ $4n-2$

④ $(n+5)(4n-3)$

⑤ n = the number
$n-19=83$
$n=\boxed{102}$

⑥ n = the number

$67 - 2n = 39$
$-2n = -28$
$(-2n)(-\frac{1}{2}) = (-28)(-\frac{1}{2})$
$n =$ **14**

⑦ n = Tyrone's age

$2n + 17 = 53$
$2n = 36$
$(2n)(\frac{1}{2}) = (36)(\frac{1}{2})$
$n =$ **18 years old**

⑧

	now	27 ago
Clarice	n	n − 27

$n - 27 = 21$ $n =$ **48 yrs old**

⑨ Bill's height = n + 5
Bob's height = n

$(n) + (n+5) = 137$
$2n + 5 = 137$
$2n = 132$ $n =$ **66 in. tall**

⑩ Mary Lou's height = n

$2n + 17 = 141$
$2n = 124$
$(2n)(\frac{1}{2}) = (124)(\frac{1}{2})$
$n =$ **62 in. tall**

⑪

	now	5 ago
Dad	n + 27	n + 22
Bob	n	n − 5

$(n+22) + (n-5) = 45$
$2n + 17 = 45$
$2n = 28$
$(\frac{1}{2})(2n) = (\frac{1}{2})(28)$
$n = 14$

14 yrs old

⑫

	now	in 8
Mom	56 − n	64 − n
Daughter	n	n + 8

$(64-n) = 2(n+8)$
$64 - n = 2n + 16$
$64 - 3n = 16$
$-3n = -48$
$(-\frac{1}{3})(-3n) = (-\frac{1}{3})(-48)$
$n =$ **16 yrs old**

⑬

	now	5 ago
Bill	50 − n	45 − n
Roy	n	n − 5

$(45-n) = 3(n-5)$
$45 - n = 3n - 15$
$45 - 4n = -15$
$-4n = -60$
$(-\frac{1}{4})(-4n) = (-\frac{1}{4})(-60)$
$n = 15$
$\text{Bill} = 50 - n = 50 - 15 = 35$

next year = **36 yrs old**

⑭

	now	3 ago
Alice	n + 22	n + 19
Gert	n	n − 3

$n+19 = 2(n-3)$
$n+19 = 2n-6$
$-n+19 = -6$
$-n = -25$
$n = 25$

25 yrs old

⑮

	now	next yr
Sheila	n	n + 1
Sister	n + 2	n + 3

$(n+1) + (n+3) = 42$
$2n + 4 = 42$
$2n = 38$
$(\frac{1}{2})(2n) = (\frac{1}{2})(38)$
$n = 19$
$\text{Sister} = n + 2 = 19 + 2 = 21$

Sister n + 2 = **21 yrs old**

1.3

Answer Key

① $3a-2b$
$3(-2)-2(2)$
$(-6)-(4)=\boxed{-10}$

② $b-3c$
$(2)-3(-1)$
$(2)-(-3)$
$(2)+(3)=\boxed{5}$

③ $2ab-c^2$
$2(-2)(2)-(-1)^2$
$(-8)-(1)=\boxed{-9}$

④ $4ac+b^3$
$4(-2)(-1)+(2)^3$
$(8)+(8)=\boxed{16}$

⑤ $2a(b-c)$
$2(-2)((2)-(-1))$
$2(-2)(3)=\boxed{-12}$

⑥ $3b(2c-2a)$
$3(2)[2(-1)-2(-2)]$
$3(2)(2)=\boxed{12}$

⑦ $4a^2b-2ac$
$4(-2)^2(2)-2(-2)(-1)$
$4(4)(2)-2(-2)(-1)$
$(32)-(4)=\boxed{28}$

⑧ $3a+2bc^3$
$3(-2)+2(2)(-1)^3$
$(-6)+(-4)=\boxed{-10}$

⑨ $3a(a-c)$
$3(-2)((-2)-(-1))$
$3(-2)(-1)$
$\boxed{6}$

⑩ $b^2(2c+3a)$
$(2)^2[2(-1)+3(-2)]$
$(4)(-8)=\boxed{-32}$

⑪ $\frac{2ab}{3a^2c}=\frac{2(-2)(2)}{3(-2)^2(-1)}$
$\frac{-8}{-12}=\boxed{\frac{2}{3}}$

⑫ $\frac{-3bc}{ac^3}=\frac{-3(2)(-1)}{(-2)(-1)^3}$
$\frac{6}{2}=\boxed{3}$

⑬ $a^2c-2abc$
$(-2)^2(-1)-2(-2)(2)(-1)$
$(-4)-(8)=\boxed{-12}$

⑭ $-3ab-2c^4$
$-3(-2)(2)-2(-1)^4$
$(12)-(2)=\boxed{10}$

⑮ $3n-m+4n+6m$
$\boxed{7n+5m}$

⑯ $2a-3b-5a+b$
$\boxed{-3a-2b}$

⑰ $2(x+y)-3x$
$2x+2y-3x$
$\boxed{-x+2y}$

⑱ $4n-2(m-3n)$
$4n-2m+6n$
$\boxed{10n-2m}$

⑲ $2x^2-3xy+2x(x-y)$
$2x^2-3xy+2x^2-2xy$
$\boxed{4x^2-5xy}$

⑳ $3a(a+b)-2ab-a^2$
$3a^2+3ab-2ab-a^2$
$\boxed{2a^2+ab}$

㉑ $4(2a-1)-3(2-a)$
$8a-4-6+3a$
$\boxed{11a-10}$

㉒ $-3(b-2)+4(3-2b)$
$-3b+6+12-8b$
$\boxed{-11b+18}$

㉓ $a-3b(a-1)+b$
$a-3ab+3b+b$
$\boxed{a-3ab+4b}$

㉔ $2x-3x(y-2)+3xy$
$2x-3xy+6x+3xy$
$\boxed{8x}$

㉕ $2n-3$

㉖ $(n+1)(2n-7)$

㉗

	now	in 4
Sue	$n+8$	$n+12$
Mary	n	$n+4$

$2(n+4)=n+12$
$2n+8=n+12$
$n=4$

Mary last yr $n-1$
$n-1=3$
$\boxed{3 \text{ yrs old}}$

㉘

	now	9 ago
Bart	n	$n-9$
Jim	$30-n$	$21-n$

$n-9=2(21-n)$
$n-9=42-2n$
$3n=51$
$(\frac{1}{3})(3n)=(\frac{1}{3})(51)$
$n=17$
Bart = $\boxed{17 \text{ yrs old}}$

㉙ Multiplicative Inverse

(30) Symmetric Property of Equality

(31) Multiplicative Identity

(32) Reflexive Property of Equality

(33) Associative Property of Multiplication

(34) Commutative Property of Addition

Unit 1
REVIEW
Answer Key

(1) Reflexive Property of Equality

(2) Closure

(3) Multiplicative Identity

(4) Transitive Property of Equality

(5) Multiplicative Inverse

(6) Substitution Property of Equality

(7) Commutative Property of Addition

(8) Additive Identity

(9) Distributive Property

(10) Commutative Property of Multiplication

(11) Associative Property of Multiplication

(12) Symmetric Property of Equality

(13) Additive Inverse

(14) Commutative Property of Addition

(15) Zero Property

(16) Associative Property of Addition

(17) Substitution Property of Equality

(18) $5n-3$

(19) $2n+7$

(20) $(n-9)(3n)$

(21) $2n+(4n-2)$

(22) n = the number

$2n-12=2$

$2n=14 \quad n=\boxed{7}$

(23) n = the number

$4n+3=27$

$4n=24 \quad n=\boxed{6}$

(24)

	now	6 ago
Simon	$n+4$	$n-2$
Art	n	$n-6$

$n-2=3(n-6)$

$n-2=3n-18$

$16=2n \quad n=8$

$(n+4)+2=14$

14 yrs old

(25)

	now	4 ago
Betty	$n-6$	$n-10$
Jean	n	$n-4$

$2(n-10)=n-4$

$2n-20=n-4$

$n=16$

Jean is 16 now

$21-16=5$

Jean will be 21 in 5 years

(26)

	now	in 2
Jennifer	14−n	16−n
Liz	n	n+2

$16-n=2(n+2)$
$16-n=2n+4$
$12=3n$
$n=4$ — **6 yrs older**
Jen is 10, Liz is 4

(27)

	now	6 ago
Evan	24−n	18−n
Krista	n	n−6

$18-n=3(n-6)$
$18-n=3n-18$
$36=4n$
$n=9$
$n-1=8$ — **8 yrs old**

(28) $5xy-z^2$
$5(-1)(-2)-(3)^2$
$(10)-(9)=\boxed{1}$

(29) $2x^2y-4z$
$2(-1)^2(-2)-4(3)$
$2(1)(-2)-4(3)$
$(-4)-(12)=\boxed{-16}$

(30) $3(x-2y)-y^2$
$3((-1)-2(-2))-(-2)^2$
$3[(-1)-(-4)]-(4)$
$3(3)-(4)$
$(9)-(4)=\boxed{5}$

(31) $4y-2(2x+y)$
$4(-2)-2[2(-1)+(-2)]$
$4(-2)-2(-4)$
$(-8)-(-8)$
$(-8)+(8)=\boxed{0}$

(32) $3x^3-y^3$
$3(-1)^3-(-2)^3$
$3(-1)-(-8)$
$(-3)+(8)$
$\boxed{5}$

(33) $2xy-x^3z$
$2(-1)(-2)-(-1)^3(3)$
$2(-1)(-2)-(-1)(3)$
$(4)-(-3)$
$(4)+(3)=\boxed{7}$

(34) $\frac{-2x}{3x^2z}=\frac{-2(-1)}{3(-1)^2(3)}=\frac{(2)}{3(1)(3)}=\boxed{\frac{2}{9}}$

(35) $\frac{xyz}{2x^5}=\frac{(-1)(-2)(3)}{2(-1)^5}=\frac{(6)}{2(-1)}=\frac{6}{-2}=\boxed{-3}$

(36) $a+2c-3a-2c=\boxed{-2a}$

(37) $4x-y-5x-3y=\boxed{-x-4y}$

(38) $2(3n-m)-2n+m$
$6n-2m-2n+m=\boxed{4n-m}$

(39) $4a-3(2a-1)+2$
$4a-6a+3+2=\boxed{-2a+5}$

(40) $2x(x-2y)-3(x^2+1)$
$2x^2-4xy-3x^2-3=\boxed{-x^2-4xy-3}$

(41) $2ab-3(a-3ab)+2a$
$2ab-3a+9ab+2a=\boxed{11ab-a}$

(42) $6x-2x(x+3)-3x^2$
$6x-2x^2-6x-3x^2=\boxed{-5x^2}$

(43) $4n(m-n)-3m(n-1)$
$4nm-4n^2-3nm+3m$
$\boxed{-4n^2+nm+3m}$

(44) $7x-3(x-2y)+5xy$
$7x-3x+6y+5xy$
$\boxed{4x+6y+5xy}$

Unit 1

SKILL CHECK - ANSWER KEY

① Multiplicative Identity

② Reflexive Property of Equality

③ Substitution Property of Equality

④ Symmetric Property of Equality

⑤ $(2n-2)(n+3)$

⑥ n = the number
$4n-12=16$
$4n=28$ $\quad n=\boxed{7}$

⑦

	now	6 ago
Ben	$24-n$	$18-n$
Bill	n	$n-6$

$n-6=2(18-n)$
$n-6=36-2n$
$3n=42$
$n=14$
Ben $(24-n)=10$
next birthday = $\boxed{11 \text{ yrs old}}$

⑧ $3(2x-y)$
$3[2(-3)-(-1)]$
$3(-6-(-1))$
$3(-5) = \boxed{-15}$

⑨ $2xy^3-3xz^2$
$2(-3)(-1)^3-3(-3)(2)^2$
$2(-3)(-1)-3(-3)(4)$
$(6)-(-36)=\boxed{42}$

⑩ $2y-3(xy-z)$
$2(-1)-3[(-3)(-1)-(2)]$
$2(-1)-3[(3)+(-2)]$
$(-2)-3(1)$
$(-2)+(-3) = \boxed{-5}$

⑪ $4ab-3a(b-2a)-5a^2$
$4ab-3ab+6a^2-5a^2$
$\boxed{ab+a^2}$

⑫ $3(x^2-xy)-2x(x-4y)-2xy$
$3x^2-3xy-2x^2+8xy-2xy$
$\boxed{x^2+3xy}$

⑬ $a(3a-b)-ab-2(a^2-b)$
$3a^2-ab-ab-2a^2+2b$
$\boxed{a^2-2ab+2b}$

⑭

	in 3	now	2 ago
Jenny	$2n$	$2n-3$	$2n-5$
Craig	n	$n-3$	$n-5$

$2n-5=7(n-5)$
$2n-5=7n-35$
$30=5n$
$n=6$

	now
J	9
C	+3
	$\boxed{12}$

Unit 1

REMEDIATION - ANSWER KEY

① Commutative Property of Addition

② Associative Property of Multiplication

③ Multiplicative Inverse

④ Reflexive Property of Equality

⑤ $(n+3)+(4n-5)$

⑥ n = the number
$2n+3=25$
$2n=22 \quad n=\boxed{11}$

⑦

	now	8 ago
Ann	$2n$	$2n-8$
Murray	n	$n-8$

$2n-8=4(n-8)$
$2n-8=4n-32$
$24=2n$
$n=12$
2 yrs ago $(n-2)=\boxed{10 \text{ yrs old}}$

