

Expressions and Operations

A.1	1.____2.____3.____4.____5.____6.____7.____8.____ 9.____10.____
A.2a	1.____2.____3.____4.____5.____
A.2b	1.____2.____3.____4.____5.____6.____7.____
A.2c	1.____2.____3.____4.____5.____6.____
A.3	1.____2.____3.____4.____5.____

SOL A.1

The student will represent verbal quantitative situations algebraically and evaluate these expressions for given replacement values of the variables.

Hints and Notes

Order of Operations:

- Parentheses
- Exponents
- Multiplication and Division
- Addition and Subtraction

Key Words:

(+) addition, sum, increase, total

(-) subtraction, difference,
minus, less, less than,
decrease

(x) multiplication, product,
times, twice(2), double(2)

(÷) division, quotient, into, half,
shared

the word **THAN switches the order
of words

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- When substituting values for variables use ()
- Always put negative #'s in ()

PRACTICE A.1

1. Six less than the product of eight and a number
A $6 - 8n$
B $8 - 6n$
C $6n - 8$
D $8n - 6$
2. Find the value of $\frac{4b+12}{3a+2c}$ if $a = 8, b = 5,$ and $c = -4$
F -4
G 2
H 4
J 16
3. The sides of a triangle have lengths $2x - 1, x + 5,$ and $3x - 7$. Which of the following describes the perimeter of the triangle in terms of x ?

Perimeter = (side 1) + (side 2) + (side 3)
A $P = 6x - 3$
B $P = 5x - 3$
C $P = 6x - 11$
D $P = 6x + 3$
4. Simplify $4a - 5(6+7a)$
F $-39a - 30$
G $6a + 1$
H $-31a - 30$
J $39a - 30$
5. Find the value of $6a^2$ for $a = -3$
A -54
B 9
C 36
D 54
6. What is the value of $3x^2 - y^2$ if $x = -1$ and $y = 3$?
F 12
G -3
H -6
J -12

PRACTICE A.1

7. $\frac{3}{4}(-12 - 4) + 32 \div 4 \cdot (-6)$

8. $-|-10| + \frac{3-39}{4}$

9. Evaluate $\sqrt[3]{x} + y \cdot p$, when $x = 8$, $y = -28$, and $p = \frac{1}{2}$

10. Evaluate $\frac{x^2+y^2}{x^2-y^3}$ when $x = -1$ and $y = -4$.

A.1 SKILLS CHECKLIST: *I can...*

- Translate verbal quantitative situations into algebraic expressions and vice versa.
- Model real-world situations with algebraic expressions in a variety of representations (concrete, pictorial, symbolic, verbal).
- Evaluate algebraic expressions for a given replacement set to include rational numbers
- Evaluate expressions that contain absolute value, square roots and cube roots.

SOL A.2

The student will perform operations on polynomials, including a) applying the laws of exponents to perform operations on expressions; b) adding, subtracting, multiplying, and dividing polynomials; and c) factoring completely first- and second-degree binomials and trinomials in one or two variables. Graphing calculators will be used as a tool for factoring and for confirming algebraic factorizations.

HINTS AND NOTES

Product of Powers-same base

$$a^m \cdot a^n = a^{m+n}$$

Power of a Power

$$(a^m)^n = a^{m \cdot n}$$

Power of a Product

$$(ab)^m = a^m b^m$$

Quotient of a Power

$$\frac{a^m}{a^n} = a^{m-n}$$

Power of a Quotient

$$\left(\frac{a}{b}\right)^x = \frac{a^x}{b^x}$$

Negative Exponents

$$x^{-a} = \frac{1}{x^a} \text{ or } \frac{1}{x^{-a}} = x^a$$

x^0 is always equal to 1

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- Remember your ()
- ^ means exponent

PRACTICE A.2a

1. $(4b^3)(8b^2)$

- A $12b^6$
- B $32b^6$
- C $12b^5$
- D $32b^5$

2. Which expression represents the simplest form of $\frac{63a^2bc}{9abc}$?

- F $7a$
- G $7ab$
- H $7abc$
- J $7a^2bc$

3. Simplify $(-2a^3)^5$

- A $-10a^{15}$
- B $-2a^{15}$
- C $32a^{26}$
- D $-32a^{15}$

4. Which is equivalent to $\frac{x^5y^2z^8}{(xy)^{-3}}$?

- F $\frac{x^2z^8}{y}$
- G $x^{12}y^8z^8$
- H $x^8y^5z^8$
- J -1

5. (*Critical Thinking Question*) For the expression below, find values for a , b , c , d , e , and f so that the expression simplifies to $3x^2y^3$.

$$\frac{ax^b y^c}{dx^e y^f}$$

HINTS and NOTES

ADD/SUBTRACT

You can only add and subtract like terms

Examples of like terms:

$$2x, 3x$$

$$4x^2, -2x^2, \frac{1}{2}x^2$$

$$2xy, -4xy$$

Examples of terms that are not alike:

$$x^2, x$$

$$3xy, 3y$$

$$4, 2x$$

MULTIPLICATION

- FOIL (first-outside-inner-last)

$$(a + b)(c + d)$$

- Distributive Property
 $a(b + c) = ab + bc$
- Vertical Format or "stacking"

$$\begin{array}{r} x^2 - 3x + 2 \\ 4x - 1 \\ \hline -x^2 + 3x - 2 \\ + 4x^3 - 12x^2 + 8x \\ \hline 4x^3 - 13x^2 + 11x - 2 \end{array}$$

- Box Method
 $(2x + 3)(2x - 4y + 10)$

	2x	3
2x	$4x^2$	$6x$
-4y	$-8xy$	$-12y$
10	$20x$	30
$4x^2 - 8xy + 14x - 12y + 10$		

PRACTICE A.2b

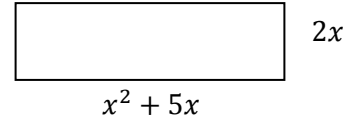
- Which polynomial represents the area of the rectangle?

A $x^2 + 7x$

B $2x^3 + 10x^2$

C $2x^2 + 10x$

D $2x^2 + 14x$



- The 1990 investments by a corporation are represented by the polynomial $x^2 + 5x - 8$ and the 1997 investments are represented by $x^2 - x + 3$. Which polynomial below represents the total investments for the two years?

F $x^2 + 4x - 5$

G $2x^2 - 4x + 5$

H $2x^2 + 4x - 5$

J $2x^2 - 6x - 11$

- Find the product of $(2x - 1)(3x - 4)$ as a trinomial.

A $6x^2 + 4$

B $6x^2 + 11x + 4$

C $6x^2 - 11x + 4$

D $6x^2 - 4$

- The length of a side of a square is $4x - 3$. Find the area of the square in terms of x .