⑧ $2(3b-c)$
$2[3(-2)-(-3)]$
$2[(-6)+(3)]$
$2(-3)=\boxed{-6}$

⑨ $3ab^2-2b^3$
$3(2)(-2)^2-2(-2)^3$
$3(2)(4)-2(-8)$
$(24)+(16)=\boxed{40}$

⑩ $3ac-2[bc-a]$
$3(2)(-3)-2[(-2)(-3)-(2)]$
$(-18)-2(4)=\boxed{-26}$

⑪ $2xy-3z(x-2)+z-xz$
$2xy-3xz+6z+z-xz$
$\boxed{2xy-4xz+7z}$

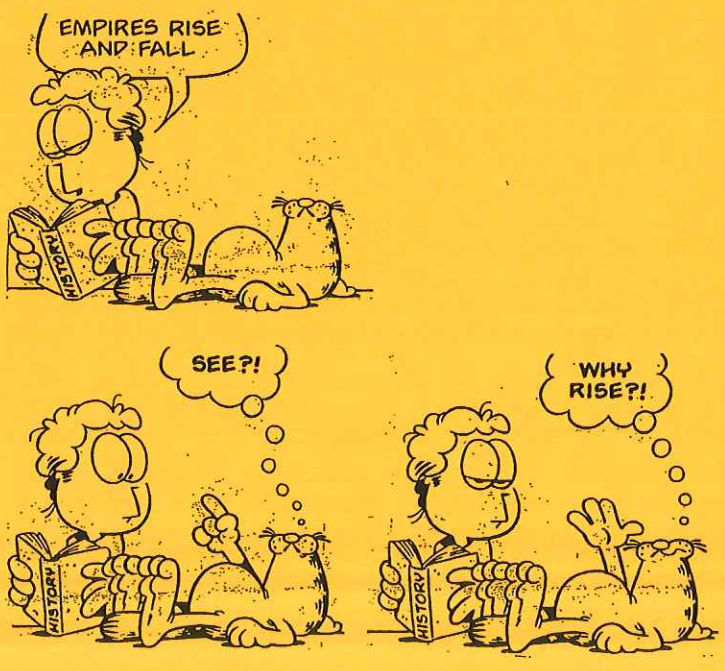
⑫ $2a(a-ab)-3a^2(2-b)-a^2b$
$2a^2-2a^2b-6a^2+3a^2b-a^2b$
$\boxed{-4a^2}$

⑬ $4x(x-2y)-xy-3(x^2+xy)$
$4x^2-8xy-xy-3x^2-3xy$
$\boxed{x^2-12xy}$

⑭

	4 ago	now	in 2
Tom	$4n$	$4n+4$	$4n+6$
Jerry	n	$n+4$	$n+6$

$4n+6=2(n+6)$
$4n+6=2n+12$
$2n=6$
$n=3$
Tom now $(4n+4)=16$ $\boxed{15 \text{ yrs old}}$
last year $=15$



Unit 1

EXTRA PRACTICE - ANSWER KEY

① Symmetric Property of Equality

② Multiplicative Inverse

③ Transitive Property of Equality

④ Zero Property

⑤ Commutative Property of Addition

⑥ Additive Identity

⑦ $3n-12$

⑧ $(2n-4)(n+5)$

⑨ n = the number
$2n-4=16$
$2n=20$
$n=\boxed{10}$

⑩

	now	6 ago
Dennis	$n-4$	$n-10$
Margaret	n	$n-6$

$n-6=3(n-10)$
$n-6=3n-30$
$-2n=-24$
$n=12$
$n-1=$ $\boxed{\text{11 years old}}$

⑪

	now	In 5
Dobie	n	$n+5$
Maynard	$35-n$	$40-n$

$n+5=2(40-n)$
$n+5=80-2n$
$3n=75$
$n=25$
$35-n=$ $\boxed{\text{10 years old}}$

⑫ $2x+y$
$2(-1)+(-2)$
$(-2)+(-2)=\boxed{-4}$

⑬ $3y^2-2z$
$3(-2)^2-2(-3)$
$3(4)-2(-3)$
$(12)-(-6)$
$(12)+(+6)=\boxed{18}$

⑭ $3(x+z)-2y$
$3[(-1)+(-3)]-2(-2)$
$3(-4)-2(-2)$
$(-12)-(-4)$
$(-12)+(4)=\boxed{-8}$

⑮ $2xyz-x^3$
$2(-1)(-2)(-3)-(-1)^3$
$2(-1)(-2)(-3)-(-1)$
$(-12)-(-1)$
$(-12)+(1)=\boxed{-11}$

⑯ $3x-2y+x-4y$
$\boxed{4x-6y}$

⑰ $3a-2(4a+3)-5$
$3a-8a-6-5$
$\boxed{-5a-11}$

⑱ $2y^2-4y(x-2y)+6xy$
$2y^2-4xy+8y^2+6xy$
$\boxed{10y^2+2xy}$

⑲

	now	3 ago	In 3
Mike	$3n+3$	$3n$	$3n+6$
Tony	$n+3$	n	$n+6$

$3n+6=2(n+6)$
$3n+6=2n+12$
$n=6$ $3n+3=\boxed{\text{21 yrs old}}$

⑳ $4a^2-5ab+2a(b-3a)-3(a^2+2ab)$
$4a^2-5ab+2ab-6a^2-3a^2-6ab$
$\boxed{-5a^2-9ab}$

2.1
Answer Key

① $\frac{1}{2}(6x+8y)-\frac{1}{3}(6x+9y)$
$3x+4y-2x-3y =$ $\boxed{x+y}$

② $-\frac{2}{7}(21x+35a)+\frac{4}{7}(35x-21a)$
$-6x-10a+20x-12a =$ $\boxed{14x-22a}$

③ $\frac{3}{4}(4a-12b)+\frac{1}{8}(16a+48b)$
$3a-9b+2a+6b =$ $\boxed{5a-3b}$

④ $\frac{5}{6}(-24a+36b)+(\frac{1}{3})(60a-42b)$
$-20a+30b-20a+14b$
$\boxed{-40a+44b}$

⑤ $\frac{1}{2}(-\frac{1}{3}a+\frac{2}{3}b)+\frac{2}{3}(\frac{1}{2}a-\frac{3}{4}b)$
$-\frac{1}{6}a+\frac{1}{3}b+\frac{1}{3}a-\frac{1}{2}b$
$-\frac{1}{6}a+\frac{2}{6}a+\frac{2}{6}b-\frac{3}{6}b =$ $\boxed{\frac{1}{6}a-\frac{1}{6}b}$

⑥ $\frac{1}{2}(-\frac{2}{3}a-\frac{3}{4}b)-\frac{3}{4}(\frac{4}{9}a-\frac{1}{2}b)$
$-\frac{1}{3}a-\frac{3}{8}b-\frac{1}{3}a+\frac{3}{8}b =$ $\boxed{-\frac{2}{3}a}$

⑦ $\frac{3a+9}{3} =$ $\boxed{a+3}$ ⑧ $\frac{6x+24}{6} =$ $\boxed{x+4}$

⑨ $\frac{7a+35}{-7} =$ $\boxed{-a-5}$ ⑩ $\frac{14n-56}{-7} =$ $\boxed{-2n+8}$

⑪ $\boxed{\frac{25x+14}{5}}$ ⑫ $\boxed{\frac{-3n-8}{4}}$

⑬ $\frac{16n-8x}{-12}$ $\boxed{\frac{-4n+2x}{3}}$

⑭ $\frac{15x-10y}{-10}$ $\boxed{\frac{-3x+2y}{2}}$

⑮ $\frac{14n-10m}{-4} =$ $\boxed{\frac{-7n+5m}{2}}$

⑯ $\frac{20a-30b}{12} =$ $\boxed{\frac{10a-15b}{6}}$

2.2
Answer Key

① $\frac{4x+5}{7}$
$4x+5=49$
$4x=44$
$\boxed{x=11}$

② $\frac{4n+8}{16}=7$
$4n+8=112$
$4n=104$
$\boxed{n=26}$

③ $\frac{3n-5}{-7}=n+5$
$3n-5=-7n-35$
$10n=-30$
$\boxed{n=-3}$

④ $\frac{2x+6}{2}=3x+11$
$2x+6=6x+22$
$-4x=16$
$\boxed{x=-4}$

⑤ $3-4x=10x+10$
$-14x=7$
$\boxed{x=-\frac{1}{2}}$

⑥ $3x-5=7x+7$
$-4x=12$
$\boxed{x=-3}$

⑦ $17+2n=21+2n$
$17=21$
false equation
$\boxed{\text{no solutions}}$

⑧ $-5x-1=-5x-1$
$-1=-1$
identity
$\boxed{\text{all solutions}}$

⑨ $-3(n+5)=3(n-1)$
$-3n-15=3n-3$
$-6n=12$
$\boxed{n=-2}$

⑩ $4(2a-1)=-10(a-5)$
$8a-4=-10a+50$
$18a=54$
$\boxed{a=3}$

2.3
Answer Key

(11) $-2(2x-3)=6-4x$
$-4x+6=6-4x$
$6=6$ identity
all solutions

(12) $5n+4=7(n+1)-2n$
$5n+4=7n+7-2n$
$5n+4=5n+7$
$4=7$ false eq
no solutions

(13) $3(x-5)=\frac{1}{5}(10x-25)$
$3x-15=2x-5$
$x=10$

(14) $4(2n-8)=\frac{1}{7}(49n+70)$
$8n-32=7n+10$
$n=42$

(15) $\frac{2n-6}{3}=\frac{3(n+2)}{2}$
$\frac{2n-6}{3}=\frac{3n+6}{2}$
$2(2n-6)=3(3n+6)$
$4n-12=9n+18$
$-5n=30$
$n=-6$

(16) $\frac{5x-4}{6}=\frac{4(2-x)}{-8}$
$\frac{5x-4}{6}=\frac{8-4x}{-8}$
$-8(5x-4)=6(8-4x)$
$-40x+32=48-24x$
$-16x=16$
$x=-1$

(17) $x+r=2d$
$x=2d-r$

(18) $5x=y$
$x=\frac{y}{5}$

(19) $\frac{d+x}{e}=f$
$d+x=ef$
$x=ef-d$

(20) $\frac{x+a}{b}=c$
$x+a=bc$
$x=bc-a$

(21) $ax+b=c$
$ax=c-b$
$x=\frac{c-b}{a}$ for $a\neq 0$

(22) $ex-2y=3z$
$ex=3z+2y$
$x=\frac{3z+2y}{e}$ for $e\neq 0$

(23) $ax-b=cx-3b$
$ax-cx=-2b$
$x(a-c)=-2b$
$x=\frac{-2b}{a-c}$ for $a\neq c$

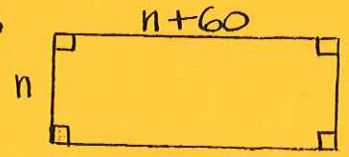
(24) $dx+c=2x$
$dx-2x=-c$
$x(d-2)=-c$
$x=\frac{-c}{d-2}$ for $d\neq 2$

① n = the number
$2n+4n=96$
$6n=96$
$n=16$

② n = the number
$2n+12=3n-31$
$-n=-43$
$n=43$

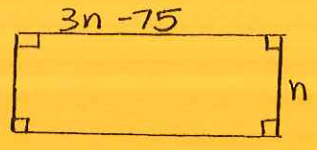
③ n = the number
$n-(2n-5)=9$
$n-2n+5=9$
$-n+5=9$
$-n=4$
$n=-4$
must use parenthesis

④ n = the number
$5n-(2n+4)=119$
$5n-2n-4=119$
$3n-4=119$
$3n=123$
$n=41$

⑤


$2n+2(n+60)=920$
$2n+2n+120=920$
$4n=800$
$n=200$ m width
$n+60=260$ m

⑥



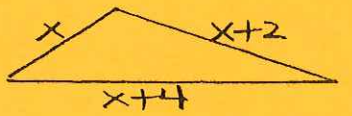
$2n+2(3n-75)=370$
$2n+6n-150=370$
$8n=520$
$n=65$ width
$3n-75=120$ length

65 by 120 yds

⑦ n = original price

$\frac{1}{2}n+8=40$
$\frac{1}{2}n=32$
$n=64$ **$64**

⑧



$(x)+(x+2)+(x+4)=27$
$3x+6=27$
$3x=21$
$x=7$ $x+4=$ **11cm**

⑨

x =	30
$x+2$ =	32
$x+4$ =	34
$x+6$ =	36

$2x+(x+6)=96$
$3x+6=96$
$3x=90$
$x=30$

⑩ x = 57
$x+2$ = 59
$x+4$ = 61
$x+6$ = **63** ←

$x+2(x+2)=175$
$x+2x+4=175$
$3x+4=175$
$3x=171$ $x=57$

⑪ $\frac{2}{3}(-6x-3y)-\frac{1}{2}(4y+8x)$
$-4x-2y-2y-4x$

$-8x-4y$

⑫ $\frac{-28x+35y}{-21}=$ **$\frac{4x-5y}{3}$**

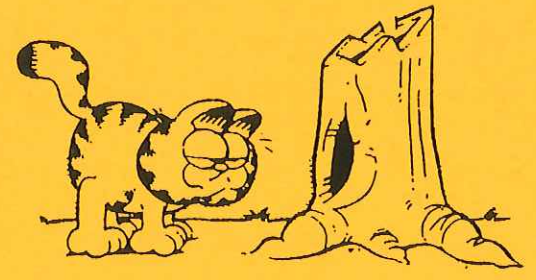
⑬ $2a+8x+b=ax$
$8x-ax=-2a-b$
$x(8-a)=-2a-b$

$x=\frac{-2a-b}{8-a}$ for $a\neq 8$

⑭ $\frac{4x-2}{7}=\frac{2(2-x)}{-5}$
$-5(4x-2)=7(4-2x)$
$-20x+10=28-14x$
$-6x=18$

$x=-3$

2.4
Answer Key



① $\frac{\text{Part}}{\text{Whole}}$ $\frac{28}{n}=\frac{20}{100}$
$20n=2800$
$n=$ **140**

② $\frac{\text{Part}}{\text{Whole}}$ $\frac{37}{296}=\frac{n}{100}$
$296n=3700$
$n=12.5$ **12.5%**

③ $\frac{\text{Part}}{\text{Whole}}$ $\frac{n}{6070}=\frac{4.3}{100}$
$100n=(6070)(4.3)$
$100n=26,101$
$n=$ **$261.01**

④ $\frac{\text{Part}}{\text{Whole}}$ $\frac{n}{9.40}=\frac{6.125}{100}$
$100n=(9.40)(6.125)$
$100n=57.575$
$n=.57575$ **$.58**

⑤ $\frac{\text{Part}}{\text{Whole}}$ $\frac{7030.50}{n}=\frac{107.5}{100}$
$107.5n=(7030.50)(100)$
$107.5n=703,050$
$n=$ **$6540**

⑥ $\frac{\text{Part}}{\text{Whole}}$ $\frac{54,000}{n}=\frac{108.4}{100}$
$108.4n=(54,000)(100)$
$108.4n=5,400,000$
$n\approx$ **$49,815.50**

⑦ part/whole $\frac{n}{5000} = \frac{.1}{100}$

$100n = 500$

$n = \boxed{\$5}$

⑧ part/whole $\frac{90}{n} = \frac{60}{100}$

$60n = 9000$

$n = \boxed{150}$

⑨ correct/tot ques $\frac{34}{n} = \frac{85}{100}$

$85n = 3400$

$n = \boxed{40 \text{ questions}}$

⑩ metal/tot ore $\frac{n}{180} = \frac{3.2}{100}$

$100n = 576$

$n = \boxed{5.76 \text{ kg}}$

⑪ purch pr/org pr $\frac{21.45}{n} = \frac{75}{100}$

$75n = 2145$

$n = 28.6$

$\$28.60 - \$21.45$

$\boxed{\$7.15}$

⑫ discount/org pr $\frac{2.72}{n} = \frac{8}{100}$

$8n = 272$

$n = 34$

$34 - 2.72 = \boxed{\$31.28}$

⑬ n = total sales

$.08n + 125 = 200$

$.08n = 75$

$n = \boxed{\$937.50}$

⑭ n = total sales

$.055n + 320 = 551$

$.055n = 231$

$n = \boxed{\$4200}$

⑮ n = total sales

$.06n + 3(215) = 975$

$.06n + 645 = 975$

$.06n = 330$

$n = \boxed{\$5500}$

⑯ n = total sales

$.075 + 2(190) = 665$

$.075n + 380 = 665$

$.075n = 285$

$n = \boxed{\$3800}$

⑰ $\frac{1}{4}(-\frac{2}{3}a - \frac{1}{2}b) - \frac{2}{3}(\frac{3}{4}b - \frac{1}{2}a)$

$-\frac{1}{6}a - \frac{1}{8}b - \frac{1}{2}b + \frac{1}{3}a$

$\boxed{\frac{1}{6}a - \frac{5}{8}b}$

⑱ $\frac{24a - 36b}{-18} = \boxed{\frac{-4a + 6b}{3}}$

⑲ $3(4n-2) = \frac{2}{3}(9n-9) + 6n$

$12n - 6 = 6n - 6 + 6n$

$12n - 6 = 12n - 6$

$-6 = -6$ identity

$\boxed{\text{all solutions}}$

⑳ $\frac{3(2x-1)}{7} = \frac{5x+4}{8}$

$\frac{6x-3}{7} = \frac{5x+4}{8}$

$48x - 24 = 35x + 28$

$13x = 52$

$\boxed{x = 4}$

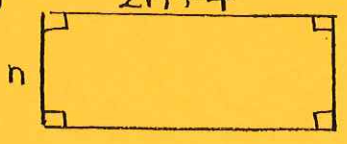
㉑ $3ab - c = 2ac$

$3ab - 2ac = c$

$a(3b - 2c) = c$

$\boxed{a = \frac{c}{3b - 2c} \text{ for } 3b \neq 2c}$

㉒



$2(n) + 2(2n+4) = 56$

$2n + 4n + 8 = 56$

$6n = 48$

$n = 8$

dimensions

8 by 20

$8 \times 20 = 160$

$\boxed{160 \text{ in}^2}$

㉓ 6 x

7 x+1

→ 8 x+2

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

$3x - 2x - 2 = 4$

$x - 2 = 4$

$x = 6$

Unit 2
REVIEW
Answer Key

① $\frac{2}{3}(9x-6y)-\frac{3}{4}(8y-4x)$

$6x-4y-6y+3x = \boxed{9x-10y}$

② $\frac{1}{2}(4a-3b)-\frac{1}{4}(6b+8a)$

$2a-\frac{3}{2}b-\frac{3}{2}b-2a = \boxed{-3b}$

③ $\frac{-10x-15y}{-5}$

$\boxed{2x+3y}$

④ $\frac{18a-12b}{6}$

$\boxed{3a-2b}$

⑤ $\frac{-26m+18n}{12}$

$\boxed{\frac{-13m+9n}{6}}$

⑥ $\frac{20a-15b}{-10}$

$\boxed{\frac{-4a+3b}{2}}$

⑦ $\frac{3n-5}{-4} = n-11$

$3n-5 = -4n+44$

$7n = 49$

$\boxed{n=7}$

⑧ $\frac{-2x+5}{5} = 2x+13$

$-2x+5 = 10x+65$

$-12x = 60$

$\boxed{x=-5}$

⑨ $3(4n-1) = 2(3n+4)+6n$

$12n-3 = 6n+8+6n$

$12n-3 = 12n+8$

$-3 = 8$ False equation

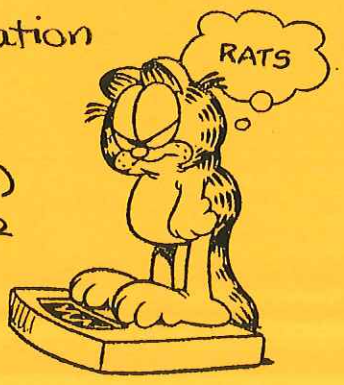
$\boxed{\text{no solutions}}$

⑩ $5(6-3x) = 3(x+4)$

$30-15x = 3x+12$

$-18x = -18$

$\boxed{x=1}$



⑪ $\frac{1}{2}(5n-4) = 2n-1$

$\frac{5n}{2}-2 = 2n-1$

$5n-4 = 4n-2$

$\boxed{n=2}$

⑫ $\frac{3}{4}(n+3) = 3-3n$

$\frac{3n}{4}+\frac{9}{4} = 3-3n$

$3n+9 = 12-2n$

$15n = 3$

$\boxed{n=1/5}$

⑬ $\frac{3x-5}{4} = \frac{6(2-x)}{-9}$

$\frac{3x-5}{4} = \frac{12-6x}{-9}$

$-27x+45 = 48-24x$

$-3x = 3$

$\boxed{x=-1}$

⑭ $\frac{2(n+4)}{-3} = \frac{5n+7}{12}$

$\frac{2n+8}{-3} = \frac{5n+7}{12}$

$24n+96 = -15n-21$

$39n = -117$

$\boxed{n=-3}$

⑮ $4ax-ab = 3c-cx$

$4ax+cx = ab+3c$

$x(4a+c) = ab+3c$

$\boxed{x=\frac{ab+3c}{4a+c} \text{ for } 4a+c\neq 0}$

⑯ $2y+3ax = 4y+x$

$3ax-x = 2y$

$x(3a-1) = 2y$

$\boxed{x=\frac{2y}{3a-1} \text{ for } a\neq\frac{1}{3}}$

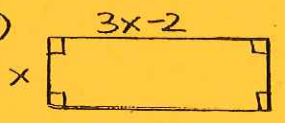
(17) n = a number

$2n-(4n+3)=-13$
$2n-4n-3=-13$
$-2n=-10$
$n=\boxed{5}$

(18) n = a number

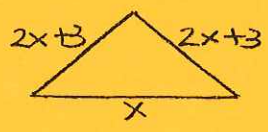
$n-(2n-5)=7$
$n-2n+5=7$
$-n=2$
$n=\boxed{-2}$

(19)



$2(x)+2(3x-2)=28$
$2x+6x-4=28$
$8x=32$
$x=4$
$3x-2=10$
4 by 10
Area = $\boxed{40\text{cm}^2}$

(20)



$(x)+2(2x+3)=41$
$x+4x+6=41$
$5x=35$
$x=7$ $\boxed{7\text{in}}$

(21)

	2	x
	3	x+1
→	4	x+2
	5	x+3

$x+3(x+3)=17$
$x+3x+9=17$
$4x=8$
$x=2$

(22)

	-7	x
	-6	x+1
→	-5	x+2

$(x+2)-(2x+1)=8$
$x+2-2x-1=8$
$-x+1=8$
$-x=7$
$x=-7$

(23)

	7	x
→	9	x+2
	11	x+4

$2(x+4)-(x+2)=13$
$2x+8-x-2=13$
$x+6=13$
$x=7$

(24)