F $16x^2 + 24x + 9$

G $16x^2 - 12x + 9$

H $16x^2 + 9$

J $16x^2 - 24x + 9$

- A rectangle has an area of A and a width of x . Its perimeter is 14. Which equation must be true?

A $A = 7x - x^2$

B $A = 7x - 2x^2$

C $A = 14x - x^2$

D $A = 14x - 2x^2$

- What is one of the factors of $x^2 - 2x - 15$?

F $(x - 3)$

G $(x - 5)$

H $(x + 1)$

J $(x + 15)$

HINTS and NOTES

Division

- You must divide the monomial into each and every term.

$$\frac{4x^2 + 8x + 2}{2x} \rightarrow \frac{4x^2}{2x} + \frac{8x}{2x} + \frac{2}{2x} \rightarrow$$
$$2x + 4 + \frac{1}{x}$$

Use the formula sheet provided to you for formulas for finding area and perimeter.

Ways to Factor

- Greatest Common Factor
 $xy + xz = x(y + z)$
- Difference of Two Squares
 $a^2 - b^2 = (a - b)(a + b)$
- Trinomials
Circle-Slide-Multiply (or)
Factor by Grouping (or)
Guess and check

7. *(Critical Thinking Question)* Give two trinomials, $f(x)$ and $g(x)$ so that $f(x) + g(x) = 2x - 5$.

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GO to Y=

Type trinomial into Y1

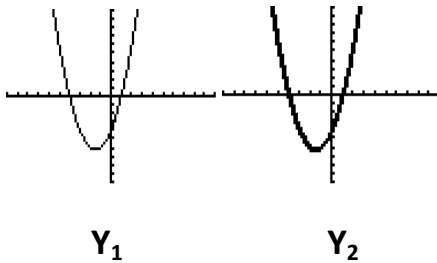
Type factoring into Y2

Make the line in Y2 a different color by highlighting Y2 select F4 choose a color.

Draw: F6

If both graphs trace over each other, then the factoring is correct.

```
Plot1 Plot2 Plot3
\Y1 [X^2+3X-4]
\Y2 [(X+4)(X-1)]
\Y3 [=]
\Y4 [=]
\Y5 [=]
\Y6 [=]
\Y7 [=]
```



PRACTICE A.2c

1. Factor

$$3y^2 + 7y - 20$$

- A $(3y - 5)(y + 4)$
- B $(3y - 20)(y + 10)$
- C $(3y - 4)(y + 5)$
- D $(3y - 5)(y + 5)$

2. Factor

$$x^2 - 25$$

- F $(x + 5)(x - 5)$
- G $(x - 50)(x - 5)$
- H $(x + 5)(x + 5)$
- J $(x + 25)(x - 1)$

3. The area of a rectangle is represented by

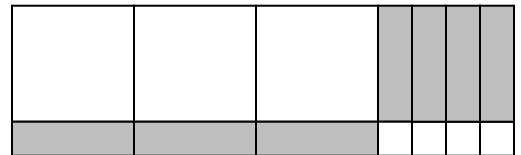
$$2x^2 + 5x - 12$$

Which of the following could represent the length of one side of the rectangle?

- A $2x + 3$
- B $2x - 3$
- C $x - 4$
- D $x + 12$

4. Which trinomial is represented by algeblocks?

= x^2
 = 1
 = x



- F $(4x + 3)(x + 1)$
- G $(3x + 4)(x + 1)$
- H $(x + 4)(x + 1)$
- J $(2x + 4)(3x + 4)$

5. Factor

$$2x^2 - 7x - 4$$

- A $(2x - 1)(x + 4)$
- B $(2x + 4)(x - 1)$
- C $(2x + 1)(x - 4)$
- D $(2x - 1)(x - 4)$

6. **(Critical Thinking Question)** $f(x) = 2x^2 + bx + 12$
Identify a value for b so that $f(x)$ can be factored as a product of two binomials. Explain how you determined your answer.

A.2 SKILLS CHECKLIST: *I can...*

- Simplify monomial expressions with integer exponents.
- MODEL sums, differences, products, and quotients of polynomials with concrete objects and their related pictorial representations.
- Relate concrete and pictorial manipulations that model polynomial operations to their corresponding symbolic representations.
- Find sums and differences of polynomials.
- Find products of polynomials. The factors will have no more than five total terms (i.e. $(x+1)(2x^2 + x + 3)$)
- Find the quotient of polynomials, using a monomial or binomial divisor, or completely factored divisor.
- Factor completely first- and second-degree polynomials with integral coefficients.
- Identify prime polynomials.
- Use the x-intercepts from the graphical representations of the polynomial to determine and confirm its factors.

SOL A.3

The student will express the square roots and cube roots of whole numbers and the square root of a monomial algebraic expression in simplest radical form.

HINTS and NOTES

Perfect Squares-are numbers whose square root is a whole number.

Non-perfect square roots are irrational and can be simplified or estimated.

To Simplify a Square Root

- Look for perfect square factors

Ex. $\sqrt{125} = 25 \cdot 5$

Take the square root of 25 and leave the 5. ANSWER: $5\sqrt{5}$

- Completely Factor and look for Pairs

Ex. $\sqrt{125} = 5 \cdot 5 \cdot 5$

Take the square root of the pair of 5's and leave the other 5.

ANSWER: $5\sqrt{5}$

Ex. $\sqrt{m^4 y^3} = m \cdot m \cdot m \cdot m \cdot y \cdot y \cdot y$
 $m^2 y \sqrt{y}$

Perfect Cube- is a number that can be written as the cube of another number

$2^3 = 8, 3^3 = 27, 4^3 = 64$

To simplify a Cube Root

- Look for perfect cube factors

Ex. $\sqrt[3]{81} = 27 \cdot 3$

$3\sqrt[3]{3}$

- Completely factor and look for triples

Ex. $\sqrt[3]{81} = 3 \cdot 3 \cdot 3 \cdot 3$

$3\sqrt[3]{3}$

PRACTICE A.3

1. What is the simplest radical form of $\sqrt{50}$?

- A. $5\sqrt{2}$
- B. $2\sqrt{25}$
- C. 25
- D. $5\sqrt{25}$

2. Express $\sqrt{28m^4x^3}$ in simplest radical form.

- F. $2\sqrt{7m^4x^3}$
- G. $2m^2x\sqrt{7x}$
- H. $14m^2\sqrt{x^3}$
- J. $14m^2x^2\sqrt{x}$

3. Write $\sqrt[3]{135}$ in simplest radical form.

- A. $3\sqrt[3]{5}$
- B. $3\sqrt[3]{15}$
- C. 15
- D. 45

4. (*Critical Thinking Question*) Identify two radical expressions whose product simplifies to

$$2a^2b\sqrt{3ab}$$

5. (*Critical Thinking Question*) Choose a composite number. Using its factor tree, explain how to simplify the square root or cube root of your number.

A.3 SKILLS CHECKLIST: *I can...*

- Express square roots of a whole number in simplest form.
- Express the cube root of a whole number in simplest form.
- Express the principal square root of a monomial algebraic expression in simplest form where variables are assumed to have positive values.

Equations and Inequalities

A.4a-b	1.____ 2.____ 3.____ 4.____ 5.____ <i>(Answer Questions 6 and 7 in packet)</i>
A.4c	1.____ 2.____ 3.____ 4.____ 5.____
A.4d	1.____ 2.____ 3.____ 4.____ 5.____
A.4e,f	1.____ 2.____ 3.____ 4.____ 5.____ 6.____ <i>(Answer Questions 7-9 in packet)</i>
A.5a-c	1.____ 2.____ 3.____ 4.____ <i>(Answer Questions 5-6 in packet)</i>
A.5d	<i>Answer all questions in packet for this skill.</i>
A.6a(slope)	1.____ 2.____ 3.____ 4.____ 5.____
A.6a(graph)	1.____ 2.____ 3.____ 4.____
A.6b	1.____ 2.____ 3.____ 4.____ 5.____

SOL A.4a,b The student will solve multi-step linear and quadratic equations in two variables, including

a) solving literal equations (formulas) for a given replacement variable.

b) justifying steps used in simplifying expressions and solving equations, using field properties and axioms of equality that are valid for the set of real numbers and its subsets.

HINTS and NOTES

Literal Equations

-Just undo what has been done

-The variable stands alone

Properties:

- **Associative Property**
(+) $a + (b + c) = (a + b) + c$
(x) $a(bc) = (ab)c$
- **Commutative Property**
(+) $a + b + c = b + a + c$
(x) $abc = cba$
- **Distributive Property**
 $a(b + c) = ab + ac$
- **Identity Property**
(+) $a + 0 = a$
(x) $a(1) = a$
- **Inverse Property**
(+) $a + (-a) = 0$
(x) $a \cdot \frac{1}{a} = 1$
- **Reflexive Property**
 $a = a$
- **Symmetric Property**
If $a = b$ then $b = a$
- **Transitive Property**
If $a = b$ and $b = c$ then $a = c$
- **Addition Property of Equality**
Adding the same term to both sides of the equation
- **Subtraction Property of Equality**
Subtracting the same term from both sides of the equation
- **Multiplication Property of Equality**
Multiplying the same factor to both sides of the equation
- **Division Property of Equality**
Dividing the same divisor on both sides of the equation

PRACTICE

1. To find the volume of a pyramid you use the

formula $V = \frac{1}{3}Bh$. Which equation solves this

formula for B?

A $B = \frac{3V}{h}$

B $B = 3V - h$

C $B = \frac{V}{3h}$

D $B = \frac{V-3}{h}$

2. Which property of real numbers justifies going from given step 3 to step 4 of the solutions shown below?

(given)	$-3(4x + 2) + 7x = 39$
(step 1)	$-12x - 6 + 7x = 39$
(step 2)	$-5x - 6 = 39$
(step 3)	$-5x = 45$
(step 4)	$x = -9$

- F Addition Property of Equality
- G Additive Inverse Property
- H Distributive Property
- J Division Property of Equality

3. Which property justifies the equation

$$(3m^5)(m^6) = (3)(m^5 \cdot m^6)$$

- A Commutative Property of Multiplication
- B Associative Property of Multiplication
- C Multiplication Property of Equality
- D Distributive Property

PRACTICE A.4 a,b

4. Which property justifies the statement $\frac{-2}{3} \cdot \frac{-3}{2} = 1$?

- F Multiplication Identity Property
- G Multiplication Inverse Property
- H Multiplication Property of Equality
- J Commutative Property of Multiplication

5. What is the solution for x of $ax - 5 = b$?

A $a(b + 5)$

B $\frac{b+a}{5}$

C $\frac{b+5}{a}$

D $a(b - 5)$

6. **(Critical Thinking Question)** The airport parking lot charges \$2.00 to enter and \$3.00 per hour after that. Carmen has N dollars and wants to be able to determine the maximum number of hours she can park. How can Carmen determine the length of time she can afford to park her car in the parking lot?

7. **(Critical Thinking Question)** Determine the field property or axiom of equality used to justify each step.

$$(x + 3) \cdot 7 = 4 + 3x$$

$$\Rightarrow 7(x + 3) = 4 + 3x$$

$$\Rightarrow 7x + 21 = 4 + 3x$$

$$\Rightarrow 7x + 21 = 3x + 4$$

$$\Rightarrow 4x + 21 = 4$$

$$\Rightarrow 4x = -17$$

$$\Rightarrow \frac{1}{4}(4x) = \frac{1}{4}(-17)$$

$$\Rightarrow x = \frac{1}{4}(-17)$$

$$\Rightarrow x = \frac{-17}{4}$$

A.4a-b SKILLS CHECKLIST: *I can...*

- Solve a literal equation (formula) for a specified variable.
- Simplify expressions and solve equations, using the field properties of the real numbers and properties of equality to justify simplification and solution.

SOL A.4c

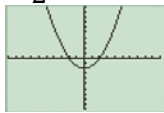
The student will solve multistep linear and quadratic equations in two variables, including:
c) solving quadratic equations algebraically and graphically.

HINTS and NOTES**Quadratic Formula**

Standard Form is $ax^2 + bx + c = 0$

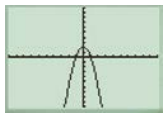
- a, b, and c are rational numbers
- if “a” is negative, then the graph will open down
- if “a” is positive, then the graph will open up
- the smaller the absolute value of “a” the wider the graph will be

$$y = \frac{1}{2}x^2 + 0x - 2$$



- the larger the absolute value of “a” the narrower the graph will be

$$y = -2x^2 + 0x + 2$$

**Three ways to Solve Quadratic-**

- Use the quadratic formula
- Factor, set each factor = 0 and solve for x
- Graph

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Equation Menu F2:

- Select degree 2 (F1)
- Make sure that the equation is written standard form
- $ax^2 + bx + c = 0$
- Identify a, b, and c.
- Remember if a term is missing use zero as a place holder.

Menu: Graph

- Type in equation
- Select Draw: F6
- Select G-Solv: F5
- Select Root: F1

Practice

1. How many solutions will the quadratic equation $5x^2 + 4x + 3 = 0$ have?

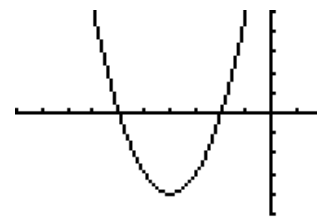
- A No solutions B One solution
C Two solutions D Three solutions

2. Solve $8x = -x^2 - 15$

- F $x = -6$ and $x = 2$ G $x = 12$ and $x = 1$
H $x = 4$ and $x = -3$ J $x = -3$ and $x = -5$

3. Which of the following best describes the solutions and vertex of the graph?

- A vertex (-2,0)
solutions -6 and -2
B vertex (4, 4)
solutions 2 and 6
C vertex (-2,-6)
solution -4
D vertex (-4,-4)
solutions -6 and -2



4. Jasmine is diving off a 3-meter springboard. Her height in meters above the water when she is x meters horizontally from the end of the board is approximated by the equation $h = -x^2 + 3x + 3$. What is the maximum height Jasmine will reach on her dive?