	10	x
	12	x+2
→	14	x+4

$3x-2(x+4)=2$
$3x-2x-8=2$
$x-8=2$
$x=10$

(25) $\frac{\text{part}}{\text{whole}}$ $\frac{24}{64}=\frac{n}{100}$

$64n=2400$
$n=37.5$
$\boxed{37.5\%}$

(26) $\frac{\text{part}}{\text{whole}}$ $\frac{n}{85}=\frac{2.2}{100}$

$100n=187$
$n=1.87$
$\boxed{1.87}$

(27) $\frac{\text{part}}{\text{whole}}$ $\frac{210.75}{n}=\frac{105.375}{100}$

$105.375n=21075$
$n=200$
$\boxed{\$200}$

(28) $\frac{\text{part}}{\text{whole}}$ $\frac{149.10}{n}=\frac{106.5}{100}$

$106.5n=14910$
$n=140$ $\boxed{\$140}$

(29) $\frac{\text{purch pr}}{\text{org pr}}$ $\frac{30.60}{n}=\frac{90}{100}$

$90n=3060$
$n=34$ $\boxed{\$34}$

(30) $\frac{\text{discount}}{\text{org pr}}$ $\frac{5.40}{n}=\frac{15}{100}$

$15n=540$
$n=36$
$\$36-\$5.40=$ $\boxed{\$30.60}$

(31) n = sales

$.12n+3(170)=918$
$.12n+510=918$
$.12n=408$
$n=3400$ $\boxed{\$3400}$

(32) n = Sales

$.075n+2(205)=620$
$.075n+410=620$
$.075n=210$
$n=2800$ $\boxed{\$2800}$

Unit 2

SKILL CHECK - ANSWER KEY

① $\frac{2}{5}(10a-15b)-\frac{1}{3}(6b+3a)$

$4a-6b-2b-a = \boxed{3a-8b}$

② $\frac{-8x-12y}{-6} = \boxed{\frac{4x+6y}{3}}$

③ $\frac{4x-2}{3} = x+1$

$4x-2 = 3x+3$ $\boxed{x=5}$

④ $\frac{3}{4}(n-2)=n$

$\frac{3n}{4}-\frac{6}{4}=n$

$3n-6=4n$

$-n=6$ $\boxed{n=-6}$

⑤ $2(5x-3)=7(x-1)+3x$

$10x-6=7x-7+3x$

$10x-6=10x-7$

$-6=-7$ false equation

$\boxed{\text{no solutions}}$

⑥ $\frac{3(2n-4)}{4} = \frac{4n-4}{2}$

$\frac{6n-12}{4} = \frac{4n-4}{2}$

$12n-24=16n-16$

$-4n=8$ $\boxed{n=-2}$

⑦ $2x-ab=3c-2ab$

$2x=3c-ab$

$\boxed{x=\frac{3c-ab}{2}}$

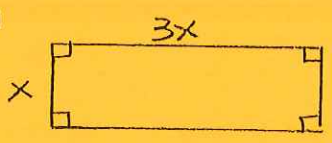
⑧ $xy-2n=3x+5$

$xy-3x=5+2n$

$x(y-3)=5+2n$

$\boxed{x=\frac{5+2n}{y-3} \text{ for } y\neq 3}$

⑨



$2(x)+2(3x)=32$

$2x+6x=32$

$8x=32$

$x=4$ $3x=12$

$4\times 12 = \boxed{48\ in^2}$

⑩

-10 x

$\rightarrow$ $\boxed{-9}$ $x+1$

-8 $x+2$

$(x+2)-(2x+2)=10$

$x+2-2x-12=10$

$x=-10$

⑪ $\frac{\text{part}}{\text{whole}}$ $\frac{n}{120} = \frac{4.375}{100}$

$100n = 525$ $n = \boxed{5.25}$

⑫ $\frac{\text{part}}{\text{whole}}$ $\frac{84.4}{n} = \frac{105.5}{100}$

$105.5n = 8440$

$n=80$ $\boxed{\$80}$

⑬ $\frac{\text{purch pr}}{\text{org pr}}$ $\frac{21.12}{n} = \frac{88}{100}$

$88n = 2112$

$n=24$

org pr $= \$24$

$\$24-\$21.12 = \boxed{\$2.88}$

⑭ $.065x+3(230)=976$

$.065x+690=976$

$.065x=286$

$x=4400$

$\boxed{\$4400}$

Unit 2

REMEDIATION - ANSWER KEY

① $\frac{3}{4}(8x-12y)-\frac{2}{5}(20y+5x)$

$6x-9y-8y-2x=$ $\boxed{4x-17y}$

② $\frac{14n-21m}{-14}=\frac{2n-3m}{-2}=\boxed{\frac{-2n+3m}{2}}$

③ $\frac{3n-7}{2}=2n-6$

$3n-7=4n-12$

$-n=-5$ $\boxed{n=5}$

④ $\frac{1}{2}(3x-4)=x+7$

$\frac{3x}{2}-2=x-7$

$3x-4=2x-14$ $\boxed{x=-10}$

⑤ $4(a-3)=2(3a-6)-2a$

$4a-12=6a-12-2a$

$4a-12=4a-12$

$-12=-12$ identity

$\boxed{\text{all solutions}}$

⑥ $\frac{2(5n-1)}{-8}=\frac{3n+1}{-2}$

$\frac{10n-2}{-8}=\frac{3n+1}{-2}$

$-20n+4=-24n-8$

$4n=-12$ $\boxed{n=-3}$

⑦ $2a-4n=3a+b$

$-4n=a+b$

$\boxed{n=\frac{-a-b}{4}}$

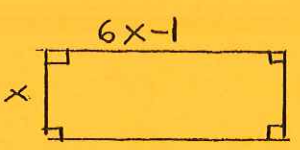
⑧ $nm+x=xy-2n$

$nm+2n=xy-x$

$n(m+2)=xy-x$

$\boxed{n=\frac{xy-x}{m+2} \text{ for } m\neq -2}$

⑨



$2(x)+2(6x-1)=26$

$2x+12x-2=26$

$14x=28$

$x=2$

$6x-1=11$

$\boxed{2 \text{ by } 11 \text{ m}}$

⑩

-5 x

-3 $x+2$

-1 $x+4$

→ $\boxed{1}$ $x+6$

$3(x+6)-2(2x+2)=11$

$3x+18-2x-2=11$

$x+16=11$

$x=-5$

⑪ $\frac{\text{part}}{\text{whole}}$ $\frac{n}{54}=\frac{6.75}{100}$

$100n=364.5$ $\boxed{n=3.645}$

⑫ $\frac{\text{part}}{\text{whole}}$ $\frac{7.75}{n}=\frac{12.5}{100}$

$12.5n=775$

$n=62$ $\boxed{\$62}$

⑬ $\frac{\text{discount}}{\text{org pr}}$ $\frac{2.90}{n}=\frac{20}{100}$

$20n=290$

$n=14.5$

org pr = \$14.50

\$14.50 − \$2.90 = $\boxed{\$11.60}$

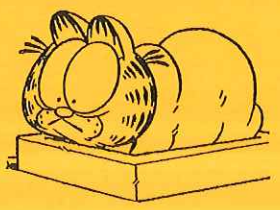
⑭ $.0825x+4(125)=599$

$.0825x+500=599$

$.0825x=99$

$x=1200$

$\boxed{\$1200}$



Unit 2

EXTRA PRACTICE - ANSWER KEY

① $\frac{2}{3}(12x-9y)-\frac{1}{3}(6x+3y)$

$8x-6y-2x-y$

$\boxed{6x-7y}$

② $\frac{15a-20b}{5}$

$\boxed{3a-4b}$

③ $\frac{-12x-10y}{-8}$

$\boxed{\frac{6x+5y}{4}}$

④ $\frac{4n-2}{7}=-2$

$4n-2=-14$

$4n=-12$

$\boxed{n=-3}$

⑤ $4(2x-5)=2(4x+3)$

$8x-20=8x+6$

$-20=6$

false equation

$\boxed{\text{no solutions}}$

⑥ $3(x-4)=2(3x-8)-2$

$3x-12=6x-16-2$

$-3x=-6$

$\boxed{x=2}$

⑦ $\frac{3}{4}(2n-2)=2(n+1)-2$

$\frac{6n}{4}-\frac{6}{4}=2n+2-2$

$4\left[\frac{6n}{4}-\frac{6}{4}=2n\right]$

$6n-6=8n$

$-2n=6$

$\boxed{n=-3}$

⑧ $3n-2(4n+1)=8-5(n+2)$

$3n-8n-2=8-5n-10$

$-5n-2=-5n-2$

$-2=-2$ identity

$\boxed{\text{all solutions}}$

⑨ $\frac{4a-3}{7}=\frac{-3(a+2)}{3}$

$3(4a-3)=-21(a+2)$

$12a-9=-21a-42$

$33a=-33$

$\boxed{a=-1}$

⑩ $5a+2x=3c$

$2x=3c-5a$

$\boxed{x=\frac{3c-5a}{2}}$

⑪ $4n-8=-20$

$4n=-12$

$\boxed{n=-3}$

⑫

	3n-2
n	

$2n+2(3n-2)=20$

$2n+6n-4=20$

$8n-4=20$

$8n=24$

$n=3$

$\boxed{3 \text{ by } 7 \text{ inches}}$

⑬

-7	n
-5	n+2
→ -3	n+4

$(n+4)-2n=(n+2)+16$

$-n+4=n+18$

$-2n=14$

$n=-7$

⑭ $\frac{\text{part}}{\text{whole}}\ \frac{8}{40}=\frac{n}{100}$

$40n=800$

$n=5$ $\boxed{5\%}$

⑮ $\frac{\text{part}}{\text{whole}}\ \frac{n}{80}=\frac{2.25}{100}$

$100n=180$

$n=\boxed{1.8}$

⑯ $\frac{\text{part}}{\text{whole}}\ \frac{32.4}{n}=\frac{60}{100}$

$60n=3240$

$n=\boxed{\$54}$

⑰ $\frac{\text{purch pr}}{\text{org pr}}\ \frac{15.30}{n}=\frac{85}{100}$

$85n=1530$

$n=\boxed{\$18}$

⑱ $3(310)+.06n=1122$

$930+.06n=1122$

$.06n=192$

$n=\boxed{\$3200}$

⑲ $2a+bx=7-cx$

$bx+cx=7-2a$

$x(b+c)=7-2a$

$\boxed{x=\frac{7-2a}{b+c} \text{ for } b+c\neq 0}$

⑳

-6	n
→ -5	n+1
-4	n+2

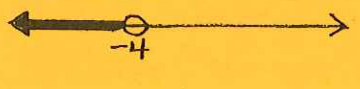
$3n-2(n+2)=2n+2$

$3n-2n-4=2n+2$

$-n=6$ $n=-6$

3.1
Answer Key

① $3n-2<2(n-3)$
$3n-2<2n-6$
$\boxed{n<-4}$



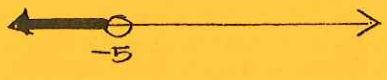
② $4(2x-1)\geq 6x-10$
$8x-4\geq 6x-10$
$2x\geq -6$
$\boxed{x\geq -3}$

③ $3x+5\geq 35-2(2x+1)$
$3x+5\geq 35-4x-2$
$3x+5\geq 33-4x$
$7x\geq 28$
$\boxed{x\geq 4}$

④ $4n-19<57-3(3n-5)$
$4n-19<57-9n+15$
$4n-19<72-9n$
$13n<91$
$\boxed{n<7}$

⑤ $3a+4>5(a+3)-7$
$3a+4>5a+15-7$
$3a+4>5a+8$
$-2a>4$ sign flip
$a<-2$
$\boxed{a<-2}$

⑥ $4x+9>3(2x+4)+7$
$4x+9>6x+12+7$
$4x+9>6x+19$
$-2x>10$ ← sign flip
$\boxed{x<-5}$



⑦ $2a+\frac{4a}{3}\leq 3(2a+1)+5$
$2a+\frac{4a}{3}\leq 6a+3+5$
$\left[2a+\frac{4a}{3}\leq 6a+8\right]3$
$6a+4a\leq 18a+24$
$10a\leq 18a+24$
$-8a\leq 24$
$\boxed{a\geq -3}$

⑧ $3n-\frac{n}{2}\geq 2(2n-5)+4$
$3n-\frac{n}{2}\geq 4n-10+4$
$\left[3n-\frac{n}{2}\geq 4n-6\right]2$
$6n-n\geq 8n-12$
$5n\geq 8n-12$
$-3n\geq -12$
$\boxed{n\leq 4}$

⑨ $\frac{2(n+3)}{5}>\frac{2+n}{-3}$

$\frac{2n+6}{5}>\frac{-2-n}{3}$

negative must be removed from the denominator before cross multiplying an inequality

$3(2n+6)>5(-2-n)$
$6n+18>-10-5n$
$\boxed{n>\frac{-28}{11}}$

⑩ $\frac{x-3}{6}>\frac{2(x+3)}{3}$

$\frac{x-3}{6}>\frac{2x+6}{3}$

$3(x-3)>6(2x+6)$
$3x-9>12x+36$
$-9x>45$
$\boxed{x<-5}$

⑪ $\frac{2a}{3}-a\geq 3(4a-1)$
$3\left[\frac{2a}{3}-a\geq 12a-3\right]$
$2a-3a\geq 36a-9$
$-a\geq 36a-9$
$-37a\geq -9$
$\boxed{a\leq 9/37}$

⑫ $12-\frac{5n}{4}<2(5n-1)$
$4\left[12-\frac{5n}{4}<10n-2\right]$
$48-5n<40n-8$
$-45n<-56$
$\boxed{n>56/45}$

⑬ $\frac{3(x-2)}{2}>\frac{6x}{4}$

$\frac{3x-6}{2}>\frac{6x}{4}$

$4(3x-6)>2(6x)$
$12x-24>12x$
$-24>0$
false inequality
$\boxed{\text{no solutions}}$

empty number line

(14) $\frac{1-n}{-5} \leq \frac{2(n-1)}{10}$

$\frac{n-1}{5} \leq \frac{2n-2}{10}$

negative must be removed from denominator before cross multiplying an inequality

$10(n-1) \leq 5(2n-2)$

$10n-10 \leq 10n-10$

$-10 \leq -10$

identity

all solutions

3.2

Answer Key

(1) $-3 > x$ and $x > -7$

$\boxed{-7 < x < -3}$

(2) $p > \frac{3}{4}$ and $p \leq 11/9$

$\boxed{3/4 < p \leq 11/9}$

(3) $y \leq 4/9$ and $y \geq \frac{-4}{3}$

$\boxed{-4/3 \leq y \leq 4/9}$

(4) $m < \frac{-6}{5}$ and $m > \frac{-4}{3}$

$\boxed{-13/7 < m < \frac{-6}{5}}$

(5) $r > 2$ or $r \leq -2$

union

(6) $x > -5$ and $x < 0$

intersection

(7) $-3 < n < 3$

intersection

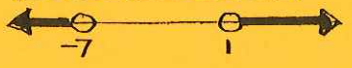
(8) $d \geq 0$ or $d < 4$

union

all points on the number line are either less than 4 or greater than (or equal to) 0

(9) $3+x < -4$ or $3+x > 4$

$\boxed{x < -7 \text{ or } x > 1}$



(10) $-1+b > -4$ or $-1+b < 3$

$b > -3$ or $b < 4$

all solutions

(11) $-5 < 4-3x < 13$

$-5 < 4-3x$ and $4-3x < 13$

$-9 < -3x$ and $-3x < 9$

$3 > x$ and $x > -3$

$\boxed{-3 < x < 3}$

(12) $-3-x \leq 2x \leq 3+x$

$-3-x \leq 2x$ and $2x \leq 3+x$

$-3 \leq 3x$ and $x \leq 3$

$-1 \leq x$ and $x \leq 3$

$\boxed{-1 \leq x \leq 3}$

(13) $2x-1 \leq 2x+8 < 2x+4$

$2x-1 \leq 2x+8$ and $2x+8 < 2x+4$

$-1 \leq 8$ and $8 < 4$

true false

no solutions

the intersection of an identity and a false inequality is the null set (no solutions)

(14) $n-1 < 2n+3 \leq n+4$

$n-1 < 2n+3$ and $2n+3 \leq n+4$

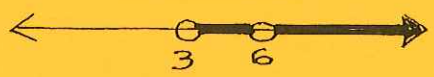
$-4 < n$ and $n \leq 1$

$\boxed{-4 < n \leq 1}$

(15) $x \neq 6$ and $3x+1 > 10$

$x \neq 6$ and $3x > 9$

$\boxed{x \neq 6 \text{ and } x > 3}$



(16) $2x+4 \leq 6$ or $x \geq 2x-4$

$2x \leq 2$ or $-x \geq -4$

$x \leq 1$ or $\boxed{x \leq 4}$

all points ≤ 1 are also ≤ 4; since this is a union, only $x \leq 4$ is needed to indicate the answer