- F 1.5 meters
G 3 meters
H 5.25 meters
J 6.1 meters

5. To the nearest hundredth, what are the solutions of the quadratic equation $x^2 - 12x + 28 = 0$?

- A -3.17 and 8.83
B 3.17 and 8.83
C 4 and 7
D 28 and 0

A.4c SKILLS CHECKLIST: I can...

- Solve quadratic equations
- Identify the roots or zeros of a quadratic function over the real number system as the solution(s) to the quadratic equation that is formed by setting the given quadratic expression equal to zero.
- Confirm algebraic solutions to quadratic equations, using a graphing calculator.

SOL A.4d

The student will solve multistep linear and quadratic equations in two variables, including
d) Solving multistep linear equations algebraically and graphically.

HINTS and NOTES**Solving Multistep Equations**

- Distribute
- Combine Like Terms
- Move all variables to the left and constants to the right
- Solve and Check

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Steps to checking a solution to a linear equation using your graphing calculator.

- **Menu-Equa (A)**
- **F3: Solver**
- **Type Equation as you see it.**
- **Remember if there is an expression in the numerator place parenthesis around it.**

PRACTICE A.4d

1. What is the solution to $4(n + 1) = 2(11 - n)$?

- A** $n = 3$
B $n = 4$
C $n = 7$
D $n = 13$

2. What is the solution to $\frac{2}{3}n = 24$?

- F** $n = 12$
G $n = 16$
H $n = 36$
J $n = 72$

3. What is the solution of $5x - 17 = 2x - 11$?

- A** $-\frac{28}{3}$ **B** -4 **C** $\frac{6}{7}$ **D** 2

4. What is the solution of $\frac{x-3}{4} = \frac{2x+6}{3}$?

- F** $-\frac{5}{3}$ **G** $-\frac{9}{5}$ **H** $-\frac{33}{5}$ **J** 9

5. Identify the following equations as having one solution, no solution or infinitely many.

- $10(x + 3) + 8 = 18x + 30$
- $12(c + 3) - 30 = 12c + 36$
- $4(6a + 3) = 6(4a + 2)$
- $16n - 20 = 4(5n + 1)$

A.4d SKILLS CHECKLIST: *I can...*

- Solve multi-linear equations in one variable.
- Confirm algebraic solutions to linear equations using a graphing calculator.
- Determine if a linear equation in one variable has one, an infinite number, or no solutions.

SOL A.4e,f

The student will solve multistep linear and quadratic equations in two variables, including
e) solving systems of two linear equations in two variables algebraically and graphically
f) solving real-world problems involving equations and systems of equations.

HINTS and NOTES

How to Solve Systems of Equations

- Graphing- Graph each equation and look for the point of intersection between the two lines.
 - Parallel lines= No solution
 - Same line= infinitely many solutions
- Substitution
 - solve one equation for a variable
 - substitute that expression for that variable into the other equation
 - solve for the remaining variable
 - substitute value of variable into equation and solve for other variable
- Elimination
 - create a pair of opposite variables within the set of equations
 - add vertically so that one variable cancels out
 - substitute the value of the variable solved for back into equation so that you can find value of other equation

To check and see if your solution is correct- substitute value of variables into equation and see if your statement is true!

Practice A.4e,f

1. What is the solution of the following system of equations?

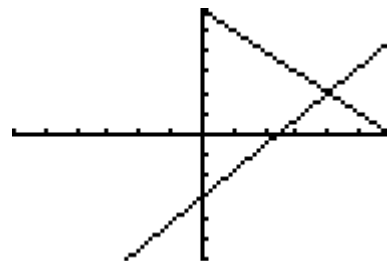
$$\begin{cases} 2x + y = 6 \\ 3x - 7y = 9 \end{cases}$$

- A (-3, 12)
- B (2, 2)
- C (3, 0)
- D (1, 4)

2. The sum of two numbers is 35. Three times the smaller number less the greater numbers is 17. Which system of equations describes the two numbers?

- F $\begin{cases} x + y = 35 \\ 3x - y = 17 \end{cases}$
- G $\begin{cases} x + y = 35 \\ x - y = 17 \end{cases}$
- H $\begin{cases} x + y = 35 \\ x - 3y = 17 \end{cases}$
- J $\begin{cases} x + y = 35 \\ x + y = 17 \end{cases}$

3. What is the solution to the system of equations graphed below?



- A (-2, 4)
- B (4, -2)
- C (2, 4)
- D (4, 2)

HINTS and NOTES

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Solving Systems of Equations

Graph Menu

- Y1= one equation solved for y
- Y2= the second equation solved for y
- Draw: F6
- G-Solv: F5
- Intersect: F5

Method 2: Equation Solver

- F1: Simultaneous
- Unknowns: F1 (2)
- Equations need to be in standard form:
 - $Ax + By = C$
 - Identify a, b, and c of both equations.

Practice A.4e,f

4. Which of the following is the solution to the system of equations below?

$$\begin{cases} 3x = 2y + 6 \\ 5x + 7y = 41 \end{cases}$$

- F (4, 1)
- G (3, 0)
- H (4, 3)
- J (4, -3)

Real World Problems and Critical Thinking (Equations and Systems)

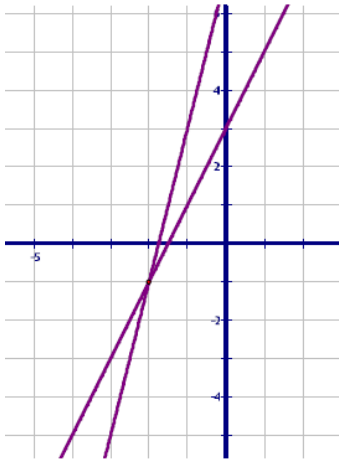
5. Sally would like a 90 average on the five math tests this semester. Her scores so far are 80, 82, 92, 98. What grade must she earn on her 5th and last test to achieve the 90 average?

- A 95
- B 96
- C 98
- D 99

6. Joe has a 300 foot fence around his rectangular yard. The length is 10 feet more than the width. Which equation can you use to determine the dimensions?

- F $x + (x + 10) = 300$
- G $x(x + 10) = 300$
- H $2x + 210x = 300$
- J $2x + 2(x + 10) = 300$

7. Explain how you could use the graph below to solve the equation $2x + 3 = 4x + 7$. Verify your solution algebraically.



8. Create a system of linear equations whose solution is $(5, 3)$. Explain how you determined your answer, and how you know it has the solution $(5, 3)$.
9. Pat has a lawn mowing business and has been experimenting with different prices in order to earn the most money. Some of the prices he has tried are listed in the table below.

WEEK	PRICE	# OF LAWN
1	\$20.00	2
2	\$17.00	7
3	\$13.00	18
4	\$10.50	33

Write an equation to model the price for a given week if Pat keeps lowering the price at about the same rate. Write a similar equation to model the number of customers per week if the number of customers continues to increase in a similar way. When would Pat achieve the highest revenue?

A.4e,f SKILLS CHECKLIST: *I can...*

- Solve a linear system in two variables by substitution or elimination to find the ordered pair which satisfies both equations.
- Solve a linear system in two variables graphically by identifying the point of intersection.
- Determine whether a system of two linear equations has one solution, no solution or infinite solutions.
- Write a system of two linear equations that models a real-world situation.
- Interpret and determine the reasonableness of the algebraic or graphical solution of a system of two linear equations that models a real-world situation.

SOL A.5a-c

The student will solve multistep linear inequalities in two variables, including

- Solving multistep linear inequalities algebraically and graphically;
- Justifying steps used in solving inequalities, using axioms of inequality and properties of order that are valid for the set of real numbers and its subsets;
- Solving real-world problems involving inequalities

HINTS and NOTES

Reminder: Inequalities have a solution set and can be written in set builder notation $\{x|x \leq 32\}$

"For all x such that x is less than or equal to 32."

To solve inequalities:

- Distribute
- Combine Like Terms
- Move all variables to left and constants to the right
- Solve and Check

ERROR ALERT- Switch direction of the comparison sign when \div/\times by negative number during solving.

Shading of Graphs:

$>$ is greater than (open-right)



$<$ is less than (open-left)



\geq is greater than or equal to (closed-right)



\leq is less than or equal to (closed-left)



PRACTICE A.5 a-c

4. Solve

$$-5x + 5 > 25$$

- A** $x > 5$
B $x < -4$
C $x > -4$
D $x < 25$

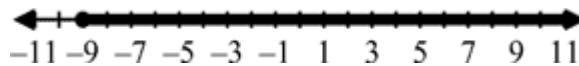
2. Solve $2x - 18 \geq 5(x + 3)$

- F** $x \leq -11$
G $x \geq -11$
H $x \geq 1$
J $x \leq 1$

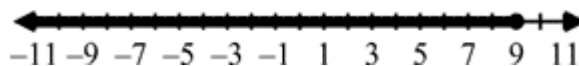
3. Solve and graph

$$-8(3d - 2) \geq -200$$

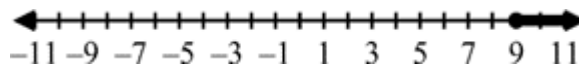
A $d \geq -9$



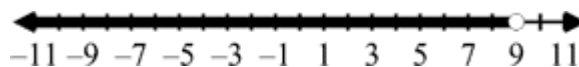
B $d \leq 9$



C $d \geq 9$



D $d < 9$



5. Joel sells ice cream cones at the county fair. He has to rent the equipment for \$36 and spend \$0.52 on ingredients for each cone. What is the minimum number of ice cream cones Joel must sell at \$1.40 each in order to make a profit?

F 39

G 40

H 41

J 42

8. (*Critical Thinking*) Solve the following inequality and in each step provide the property that justifies your step. Then look at the examples below of other students' work and identify their incorrect steps and why they are incorrect.

	$3 - 7x \geq -6$	Reason
Step 1		
Step 2		
Step 3		
Step 4		
Step 5		

Ray's solution

$$3 - 7x \geq -6$$

$$-7x \geq -9$$

$$7x \leq 9$$

$$x \geq \frac{9}{7}$$

Sam's solution

$$3 - 7x \geq -6$$

$$7x - 3 \geq 6$$

$$7x \geq 9$$

$$x \leq \frac{9}{7}$$

Joe's solution

$$3 - 7x \geq -6$$

$$-7x \geq -3$$

$$x \leq \frac{-3}{7}$$

Pat's solution

$$3 - 7x \geq -6$$

$$9 - 7x \geq 0$$

$$9 \geq 7x$$

$$\frac{9}{7} \geq x$$

$$x \leq \frac{9}{7}$$

Tom's solution

$$3 - 7x \geq -6$$

$$3 \geq 7x + 6$$

$$-3 \geq 7x$$

$$\frac{-3}{7} \geq x$$

$$x \leq \frac{-3}{7}$$

6. (*Critical Thinking*) Create 3 different two-step inequalities for which the solution set is

$$\left\{ x \mid x \geq \frac{3}{4} \right\}$$

A.5a-c SKILLS CHECKLIST: *I can...*

- Solve multistep linear equations in one variable.
- Justify steps used in solving inequalities, using axioms of inequality and properties of order that are valid for the set of real numbers.
- Solve real-world problems involving inequalities.
- Solve systems of linear inequalities algebraically and graphically.

SOL A.5d

The student will solve multistep linear inequalities in two variables, including
d) solving systems of inequalities

HINTS and NOTES

Solving System of Linear Inequalities:

- Graph both linear inequalities on same coordinate grid
 - Easier if put in $y = mx + b$
 - Shade the “true side” of both lines
 - Line is solid if \leq or \geq
 - Line is dotted if $<$ or $>$
- Reminder the solution includes the entire region that is shared by both inequalities.

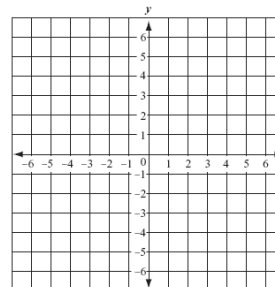
CASIO CFX-9850GC PLUS

- Put one inequality in for Y_1
SELECT F3 for type SELECT F6 to arrow over to correct inequality use function keys to select inequality.
- Put the second inequality in for Y_2
SELECT F3 for type SELECT F6 to arrow over to correct inequality use function keys to select inequality.
- Draw: F6
- $>$: F1
- $<$: F2
- \geq : F3
- \leq : F4

PRACTICE A.5d

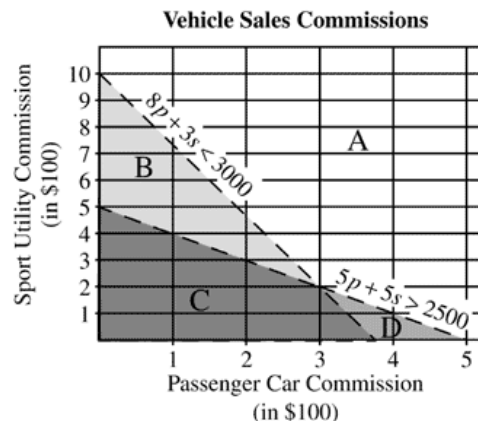
1. Solve this system by graphing.