(17) intersection

$-2 < x \leq 3$

(18) union

$x \leq -4$ or $x > 2$

(19) intersection

$x \geq 0$ and $x \neq 2$

(20) intersection

$-5 < x < 1$

3.3
Answer Key

① n = number of papers to be delivered

$.15n \geq 5.30$

$n \geq 35.\overline{3}$

at least 36 papers

② n = number of two-volume sets sold

$4.30n \geq 175$

$n \geq 40.697\ldots$

at least 41 sets

③ n = amount of sales

$21{,}000 < .06n + 12{,}000 < 27{,}000$

subtract 12,000 from each part of the inequality:

$9{,}000 < .06n < 15{,}000$

divide by .06:

$150{,}000 < n < 250{,}000$

between \$150,000 and \$250,000

④ n = an integer

$13 < 4n + 3 < 25$

subtract 3:

$10 < 4n < 22$

divide by 4:

$\frac{5}{2} < n < \frac{11}{2}$

$n =$ **3, 4, 5**

⑤

n	7	5	3	1
$n+2$	9	7	5	3

$(n)+(n+2) \leq 18$

$2n+2 \leq 18$

$2n \leq 16$

$n \leq 8$

highest odd value for n is 7

4 sets of integers (positive, odd)

⑥

n	10	8	6	4	2
$n+2$	12	10	8	6	4

$(n)+(n+2) \leq 22$

$2n+2 \leq 22$

$2n \leq 20$

$n \leq 10$

highest even value for $n = 10$

5 set of integers (pos, even)

⑦ $2 - \frac{2n}{3} < 3(3n-1)$

$3\left[2 - \frac{2n}{3} < 9n - 3\right]$

$6 - 2n < 27n - 9$

$-29n < -15$

$n > 15/29$

⑧ $\frac{2(3x-4)}{3} \geq \frac{4x-1}{2}$

$\frac{6x-8}{3} \geq \frac{4x-1}{2}$

$2(6x-8) \geq 3(4x-1)$

$12x - 16 \geq 12x - 3$

$-16 \geq -3$ false inequality

no solutions

⑨ $3 - 2x < 5$ or $3x - 1 > -10$

$-2x < 2$ or $3x > -9$

$x > -1$ or $x > -3$ union

since this is a union, all values greater than -3 include all possible solutions

⑩ $5n + 2 \geq 17$ and $n \neq 7$

$5n \geq 15$ and $n \neq 7$

$n \geq 3$ and $n \neq 7$

⑪ $n - 4 < 2n + 1 \leq n + 10$

$n - 5 < 2n \leq n + 9$

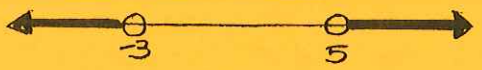
subtract 1
subtract n

$-5 < n \leq 9$

⑫ $2a+1>11$ or $3a<a-6$

$2a>10$ or $2a<-6$

$\boxed{a>5 \text{ or } a<-3}$



⑬ $x<-3$ or $x>4$

union

⑭ $-4\leq x<0$

intersection

⑮ $x>-2$ and $x\neq 6$

intersection

⑯ $-5\leq x\leq 4$

intersection

3.4

Answer Key

① $|x+4|=6$

$x+4=6$ or $x+4=-6$

$\boxed{x=2 \text{ or } x=-10}$

② $|y+1|=5$

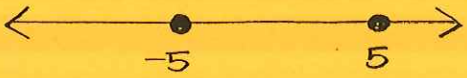
$y+1=5$ or $y+1=-5$

$\boxed{y=4 \text{ or } y=-6}$

③ $|x|+7=12$

$|x|=5$

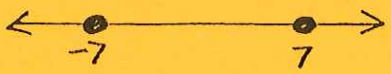
$\boxed{x=5 \text{ or } x=-5}$



④ $|n|-4=3$

$|n|=7$

$\boxed{n=7 \text{ or } n=-7}$



⑤ $|y-1|<4$

$y-1<4$ and $y-1>-4$

$y<5$ and $y>-3$

$\boxed{-3<y<5}$

⑥ $|2-x|\leq 1$

$2-x\leq 1$ and $2-x\geq -1$

$-x\leq -1$ and $-x\geq -3$

$x\geq 1$ and $x\leq 3$

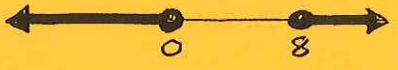
$\boxed{1\leq x\leq 3}$

⑦ $|12-3x|\geq 12$

$12-3x\geq 12$ or $12-3x\leq -12$

$-3x\geq 0$ or $-3x\leq -24$

$\boxed{x\leq 0 \text{ or } x\geq 8}$



⑧ $|y+1|>4$

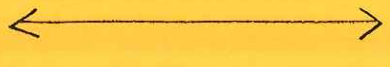
$y+1>4$ or $y+1<-4$

$\boxed{y>3 \text{ or } y<-5}$

⑨ $|x-3|+5\leq 2$

$|x-3|\leq -3$

$\boxed{\text{no solutions}}$



an absolute value cannot be negative

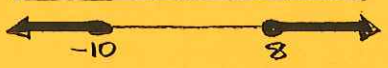
⑩ $|n+3|+7>5$
$|n+3|>-2$
all solutions
an absolute value must be greater than a negative

⑪ $|4x+4|+2 \leq 22$
$|4x+4| \leq 20$
$4x+4 \leq 20$ and $4x+4 \geq -20$
$4x \leq 16$ and $4x \geq -24$
$x \leq 4$ and $x \geq -6$
$-6 \leq x \leq 4$

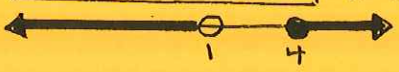
⑫ $|6x+6|-3 \leq 33$
$|6x+6| \leq 36$
$6x+6 \leq 36$ and $6x+6 \geq -36$
$6x \leq 30$ and $6x \geq -42$
$x \leq 5$ and $x \geq -7$
$-7 \leq x \leq 5$

⑬ $|2x+1|+3 \geq 1$
$|2x+1| \geq -2$
all solutions
absolute value must be greater than a negative

⑭ $|10x+10|-1 \geq 89$
$|10x+10| \geq 90$
$10x+10 \geq 90$ or $10x+10 \leq -90$
$10x \geq 80$ or $10x \leq -100$
$x \geq 8$ or $x \leq -10$
$x \geq 8$ or $x \leq -10$

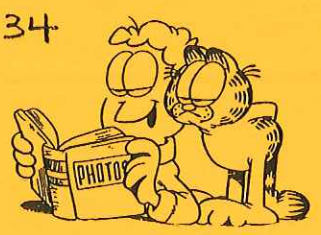


⑮ $3n+1<4$ or $2n-1 \geq 7$
$3n<3$ or $2n \geq 8$
$n<1$ or $n \geq 4$ union



⑯ $3x-2 \leq 5x+4 < 3x+12$ and $x \neq 0$
$3x-6 \leq 5x < 3x+8$ subtract 4
$-6 \leq 2x < 8$ subtract 3x
$-3 \leq x < 4$ divide by 2
$-3 \leq x < 4$ and $x \neq 0$
intersection

⑰ n = the integer
$22 \leq 5n-7 \leq 34$
$29 \leq 5n \leq 41$
$\frac{29}{5} \leq n \leq \frac{41}{5}$
$n = 6, 7, 8$



⑱

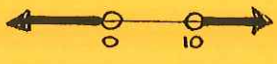
n	-3	-1	1	3	5
$n+2$	-1	1	3	5	7

$-5 < (n)+(n+2) < 13$
$-5 < 2n+2 < 13$
$-7 < 2n < 11$
$-\frac{7}{2} < n < \frac{11}{2}$
consecutive odd integers
n must be an odd integer between $-3\frac{1}{2}$ and $5\frac{1}{2}$

3.5
Answer Key

① $|4n-2|-1<9$
$|4n-2|<10$
$4n-2<10$ and $4n-2>-10$
$4n<12$ and $4n>-8$
$n<3$ and $n>-2$
$-2<n<3$

② $|x-5|-3>2$ $|x-5|>5$
$x-5>5$ or $x-5<-5$
$x>10$ or $x<0$



③ $|2n-1| \geq 5$

$2n-1 \geq 5$ or $2n-1 \leq -5$

$2n \geq 6$ or $2n \leq -4$

$\boxed{n \geq 3 \text{ or } n \leq -2}$

④ $|3y+2| \leq 5$

$3y+2 \leq 5$ and $3y+2 \geq -5$

$3y \leq 3$ and $3y \geq -7$

$y \leq 1$ and $y \geq -7/3$

$\boxed{-7/3 \leq y \leq 1}$

⑤ $|4-2x|+3 \leq 2$

$|4-2x| \leq -1$

$\boxed{\text{no solutions}}$

absolute valve must be positive or zero

⑥ $|2n+1|-3=8$

$|2n+1|=11$

$2n+1=11$ or $2n+1=-11$

$2n=10$ or $2n=-12$

$\boxed{n=5 \text{ or } n=-6}$

⑦ $|4x|-2=6$

$|4x|=8$

$4x=8$ or $4x=-8$

$\boxed{x=2 \text{ or } x=-2}$

⑧ $|3n-2|+4>2$

$|3n-2|>-2$

$\boxed{\text{all solutions}}$

absolute value must be greater than or equal to zero, all values of n will work in this inequality

⑨ $\frac{3(n-3)}{4} < \frac{n-6}{-2}$

$\frac{3n-9}{4} < \frac{6-n}{2}$

negative must be removed from denominator before cross multiplying an inequality

$2(3n-9)<4(6-n)$

$6n-18<24-4n$

$10n<42$

$\boxed{n<21/5}$

⑩ $x \geq -8$ and $x<0$

$\boxed{-8 \leq x < 0}$

⑪ union

$\boxed{x<-2 \text{ or } x \geq 1}$

⑫ intersection

$\boxed{-2<x<5 \text{ and } x \neq 3}$

⑬ $2n-1<3n+6<2n+8$ and $n \neq -2$

$2n-7<3n<2n+2$ subtract 6

$-7<n<2$ subtract $2n$

$\boxed{-7<n<2 \text{ and } n \neq -2}$

⑭ n = sales for the year

$21{,}600 < .05n + 18{,}000 < 24{,}500$

$3600 < .05n < 6500$

divide by .05

$72{,}000 < n < 130{,}000$

$\boxed{\text{between } \$72{,}000 \text{ and } \$130{,}000}$

⑮ n = the integer

$21 \leq 3n-4 \leq 37$

$25 \leq 3n \leq 41$

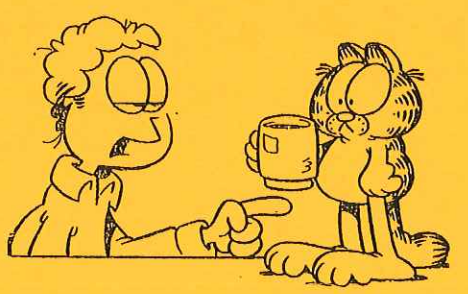
$\frac{25}{3} \leq n \leq \frac{41}{3}$

n is between $8\frac{1}{3}$ and $13\frac{2}{3}$

There are five values for n

$\boxed{9, 10, 11, 12, 13}$

Unit 3
REVIEW
Answer Key



① $4(n-3) \leq 2(3n-5)-6$

$4n-12 \leq 6n-10-6$

$4n-12 \leq 6n-16$

$-2n \leq -4$

$\boxed{n \geq 2}$

② $3(2x+1)>4(3+3x)+3$

$6x+3>12+12x+3$

$6x+3>15+12x$

$-6x>12$

$\boxed{x<-2}$

③ $4a+\frac{a}{3} \geq 2(a-5)-4$

$3\left[4a+\frac{a}{3} \geq 2a-14\right]$

$12a+a \geq 6a-42$

$7a \geq -42$

$\boxed{a \geq -6}$

④ $\frac{2n}{5}+1<3(n-5)-n$

$\frac{2n}{5}+1<3n-15-n$

$5\left[\frac{2n}{5}+1<2n-15\right]$

$2n+5<10n-75$

$-8n<-80$

$\boxed{n>10}$

⑤ $\frac{2(x+4)}{3}>\frac{x+7}{2}$

$\frac{2x+8}{3}>\frac{x+7}{2}$

$2(2x+8)>3(x+7)$

$4x+16>3x+21$

$\boxed{x>5}$

⑥ $\frac{-2(n+5)}{8}\leq\frac{4-3n}{-7}$

$\frac{-2n-10}{8}\leq\frac{3n-4}{7}$

negative must be removed from the denominator before cross multiplying an inequality

$7(-2n-10)\leq 8(3n-4)$

$-14n-70\leq 24n-32$

$-38n\leq 38$

$\boxed{n\geq -1}$

⑦ $2(3n+5)<3(2n-1)$

$6n+10<6n-3$

$10<-3$

false inequality

$\boxed{\text{no solutions}}$

⑧ $n-3\geq 4n-3(n+1)$

$n-3\geq 4n-3n-3$

$n-3\geq n-3$

$-3\geq -3$ identity

$\boxed{\text{all solutions}}$

⑨ $-2<n$ and $4>n$

$\boxed{-2<n<4}$

⑩ $x\geq\frac{-2}{3}$ and $x<\frac{1}{2}$

$\boxed{-\frac{2}{3}\leq x<\frac{1}{2}}$

⑪ $2n-1>5$ or $4-3n>2$

$2n>6$ or $-3n>-6$

$\boxed{n>3 \text{ or } n<2}$

⑫ $4(x+1)\geq -8$ or $9-5x<-1$

$4x+4\geq -8$ or $-5x<-10$

$4x\geq -12$ or $x>2$

$x\geq -3$ or $x>2$

$\boxed{x\geq -3}$

⑬ $3n+4<3n-2<3n+1$

subtract $3n$ from all parts:

$4<-2<1$

false inequality

$\boxed{\text{no solutions}}$

⑭ $n-5\leq 2n+1\leq n+4$

$n-6\leq 2n\leq n+3$

subtract 1 ↓

subtract n ↓

$\boxed{-6\leq n\leq +3}$

⑮ $3a+4<-5$ and $-2a>4$

$3a<-9$ and $a<-2$

$a<-3$ and $a<-2$

$\boxed{a<-3}$

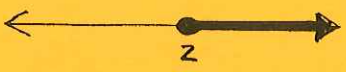
⑯ $4x\geq 2x+4$ and $-3(2x-1)\leq 3$

$2x\geq 4$ and $-6x+3\leq 3$

$x\geq 2$ and $-6x\leq 0$

$x\geq 2$ and $x\geq 0$

$\boxed{x\geq 2}$



⑰ $3n-1<4n+4<2n+8$

subtract 4

$3n-5<4n<2n+4$

$3n-5<4n$ and $4n<2n+4$

$-5<n$ and $2n<4$

$-5<n$ and $n<2$

$\boxed{-5<n<2}$

⑱ $2x-2>4$ or $3x-1<14$

$2x>6$ or $3x<15$

$x>3$ or $x<5$

all values of x are either greater than 3 or less than 5

$\boxed{\text{all solutions}}$

⑲ $x-1\leq 2x<x+4$ and $x\neq 0$

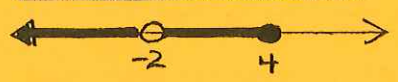
subtract x

$\boxed{-1\leq x<4 \text{ and } x\neq 0}$

(20) $3x-1 \le 11$ and $x \neq -2$

$3x \le 12$ and $x \neq -2$

$x \le 4$ and $x \neq -2$



(21) $-4 < x \le 3$

intersection

(22) $x < -4$ or $x > 2$

union

(23) $x \le 3$ and $x \neq -1$

intersection

(24) $-5 < x < 4$ and $x \neq 2$

intersection

(25) n = the integer

$17 < 2n+4 < 27$

subtract 4

$13 < 2n < 23$

divide by 2

$\frac{13}{2} < n < \frac{23}{2}$

n is between $6\frac{1}{2}$ and $11\frac{1}{2}$

7, 8, 9, 10, 11

(26) n = the integer

$-9 < 3n-4 < 1$

add 4

$-5 < 3n < 5$

divide by 3

$\frac{-5}{3} < n < \frac{5}{3}$

n is between $-1\frac{2}{3}$ and $1\frac{2}{3}$

-1, 0, 1

(27) n = sales

$16,400 < 15,200 + .06n < 18,200$

subtract 15,200

$1200 < .06n < 3000$

divide by .06

$20,000 < n < 50,000$

between \$20,000 and \$50,000

(28) n = sales

$12,780 < 11,100 + .07n < 16,280$

subtract 11,100

$1680 < .07n < 5180$

divide by .07

$24,000 < n < 74,000$

between \$24,000 and \$74,000

(29)

n	5	6	7
$n+1$	6	7	8
$n+2$	7	8	9

$17 \le (n) + (n+1) + (n+2) \le 26$

$17 \le 3n+3 \le 26$

subtract 3

$14 \le 3n \le 23$

divide by 3

$\frac{14}{3} \le n \le \frac{23}{3}$

n is between $4\frac{2}{3}$ and $7\frac{2}{3}$

(30)

n	-2	0	2	4
$n+2$	0	2	4	6
$n+4$	2	4	6	8

$-1 \le (n) + (n+2) + (n+4) \le 20$

$-1 \le 3n+6 \le 20$

subtract 6

$-7 \le 3n \le 14$

divide by 3

$\frac{-7}{3} \le n \le \frac{14}{3}$

$-2\frac{1}{3} \le n \le 4\frac{2}{3}$

n is even and n is between $-2\frac{1}{3}$ and $4\frac{2}{3}$

(31) $|n+1|+4=7$

$|n+1|=3$

$n+1=3$ or $n+1=-3$

$\boxed{n=2 \text{ or } n=-4}$

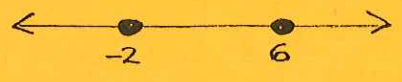
(32) $|2x-4|-3=5$

$|2x-4|=8$

$2x-4=8$ or $2x-4=-8$

$2x=12$ or $2x=-4$

$\boxed{x=6 \text{ or } x=-2}$



(33) $|3a-2|+4<3$

$|3a-2|<-1$

an absolute value must be greater than or equal to 0

$\boxed{\text{no solutions}}$

(34) $|2n+3|+4 \geq 2$

$|2n+3| \geq -2$

an absolute value must be greater than or equal to 0

$\boxed{\text{all solutions}}$

(35) $|a+4|>2$

$a+4>2$ or $a+4<-2$

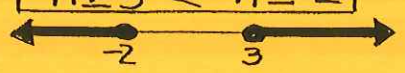
$\boxed{a>-2 \text{ or } a<-6}$

(36) $|2n-1| \geq 5$

$2n-1 \geq 5$ or $2n-1 \leq -5$

$2n \geq 6$ or $2n \leq -4$

$\boxed{n \geq 3 \text{ or } n \leq -2}$



(37) $|x-6|-2 \leq 10$

$|x-6| \leq 12$

$x-6 \leq 12$ and $x-6 \geq -12$

$x \leq 18$ and $x \geq -6$

$\boxed{-6 \leq x \leq 18}$

(38) $|2a+4|+1<13$

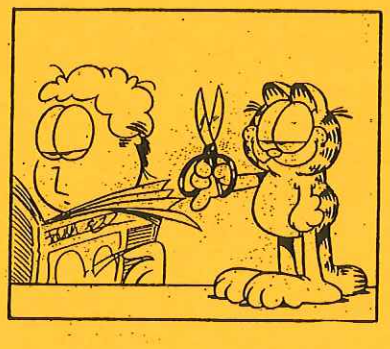
$|2a+4|<12$

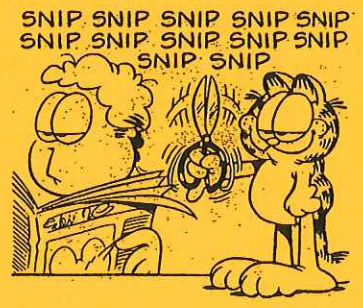
$2a+4<12$ and $2a+4>-12$

$2a<8$ and $2a>-16$

$a<4$ and $a>-8$

$\boxed{-8<a<4}$





Unit 3

SKILL CHECK - ANSWER KEY

① $3(n-1) > 4n-7$
$3n-3 > 4n-7$
$-n > -4$
$\boxed{n<4}$

② $\frac{n}{2}+4 \le 2(n-1)-\frac{3n}{2}$
$2\left[\frac{n}{2}+4 \le 2n-2-\frac{3n}{2}\right]$
$n+8 \le 4n-4-3n$
$n+8 \le n-4$
$8 \le -4$ false ineq.
$\boxed{\text{no solutions}}$

③ $\frac{2(x+1)}{3} < \frac{3x+1}{4}$
$\frac{2x+2}{3} < \frac{3x+1}{4}$
$4(2x+2) < 3(3x+1)$
$8x+8 < 9x+3$
$-x < -5$
$\boxed{x>5}$

④ $2a<6$ and $3a \ge -9$
$a<3$ and $a \ge -3$
$\boxed{-3 \le a < 3}$

⑤ $3n-5 < 4n+6 < 2n+8$
subtract 6
$3n-11 < 4n < 2n+2$
$3n-11 < 4n$ and $4n < 2n+2$
$-11 < n$ and $2n < 2$
$-11 < n$ and $n < 1$
$\boxed{-11 < n < 1}$

⑥ $4(x+4) \le 4x+8 \le 2(2x+5)$
$4x+16 \le 4x+8 \le 4x+10$
subtract $4x$
$16 \le 8 \le 10$
false inequality
$\boxed{\text{no solutions}}$

⑦ $3n+4 \le -2$ or $2n-5 \ge 3$
$3n \le -6$ or $2n \ge 8$
$\boxed{n \le -2 \text{ or } n \ge 4}$

⑧ $n<-1$ or $n>8$
union

⑨ n = an even integer
$-12 < 4n-3 < 7$
add 3
$-9 < 4n < 10$
divide by 4
$\frac{-9}{4} < n < \frac{10}{4}$
n is between
$-2\frac{1}{4}$ and $2\frac{1}{2}$
$n = \boxed{-2, 0, 2}$

⑩ n = sales
$16{,}960 < 16{,}000 + .08n < 21{,}600$
$960 < .08n < 5{,}600$
$12{,}000 < n < 70{,}000$
$\boxed{\text{between } \$12{,}000 \text{ and } \$70{,}000}$

⑪

n	5	7	9
$n+2$	7	9	11

$2 \le 2n-(n+2) \le 8$
$2 \le 2n-n-2 \le 8$
$2 \le n-2 \le 8$
$4 \le n \le 10$
n is odd = 5, 7, 9

⑫ $x-3 \le 3x+5 < 2x+8$
$x-8 \le 3x < 2x+3$
$x-8 \le 3x$ and $3x < 2x+3$
$-8 \le 2x$ and $x < 3$
$\boxed{-4 \le x < 3 \text{ and } x \ne -1}$

⑬ $|2n-4|-2 \ge 4$
$|2n-4| \ge 6$
$2n-4 \ge 6$ or $2n-4 \le -6$
$2n \ge 10$ or $2n \le -2$
$\boxed{n \ge 5 \text{ or } n \le -1}$

⑭ $|3x+2|+4 < 10$
$|3x+2| < 6$
$3x+2 < 6$ and $3x+2 > -6$
$3x < 4$ and $3x > -8$
$\boxed{\frac{-8}{3} < x < \frac{4}{3}}$

Unit 3

REMEDIATION - ANSWER KEY

① $2(a-3) \le 5a-3$
$2a-6 \le 5a-3$
$-3a \le 3$
$\boxed{a \ge 1}$

② $\left[\frac{2n}{3} - 1 > n-4\right] 3$
$2n-3 > 3n-12$
$-n > -9$ $\boxed{n < 9}$

③ $\frac{3(2n+2)}{2} > \frac{6n-7}{2}$

$\frac{6n+6}{2} > \frac{6n-7}{2}$

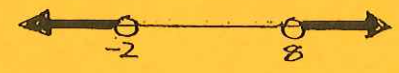
$2(6n+6) > 2(6n-7)$
$12n+12 > 12n-14$
$12 > -14$ identity
$\boxed{\text{all solutions}}$

④ $5n-1 \le 14$ and $2n+3 > -1$
$5n \le 15$ and $2n > -4$
$n \le 3$ and $n > -2$
$\boxed{-2 < n \le 3}$

⑤ $2x-6 \le 3x+4 < x+12$
subtract 4
$2x-10 \le 3x < x+8$
$2x-10 \le 3x$ and $3x < x+8$
$-10 \le x$ and $2x < 8$
$-10 \le x$ and $x < 4$
$\boxed{-10 \le x < 4}$

⑥ $2(4n-1) < 8n+5 < 4(2n+3)$
$8n-2 < 8n+5 < 8n+12$
$-2 < 5 < 12$ identity
$\boxed{\text{all solutions}}$

⑦ $3a+1 < -5$ or $2a+6 < 3a-2$
$3a < -6$ or $-a < -8$
$\boxed{a < -2 \text{ or } a > 8}$



⑧ $-4 < n \le 0$
intersection

⑨ n = odd integer
$-4 \le 2n+3 \le 10$
$-7 \le 2n \le 7$
$-\frac{7}{2} \le n \le \frac{7}{2}$
$n = \boxed{-3, -1, 1, 3}$

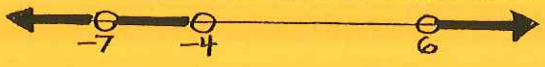
⑩ n = total sales
$16,820 < 12,500 + .12n < 25,460$
$4320 < .12n < 12,960$
$36,000 < n < 108,000$
$\boxed{\begin{array}{l}\text{between} \\ \$36,000 \text{ and } \$108,000\end{array}}$

⑪

n	-6	-4	-2	0
$n+2$	-4	-2	0	2
$n+4$	-2	0	2	4

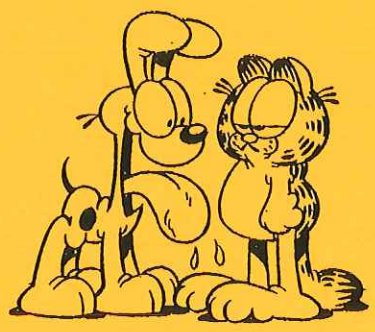
$-10 < (n+2) + 2(n+4) < 12$
$-10 < 3n+10 < 12$
$-20 < 3n < 2$
$-\frac{20}{3} < n < \frac{2}{3}$ n is even $-6, -4, -2, 0$