$$\begin{cases} y > -x - 3 \\ y \leq x + 6 \end{cases}$$



4. A salesman at a new car dealership gets paid a fixed commission above his base salary for any passenger car he sells and a different fixed commission for any sport utility vehicle he sells. In August, he sold 5 passenger cars and 5 sport utility vehicles and earned more than \$2500 above his base salary. In September, he sold 8 passenger cars and 3 sport utility vehicles and earned less than \$3000 above his base salary. This information can be represented by the following inequalities and their graph, where p represents the number of passenger cars sold and s represents the number of sport utility vehicles sold.

$$\begin{cases} 5p + 5s > 2500 \\ 8p + 3s < 3000 \end{cases}$$



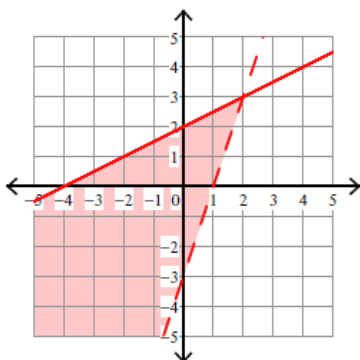
Which region of the graph represents the possible commissions paid to the salesman for the two types of vehicles?

- A Region A
- C Region C

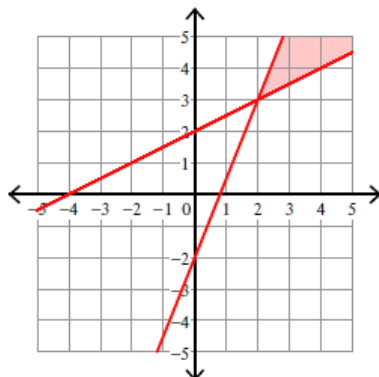
- B Region B
- D Region D

PRACTICE A.5d

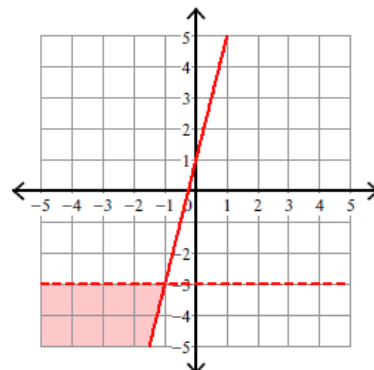
3. Match each solution with its system and explain how you knew they matched.



$$\begin{cases} y < -3 \\ y \geq 4x + 1 \end{cases}$$



$$\begin{cases} y \leq \frac{1}{2}x + 2 \\ y > 3x - 3 \end{cases}$$



$$\begin{cases} y \leq \frac{5}{2}x - 2 \\ y \geq \frac{1}{2}x + 2 \end{cases}$$

A.5d SKILLS CHECKLIST: I can...

- Solve systems of linear inequalities algebraically and graphically.

SOL A.6

The student will graph linear equations and linear inequalities in two variables, including
a) Determining the slope of a line when given an equation of the line, the graph of the line, or two points on the line. Slope will be described as rate of change and will be positive, negative, zero, or undefined; and
b) writing the equation of a line when given the graph of the line, two points on the line, or the slope and a point on the line.

HINTS and NOTES

Methods Used to Find Slope

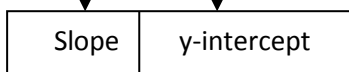
- Graphing
 $\frac{\text{rise}}{\text{run}}$ or $\frac{\text{difference in range}}{\text{difference of domain}}$
- Formula with 2 ordered pairs $(x_1, y_1)(x_2, y_2)$

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

- From an equation of a line

Slope Intercept

$$y = mx + b$$



Standard Form

$$Ax + By = C$$

$$m = \frac{-A}{B}$$

Slopes are classified as

- Positive $y = (+)mx + b$
- Negative $y = (-)mx + b$
- Zero $y = \#$
- Undefined or no slope $x = \#$

PRACTICE A.6 a

1. Find the slope of PQ if P(1,1) and Q(5,4).

A $\frac{4}{3}$

B $\frac{3}{4}$

C $-\frac{4}{3}$

D $-\frac{3}{4}$

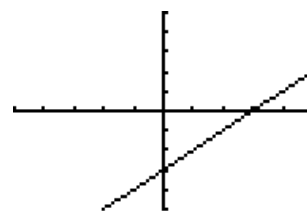
2. Find the slope of the line shown

F 0

G undefined

H 1

J -1



3. Find the slope of $8x + 2y = -10$.

A -10

B -8

C -4

D 4

4. Find the slope of $y = 4$.

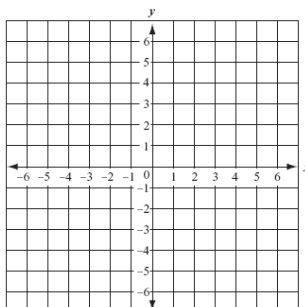
F 0

G 4

H undefined

J 1

5. **(Critical Thinking)** Draw a line with a slope of $\frac{2}{5}$, and identify 4 points on the line. Write the equation of your line. Explain how you know your line has a slope of $\frac{2}{5}$, and the 4 points identified work.



HINTS and NOTES

You can graph an equation by:

- Using a table of values
- Using the x and y intercepts
- Using slope-intercept form
 $y = mx + b$

You can find the intercepts by:

- Substituting 0 for y to find the x – *intercept*
- Substituting 0 for x to find the y – *intercept*

“VUX HOY”

- Vertical lines have an Undefined slope and come in the form $x = \#$
- Horizontal lines have a slope of zero (0) and come in the form $y = \#$

CASIO CFX-9850GC PLUS HELP

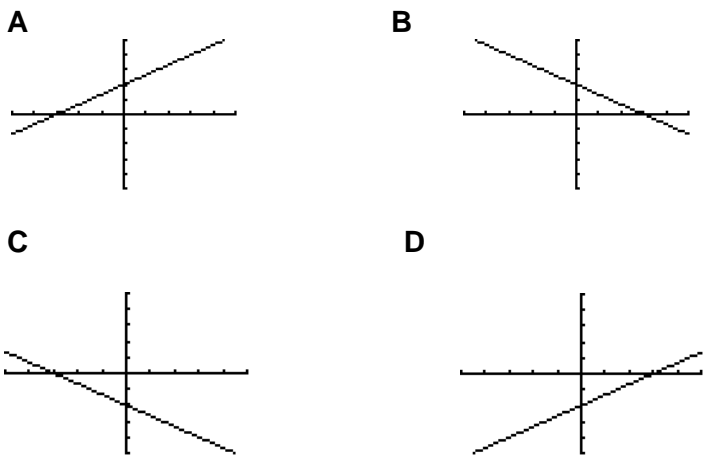
- **Menu: Table**
- Type in the equation at Y=
- Tabl: F6
- Type in x values to see if y values equal.

PRACTICE A.6 a

1. If the line $y = x + 2$ moved to $y = x + 4$, then how did it move?

- A moves right 2 units
- B moves right 4 units
- C moves up 2 units
- D moves down 2 units

2. Which is the graph that represents $2x - 3y = -7$?



3. What are the x- and y-intercepts of $2x - 4y = 7$?

- A 3.5 and -7
- B -1.75 and 3.5
- C 3.5 and -1.75
- D $\frac{2}{7}$ and $\frac{4}{7}$

4. Which coordinate pair is a solution of $y = 2x + 4$?

- F $(-2, 0)$
- G $(0, 6)$
- H $(2, -6)$
- J $(1, 1)$

HINTS and NOTES

Writing Equations of Lines

Given Slope and y-Intercept

- **Use** $y = mx + b$ where
 $m = \text{slope}$
 $b = y - \text{intercept}$

Given Two-Points on a Line

- **One Way**

1) find slope

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

2) substitute slope (m) and values of point (x, y) into $y = mx + b$ and solve for b

3) substitute m and b into $y = mx + b$

- **Another Way**

$$y - y_1 = m(x - x_1)$$

1) substitute x_1 & y_1 with point

2) substitute m with slope

Given Slope and one-point on the line

- **Use the same steps as if you were given Two Points on a line**

PRACTICE A.6b

5. Which is the equation of the line through the point $(-4, 2)$ and having a slope of 1?

A $y = x + 6$

B $y = x + 2$

C $y = x - 6$

D $y = x - 2$

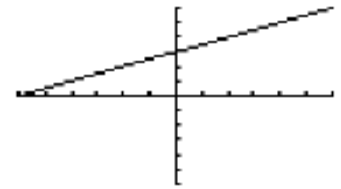
6. Which of the following equations best represents the line graphed?

F $y = 2x + 3$

G $y = -2x + 3$

H $y = \frac{1}{2}x + 3$

J $y = -\frac{1}{2}x + 3$



7. Which is the equation of the line with slope $-\frac{1}{2}$ and y-intercept of -4 ?

A $x - 2y = 8$

B $2x + y = -8$

C $-4x + \frac{1}{2}y = 1$

D $x + 2y = -8$

8. Which is the equation of the line through the points $(-2, 2)$ and $(5, 9)$?

F $y = x + 4$

G $y = x + 2$

H $y = x - 4$

J $y = x - 2$

9. Which of the following equations represents a line through the points $(-6, 8)$ and $(2, 8)$?

A $x = -6$

B $y = 2$

C $x = 8$

D $y = 8$

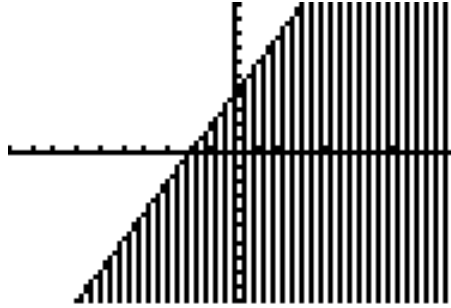
HINTS AND NOTES

When graphing linear inequalities, remember

- you have to shade the “true side” of the line.
- The line is solid if the inequality is \leq or \geq
- The line is dashed if the inequality is $<$ or $>$

CASIO CFX-9850GC PLUS HELP

- Put inequality in for Y_1 **SELECT F3 for type SELECT F6 to arrow over to correct inequality use function keys to select inequality.**
- Draw: F6
- $>$: F1
- $<$: F2
- \geq : F3
- \leq : F4



6. Which inequality is shown?

- A $y > 2x + 4$
- B $y \geq 2x + 4$
- C $y < 2x + 4$
- D $y \leq 2x + 4$

A.6 SKILLS CHECKLIST: *I can...*

- Graph linear equations and inequalities in two variables, including those that arise from a variety of real-world situations.
- Use the parent function $y = x$ and describe transformations defined by changes in the slope of y-intercept.
- Find the slope of the line, given the equation of a linear function.
- Find the slope of a line, given the coordinates of two points on the line.
- Find the slope of a line, given the graph of a line.
- Recognize and describe a line with a slope that is positive, negative, zero, or undefined.
- Use transformational graphing to investigate effects of changes in equation parameters on the graph of the equation.
- Write an equation of a line when given the graph of a line.
- Write an equation of a line when given two points on the line whose coordinates are integers.
- Write an equation of a line when given the slope and a point on the line whose coordinates are integers.
- Write an equation of a vertical line $x = a$
- Write an equation of a horizontal line as $y = c$.

Functions and Statistics

A.7a-f	1. _____ 2. _____ 3. _____ 4. _____ 5. _____ 6. _____ 7. _____ 8. _____ (<i>Answer 9 and 10 in packet</i>)
A.8	1. _____ 2. _____ 3. _____ 4. _____ 5. _____
A.9	1. _____ 2. _____ 3. _____ 4. _____ (<i>Answer 3 Application questions in packet</i>)
A.10	1. _____ 2. _____ 3. _____ 4. _____ 5. _____ (<i>Answer 6 in packet</i>)
A.11	1. _____ 2. (<i>Answer in packet</i>)

SOL A.7

The student will investigate and analyze function (linear and quadratic) families and their characteristics both algebraically and graphically, including a) determining whether a relation is a function; b) domain and range; c) zeros of a function; d) x - and y -intercepts; e) finding the values of a function for elements in its domain; and f) making connections between and among multiple representations of functions including concrete, verbal, numeric, graphic, and algebraic.

HINTS and NOTES

Relation- can be functions or NOT functions

- Mapping
- Set of ordered pairs
- Table of Values
- Graph

Function- is a relation that has an output that is unique to an input

Domain- x -values or input

Range- y -values or output

Function	Not Function (Relation only)
Domain can't repeat	Domain can repeat
Must pass vertical line test	Fails vertical line test

PRACTICE A.7

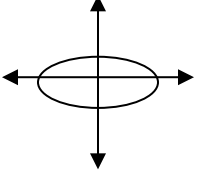
1. Which relation below is not a function?

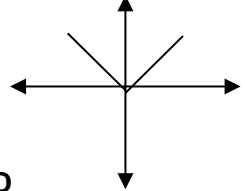
- A $\{(2, 8) (3, -10) (-1, 1) (0, -1)\}$
 B $\{(-3, 8) (4, -6) (-2, 6) (-9, 8)\}$
 C $\{(1, 9) (5, -8) (-1, 3) (-2, 4)\}$
 D $\{(1, 6) (8, -3) (-1, -6) (8, 2)\}$

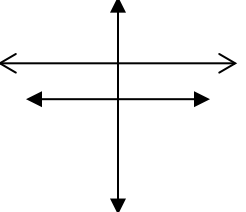
2. What is the range of the function of $f(x) = -x^2 - 3$ when the domain is $\{-4, -1, 5\}$?