⑫ $[3n < n-8$ or $2n > n+6]$ and $n \ne -7$
$(2n < -8$ or $n > 6)$ and $n \ne -7$
$\boxed{(n < -4 \text{ or } n > 6) \text{ and } n \ne -7}$



⑬ $|5x+3| - 1 > 7$
$|5x+3| > 8$
$5x+3 > 8$ or $5x+3 < -8$
$5x > 5$ or $5x < -11$
$\boxed{x > 1 \text{ or } x < -11/5}$

⑭ $|2n-5| + 3 \le 6$
$|2n-5| \le 3$
$2n-5 \le 3$ and $2n-5 \ge -3$
$2n \le 8$ and $2n \ge 2$
$\boxed{1 \le n \le 4}$



Unit 3

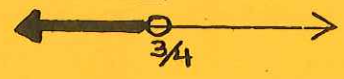
EXTRA PRACTICE - ANSWER KEY

① $2(4a-6)<-6$

$8a-12<-6$

$8a<6$

$\boxed{a<3/4}$



② $-3(x-2)\geq 2(x-1)+3$

$-3x+6\geq 2x-2+3$

$-3x+6\geq 2x+1$

$-5x\geq -5$

$\boxed{x\leq 1}$

③ $2(n+3)<\frac{n}{4}-1$

$4[2n+6<\frac{n}{4}-1]$

$8n+24<n-4$

$7n<-28$

$\boxed{n<-4}$

④ $-3(3x+2)\geq 2(x-3)-11x$

$-9x-6\geq 2x-6-11x$

$-6\geq -6$ identity

$\boxed{\text{all solutions}}$

⑤ $\frac{2n+7}{3}\geq\frac{3(3n-2)}{6}$

$6(2n+7)\geq 9(3n-2)$

$12n+42\geq 27n-18$

$-15n\geq -60$

$\boxed{n\leq 4}$

⑥ $x>-2$ and $x<4$

$\boxed{-2<x<4}$

⑦ $3x-2<-8$ or $x-7>-3$

$3x<-6$

$\boxed{x<-2 \text{ or } x>4}$

⑧ $x+4\leq 2x+9\leq x+15$

$4\leq x+9\leq 15$

$\boxed{-5\leq x\leq 6}$

⑨ $6n+5<2(3n+4)<3(2n-1)$

$6n+15<6n+8<6n-3$

$15<18<-3$

$\boxed{\text{no solutions}}$

⑩ $x\geq 4x-9$ or $2x\geq x+4$

$-3x\geq -9$ or $x\geq 4$

$\boxed{x\leq 3 \text{ or } x\geq 4}$

⑪ $n-8>3n-4$ and $n\neq -6$

$-2n>4$

$\boxed{n<-2 \text{ and } n\neq -6}$

⑫ $\boxed{\text{union}\quad x<-2 \text{ or } x>4}$

⑬ $\boxed{\text{intersection}\quad -7\leq x\leq 1}$

⑭ $12<3n-5<15$

$17<3n<20$

$\frac{17}{3}<n<\frac{20}{3}$

$5\frac{2}{3}<n<6\frac{2}{3}$

integer = $\boxed{6}$

⑮ $6<5n-3<25$

$9<5n<28$

$\frac{9}{5}<n<\frac{28}{5}$

$1\frac{4}{5}<n<5\frac{3}{5}$

$\boxed{2,3,4,5}$

⑯ $21{,}200<14{,}200+.05n<25{,}200$

$7000<.05n<11{,}000$

$140{,}000<n<220{,}000$

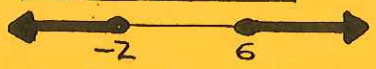
$\boxed{\begin{array}{l}\text{between}\\ \$140{,}000 \text{ and } \$220{,}000\end{array}}$

⑰ $|3x-6|\geq 12$

$3x-6\geq 12$ or $3x-6\leq -12$

$3x\geq 18$ or $3x\leq -6$

$\boxed{x\geq 6 \text{ or } x\leq -2}$



⑱ $|2x+6|-4<6$

$|2x+6|<10$

$2x+6<10$ and $2x+6>-10$

$2x<4$ and $2x>-16$

$x<2$ and $x>-8$

$\boxed{-8<x<2}$

⑲ $x-3<2x+5<x+9$

$-3<x+5<9$ and $x\neq -2$

$\boxed{-8<x<4 \text{ and } x\neq -2}$

⑳ $30<n+4(n+2)<56$

$30<5n+8<56$

$22<5n<48$

$\frac{22}{5}<n<\frac{48}{5}$

$4\frac{2}{5}<n<9\frac{3}{5}$

$\boxed{\begin{array}{l}5,7\\ 7,9\\ 9,11\end{array}}$

Cumulative Review

"A"

Cumulative Review Answer Key

① Substitution Property of Equality

② Distributive Property

③ $(2n+3)+(n-5)$

④ $2ab^2 - 3bc$

$2(-2)(-1)^2 - 3(-1)(3)$

$2(-2)(1) - 3(-1)(3)$

$(-4)-(-9) = (-4)+(9) = \boxed{5}$

⑤ $2b^3 - 3(ac-b)$

$2(-1)^3 - 3[(-2)(3)-(-1)]$

$2(-1) - 3[(-6)+1]$

$(-2) - 3(-5)$

$(-2)-(-15) = (-2)+15 = \boxed{13}$

⑥ $8xy - 3x(2x-4y) - 2x^2$

$8xy - 6x^2 + 12xy - 2x^2$

$\boxed{20xy - 8x^2}$

⑦ $4a(a-2b) - 3b(a+2b) + b^2$

$4a^2 - 8ab - 3ab - 6b^2 + b^2$

$\boxed{4a^2 - 11ab - 5b^2}$

⑧ $\frac{3n-4}{8} = 3n+10$ } mult. by 8

continued

$3n-4 = 24n+80$

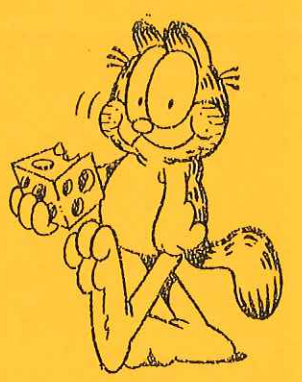
$-21n = 84$ $\boxed{n=-4}$

⑨ $5(3n-2) = 4(n+4)+3n-2$

$15n-10 = 4n+16+3n-2$

$15n-10 = 7n+14$

$8n = 24$ $\boxed{n=3}$



⑩ $\frac{n+5}{3} < \frac{4(3n-1)}{12}$

$\frac{n+5}{3} < \frac{12n-4}{12}$

$12(n+5) < 3(12n-4)$

$12n+60 < 36n-12$

$-24n < -72$ $\boxed{n>3}$

Sign flips, multiply by neg.

⑪ $2n-9 \le 3n-4 < n+8$

$2n-9 \le 3n-4$ and $3n-4 < n+8$

$-5 \le n$ and $2n < 12$

$n < 6$

$\boxed{-5 \le n < 6}$

⑫ $2x+3 \le 7$ or $3(x-4) > 6$

$2x \le 4$ $3x-12 > 6$

$x \le 2$ or $3x > 18$

$x > 6$

$\boxed{x \le 2 \text{ or } x > 6}$

⑬ $3n-2m=mn+4$

$3n-mn=2m+4$

$n(3-m)=2m+4$

$\boxed{n=\frac{2m+4}{3-m} \text{ for } m\neq 3}$

⑭

	now	6 ago	in 2
Mrs. B	$4n$	$4n-6$	
Nick	n		$n+2$

$4n-6=3(n+2)$

$4n-6=3n+6$

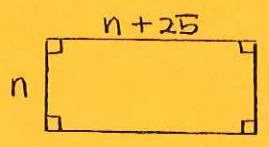
$n=12$

$n-1$ (last yr) = $\boxed{11 \text{ yrs old}}$

⑮ $2n+12=3n-31$

$43=n$ $\boxed{43}$

⑯



$2n+2(n+25)=170$

$2n+2n+50=170$

$4n=120$

$n=30$ $A=(30)(55)$

$n+25=55$ $\boxed{1650 m^2}$

⑰ $\frac{\text{Part}}{\text{Whole}}$ $\frac{85.69}{n}=\frac{104.5}{100}$

$104.5n=8569$

$n=\boxed{\$82}$

⑱ $\frac{\text{Purch pr}}{\text{Orig pr}}$ $\frac{128}{n}=\frac{80}{100}$

$80n=12{,}800$ $n=\boxed{\$160}$

⑲ $8<3n-2<24$

$10<3n<26$

$\frac{10}{3}<n<\frac{26}{3}$ $\boxed{4, 6, 8}$

n = even, between $3\frac{1}{3}$ and $8\frac{2}{3}$

⑳ $.04n+400=520$

$.04n=120$

$n=3000$ $\boxed{\$3000}$

㉑ $|4n-6|>10$

$4n-6>10$ or $4n-6<-10$

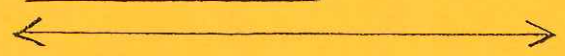
$4n>16$ or $4n<-4$

$\boxed{n>4 \text{ or } n<-1}$

㉒ $|n|-3\leq -4$

$|n|\leq -1$ ← impossible

$\boxed{\text{no solutions}}$



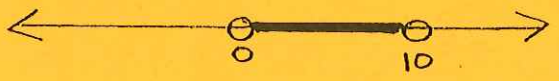
㉓ $|n-5|+3<8$

$|n-5|<5$

$n-5<5$ and $n-5>-5$

$n<10$ and $n>0$

$\boxed{0<n<10}$



"B"

Cumulative Review Answer Key

① Multiplicative Inverse

② Symmetric Property of Equality

③ $(n-3)(n^2+2)$

④ $-x^2-3xy$

$-(-1)^2-3(-1)(4)$

$-(1)-(-12)$

$-1+12$

$\boxed{11}$

⑤ $\frac{2xy^2+8z}{4x^3y} = \frac{2(-1)(4)^2+8(-2)}{4(-1)^3(4)}$

$\frac{(-32)+(-16)}{-16} = \frac{-48}{-16} = \boxed{3}$

⑥ $3x(2y-x)-2x(3x+y)$

$6xy-3x^2-6x^2-2xy$

$\boxed{-9x^2+4xy}$

⑦ $\frac{-12m-20mn}{8m} = \frac{-3-5n}{2}$

divide by 4

⑧ $3(a-4)-5a = a+3$

$3a-12-5a = a+3$

$-2a-12 = a+3$

$-3a = 15$

$\boxed{a=-5}$

⑨ $\left[6-\frac{3n}{2} = 9-2n\right](2)$

$12-3n = 18-4n$

$\boxed{n=6}$

⑩ $4(x-3) \geq 8(x-1)$

$4x-12 \geq 8x-8$

$-4x \geq 4$

$\boxed{x \leq -1}$

⑪ $n+6 < 3n+10 \leq n+16$

$n-4 < 3n \leq n+6$

subtract 10 then subtract n

$-4 < 2n \leq 6$

divide by 2

$\boxed{-2 < n \leq 3}$

⑫ $a-3 \leq 4$ or $3(a-2) < 5a-2$

$a \leq 7$ or $3a-6 < 5a-2$

$-2a < 4$

$a \leq 7$ or $a > -2$

all points are either less than or equal to 7 or greater than -2

$\boxed{\text{all solutions}}$ ⟷

⑬ $4(x-3y) = xy+y^2$

$4x-12y = xy+y^2$

$4x-xy = 12y+y^2$

$x(4-y) = 12y+y^2$

$\boxed{x = \frac{12y+y^2}{4-y} \text{ for } y \neq 4}$

⑭

	now	6 ago	4 ago
Alice	n		n−4
Fay	2n	2n−6	

$2n-6 = 3(n-4)$

$2n-6 = 3n-12$

$-n = -6$

$n = 6 \quad 2n = 12$

$\boxed{\text{Fay is 6 yrs older}}$

⑮

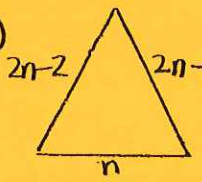
n	−4	
n+2	−2	←
n+4	0	

$2n-3(n+2) = -2$

$2n-3n-6 = -2$

$-n = 4$

$n = -4$

⑯ 

$(2n-2)+(2n-2)+n = 26$

$5n-4 = 26$

$5n = 30$

$n = 6$

$\boxed{6 \text{ in.}}$

⑰ $\frac{\text{part}}{\text{whole}} \quad \frac{n}{140} = \frac{22.5}{100}$

$100n = 3150$

$\boxed{31.5}$

(18) $\frac{\text{discount}}{\text{org pr}}$ $\frac{10.80}{n} = \frac{15}{100}$

$15n = 1080$

$n = 72$

$72 - 10.80 =$ **$61.20**

(19) $-7 < 4n + 6 < 19$

$-13 < 4n < 13$

$\frac{-13}{4} < n < \frac{13}{4}$

$n =$ **$-3, -1**

(20) $.05n + 3(225) = 815$

$.05n + 675 = 815$

$.05n = 140$

$n =$ **$2800**

(21) $|6x - 6| - 2 \leq 16$

$|6x - 6| \leq 18$

$6x - 6 \leq 18$ and $6x - 6 \geq -18$

$6x \leq 24$ and $6x \geq -12$

$x \leq 4$ and $x \geq -2$

$-2 \leq x \leq 4

(22) $|n - 1| + 4 > 2$

$|n - 1| > -2$

absolute value must be greater than or = 0

all solutions

(23) $|3n - 6| > 15$

$3n - 6 > 15$ or $3n - 6 < -15$

$3n > 21$ or $3n < -9$

$n > 7$ or $n < -3$

$n > 7$ or $n < -3

"C"

Cumulative Review Answer Key

① Commutative Property of Addition

② Additive Inverse

③ $n^3 - (4n - 3)$

④ $abc - 2bc^3$

$(2)(-2)(-1) - 2(-2)(-1)^3$

$(4) - 2(-2)(-1)$

$(4) - (4) =$ **0**

⑤ $4bc - 2(ab^2 - 1)$

$4(-2)(-1) - 2[(-2)(-2)^2 - 1]$

$(8) - 2(7)$

$(8) - (14) =$ **$-6**

⑥ $4ab - 2a(3a - b) - 5a^2$

$4ab - 6a^2 + 2ab - 5a^2$

$6ab - 11a^2

⑦ $3x(2x - y) - 4x^2 - 3(x^2 - xy)$

$6x^2 - 3xy - 4x^2 - 3x^2 + 3xy$

$-x^2

⑧ $\left[\frac{2(n-5)}{3} - n = 3n\right](3)$

$2n - 10 - 3n = 9n$

$-10 = 10n$ **$n = -1**

⑨ $\left[2(3x - 4) - 2x = \frac{x-2}{3}\right](3)$

$\left[6x - 8 - 2x = \frac{x-2}{3}\right](3)$

$12x - 24 = x - 2$

$11x = 22$ **$x = 2**

⑩ $\frac{2(n-3)}{6} > \frac{4n-4}{9}$

$9(2n-6) > 6(4n-4)$

$18n-54 > 24n-24$

$-6n > 30$ sign flip

$\boxed{n<-5}$

⑪ $x-1 \le 3x+7 < 2x+8$

$x-8 \le 3x < 2x+1$

$x-8 \le 3x$ and $3x < 2x+1$

$-8 \le 2x$ and $x < 1$

$\boxed{-4 \le x < 1}$

⑫ $3n-4 > 11$ or $2n-4 < -2$

$3n > 15$ or $2n < 2$

$\boxed{n>5 \text{ or } n<1}$

⑬ $5x-3n = x^2-2mn$

$2mn-3n = x^2-5x$

$n(2m-3) = x^2-5x$

$\boxed{n = \frac{x^2-5x}{2m-3} \text{ for } 2m-3 \neq 0}$

⑭

Mrs. McCann	now n	in 6 $n+6$
Arthur	$57-n$	$63-n$

$n+6 = 2(63-n)$

$n+6 = 126-2n$

$3n = 120$

$n = 40$ $57-n = \boxed{17 \text{ yrs old}}$

⑮ $5n-(-2) = -13$

$5n+2 = -13$

$5n = -15$

$\boxed{n=-3}$

⑯

$2n+2(n+4) = 52$

$4n = 44$

$n = 11$

$\boxed{11 \text{ by } 15 \text{ ft.}}$

⑰ $\frac{\text{part}}{\text{whole}}$ $\frac{15}{n} = \frac{18}{100}$ $18n = 1500$

$n = \boxed{83.3}$

⑱ $\frac{\text{purch pr}}{\text{orig pr}}$ $\frac{51.20}{n} = \frac{80}{100}$ $80n = 5120$

$n = 64$

$64 - 51.20 = \boxed{\$12.80}$

⑲ $-7 < 4n+1 < 26$

$-8 < 4n < 25$

$-2 < n < \frac{25}{4}$

$n = \boxed{2,4,6}$

⑳ $.075n + 2(.075) = 725$

$.075n + 350 = 725$

$.075n = 375$

$n = 5000$

$\boxed{\$5000}$

㉑ $|x|+3 < 2$ $\boxed{\text{no solutions}}$

$|x| < -1$

absolute value must be ≥ 0

㉒ $|5n-10|+15 \ge 25$

$|5n-10| \ge 10$

$5n-10 \ge 10$ or $5n-10 \le -10$

$5n \ge 20$ or $5n \le 0$

$\boxed{n \ge 4 \text{ or } n \le 0}$

㉓ $|3n|-6 < 12$

$|3n| < 18$

$3n < 18$ and $3n > -18$

$n < 6$ and $n > -6$

$\boxed{-6 < n < 6}$

Quarterly Exam #1

REMEDIATION & EXTRA PRACTICE – Key

① Transitive Property of Equality

Associative Property of multiplication

② Commutative Property of Addition

Symmetric Property of Equality

③ $2ab^2 - cb^3$

$2(-2)(-1)^2 - (2)(-1)^3$

$2(-2)(1) - (2)(-1)$

$(-4) - (-2)$

$(-4) + (2) = -2$

$abc + 2a^2b$

$(-2)(-1)(2) + 2(-2)^2(-1)$

$(-2)(-1)(2) + 2(4)(-1)$

$(4) + (-8) = -4$

④ $3bc - 2b^5 + ac$

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

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

$(-6) - (-2) + (-4)$

$(-6) + (2) + (-4) = -8$

$2b - ac - b^2c^2$

$2(-1) - (-2)(2) - (-1)^2(2)^2$

$2(-1) - (-2)(2) - (1)(4)$

$(-2) - (-4) - (4) = (-2) + (4) + (-4) = -2$

⑤ $3xy - 2x(x-4y) - 2xy + 3x^2$

$3xy - 2x^2 + 8xy - 2xy + 3x^2$

$x^2 + 9xy$

$a^2b - 2a(a+ab) - 5a^2$

$a^2b - 2a^2 - 2a^2b - 5a^2$

$-a^2b - 7a^2$

⑥ $4a(a+b) - 2a(b-3a)$

$4a^2 + 4ab - 2ab + 6a^2$

$10a^2 + 2ab$

$2xy - 3x(y-2) + y(x-3)$

$2xy - 3xy + 6x + xy - 3y$

$6x - 3y$

⑦ $\frac{3x+7}{2} = x+1$

$3x + 7 = 2x + 2$

$x = -5$

$3n - \frac{2n}{3} = 2(n+1)$

$3\left[3n - \frac{2n}{3} = 2n+2\right]$

$9n - 2n = 6n + 6$

$n = 6$

⑧ $3(3n-5) - 4n = 5$

$9n - 15 - 4n = 5$

$5n - 15 = 5$

$5n = 20$

$n = 4$

$2(3x-4) - 2(x+3) = x - 11$

$6x - 8 - 2x - 6 = x - 11$

$4x - 14 = x - 11$

$3x = 3$

$x = 1$

⑨ $\frac{2(4x-3)}{5} > \frac{2x+2}{3}$

$6(4x-3) > 10x + 10$

$24x - 18 > 10x + 10$

$14x > 28 \quad x > 2$

$\frac{3(n-4)}{4} \leq \frac{n-3}{2}$

$6(n-4) \leq 4n-12$

$6n-24 \leq 4n-12$

$2n \leq 12$

$n \leq 6$

⑩ $2y+5x = xy+3$

$5x-xy = 3-2y$

$x(5-y) = 3-2y$

$x = \frac{3-2y}{5-y}$ for $y \neq 5$

$3xy+2 = -2x+3y$

$3xy+2x = 3y-2$

$x(3y+2) = 3y-2$

$x = \frac{3y-2}{3y+2}$ for $y \neq -\frac{2}{3}$

⑪ $x-4 < 3x+2 \leq x+8$

$x-4 < 3x+2$ and $3x+2 \leq x+8$

$-6 < 2x$ and $2x \leq 6$

$-3 < x$ and $x \leq 3$

$-3 < x \leq 3$

$2x-6 \leq 3x+8 \leq x+14$

$2x-6 \leq 3x+8$ and $3x+8 \leq x+14$

$-14 \leq x$ and $2x \leq 6$

$x \leq 3$

$-14 \leq x \leq 3$

⑫ $2n-5 > 9$ or $3n-5 < 7$

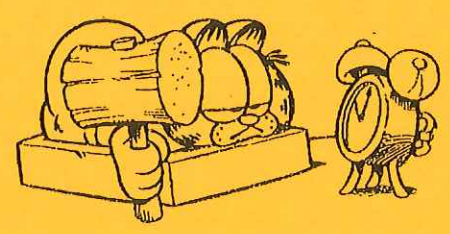
$2n > 14$ or $3n < 12$

$n > 7$ or $n < 4$

$n+3 \leq -5$ or $2n-3 \geq 7$

$n \leq -8$ or $2n \geq 10$

$n \geq 5$



⑬ $|2n-5| \geq 7$

$2n-5 \geq 7$ or $2n-5 \leq -7$

$2n \geq 12$ or $2n \leq -2$

$n \geq 6$ or $n \leq -1$

$|3n-3| > 12$

$3n-3 > 12$ or $3n-3 < -12$

$3n > 15$ or $3n < -9$

$n > 5$ or $n < -3$

⑭ $|2n-5|-8 < 3$

$|2n-5| < 11$

$2n-5 < 11$ and $2n-5 > -11$

$2n < 16$ $\quad$ $2n > -6$

$n < 8$ $\quad$ $n > -3$

$-3 < n < 8$

$|n+2|-6 \leq 4$

$|n+2| \leq 10$

$n+2 \leq 10$ and $n+2 \geq -10$

$n \leq 8$ $\quad$ $n \geq -12$

$-12 \leq n \leq 8$

(15)

	Now	4 ago	In 2
Jay	$4n$	$4n-4$	
Paul	n		$n+2$

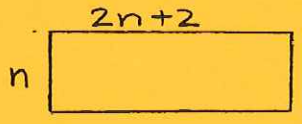
$4n-4 = 2(n+2)$
$4n-4 = 2n+4$
$2n = 8$
$n = 4$
Jay last year $4n-1 = 15$ yrs. old

	Now	5 ago	In 1
Albert	$5n$	$5n-5$	
Joey	n		$n+1$

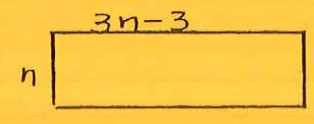
$5n-5 = 3(n+1)$
$5n-5 = 3n+3$
$2n = 8$
$n = 4$
Joey 2 yrs. ago $n-2 = 2$ yrs. old

(16) $4n+8 = n-1$ $2n-3 = 4n+7$
$3n = -9$ $-2n = 10$
$n = -3$ $n = -5$

(17)



$2(n) + 2(2n+2) = 22$
$2n + 4n + 4 = 22$
$6n = 18$
$n = 3$
dimensions: 3 by 8
area = 24 in^2



$2(n) + 2(3n-3) = 34$
$2n + 6n - 6 = 34$
$8n = 40$
$n = 5$
dimensions 5 by 12 in.
area = 60 in^2

(18) Sale pr: $\frac{15.64}{n} = \frac{85}{100}$
org. pr.

$85n = 1564$
$n = 18.4$
Savings: \$18.40 − \$15.64
\$2.76

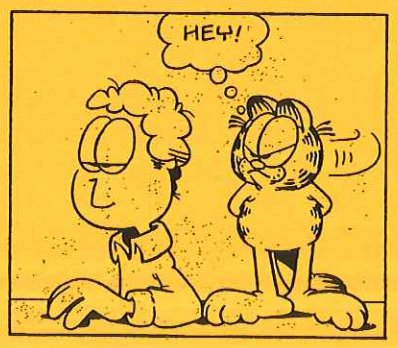
Coupon pr: $\frac{9.12}{n} = \frac{95}{100}$
org. pr

$95n = 912$
$n = 9.6$
org. price: \$9.60

(19) $-9 < 2n+6 < 10$
$-9 < 2n+6$ and $2n+6 < 10$
$-15 < 2n$ and $2n < 4$
$-\frac{15}{2} < n$ and $n < 2$

$-\frac{15}{2} < n < 2$

negative, even: $-6, -4, -2$



$-12 < 3n+1 < 11$

$-12 < 3n+1$ and $3n+1 < 11$

$-13 < 3n$ and $3n < 10$

$\frac{-13}{3} < n$ and $n < \frac{10}{3}$

$\frac{-13}{3} < n < \frac{10}{3}$

positive, odd: 1, 3

(20) $180 + .12n = 708$

$.12n = 528$

$n = 4400$

Sales: \$4400

$2(120) + .04n = 631.20$

$240 + .04n = 631.20$

$.04n = 391.2$

$n = 9780$

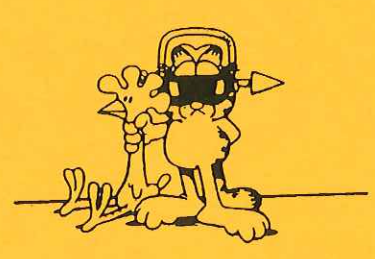
Sales: \$9780

(21) $|x-5| < 3$ and $x \neq 4$

$[x-5 < 3$ and $x-5 > -3]$ and $x \neq 4$

$[x < 8$ and $x > 2]$ and $x \neq 4$

$(2 < x < 8)$ and $x \neq 4$



$|2x-3| \geq 7$ and $x \neq 7$

$[2x-3 \geq 7$ or $2x-3 \leq -7]$ and $x \neq 7$

$[2x \geq 10$ or $2x \leq -4]$ and $x \neq 7$

$(x \geq 5$ or $x \leq -2)$ and $x \neq 7$