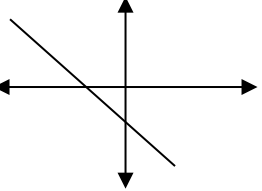
- F $\{13, -2, 22\}$ G $\{19, 4, 28\}$
 H $\{13, -4, -28\}$ J $\{-19, -4, -28\}$

3. Which of the following is not a function?

A 

B 

C 

D 

4. Which table is a function?

- F

x	-1	3	-1	-8
y	3	-2	-2	17
- G

x	-2	4	-1	-7
y	3	3	-1	1
- H

x	-8	1	0	-8
y	2	2	-3	1
- J

x	-2	1	-9	1
y	4	3	-2	4

HINTS and NOTES

$f(x)$ means the “function evaluated at x ”

When you evaluate a function you are to substitute that value in place of x to find $f(x)$

$f(x)$ is the same thing as “ y ”

The zeroes of the function are the x -intercepts of the function.

A quadratic function can have:

- One zero (sits on or hangs from the x -axis)
- Two zeros (crosses the x -axis twice)
- No zeros (never crosses the x -axis)

TI-83 CALCULATOR HELP

Put function in Y1, once graphed you can find the x -intercepts of the equation by

- Draw: F6
- G-Solv: F5
- Roots: F1
- $f(x)$ If x -value is given select Menu
- Table: 7
- Tabl: F6
- Type in x value
- Look at table for y value

PRACTICE A.7

5. What is the zero of the function $f(x) = 2x + 6$?

- A -3
- B 0
- C 3
- D 6

6. If $f(x) = x^2 + 2x + 4$, then what is $f(3)$?

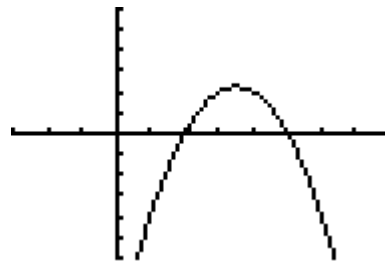
- F 19
- G 16
- H $\frac{19}{3}$
- J $\frac{16}{3}$

7. Which is the zero of the following function

$$f(x) = x^2 + 3x - 18$$

- A 1
- B 2
- C 3
- D 4

8. What are the zeros of the graphed function?



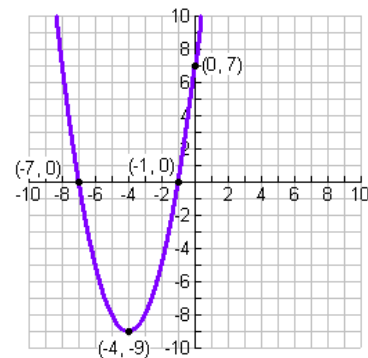
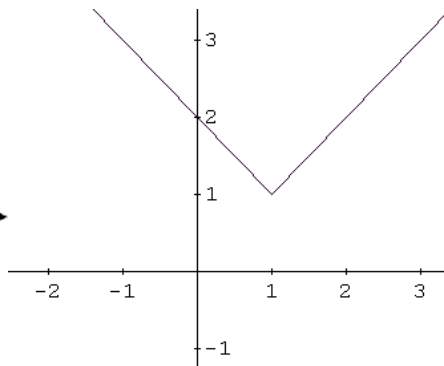
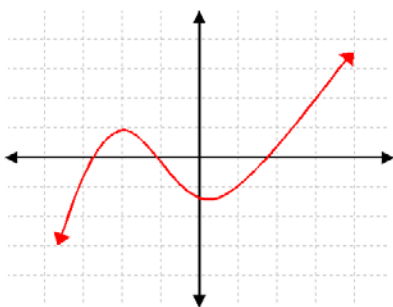
- F 2 and 5
- G 3 and 2
- H 0 and 2
- J 0 and 5

PRACTICE A.7 (Critical Thinking Questions)

9. Complete the table of real-world functions

Real World Scenario	Identify the Domain	Identify the Range	Is it a function?	Explain
Number of hours worked and amount paid				
Number of miles you can drive and the amount of gas in your tank				
Age and height				
Cell Phone Bill and Number of Texts sent				
Number of Jeans you want to buy and the price of Jeans				


10. Identify the domain and range using notation for each of the following graphs.



A. 7 SKILLS CHECKLIST: I can...

- Determine whether a relation, represented by a set of ordered pairs, a table, or a graph is a function.
- Identify the domain, range, zeros, and intercepts of a function presented algebraically and graphically.
- For each x in the domain of f , find $f(x)$.
- Represent relations and functions using multiple representations and convert between.
- Detect patterns in data and represent arithmetic and geometric patterns algebraically.

Enter the data into List 1

- From the menu screen select  and press **EXE**.
- In List 1, enter the data set. Enter the first element and press **EXE** to move to the next line and continue until all the elements have been entered into List 1.

SOL A.9

The student, given a set of data, will interpret variation in real-world context, calculate and interpret mean absolute deviation, standard deviation, and variance.

HINTS and NOTES

Variance,

standard deviation, and mean absolute deviation measure the dispersion of the data.

Mean Absolute Deviation- average absolute value difference between data elements and the mean

$$\text{Mean Absolute Deviation} = \frac{\sum_{i=1}^n |x_i - \mu|}{n}$$

Variance- average of the squared differences between the data elements and the mean.

$$\text{Variance } (\sigma^2) = \frac{\sum_{i=1}^n (x_i - \mu)^2}{n}$$

Standard deviation- square root of the variance so your numbers are like your data elements.
>standard deviation= more spread out data
<standard deviation= more clustered about the mean

$$\text{Standard Deviation- } (\sigma) = \sqrt{\frac{\sum_{i=1}^n (x_i - \mu)^2}{n}}$$

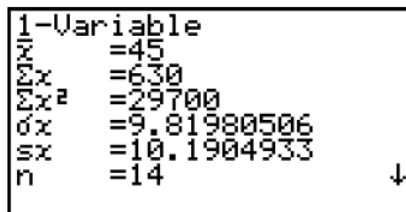
z-score- describes how many standard deviations an element is above or below the mean. (Data should be normally distributed)
a (-) z scores it is below
a (+) z scores means it is above

You can use z- score with standard deviation to find the actual value of a missing element.

$$\text{z-score } (z) = \frac{x - \mu}{\sigma}$$

CASIO CFX-9850GC PLUS HELP

- Menu: Stat: 2
- Enter data into List 1
- Press F2: Calc
- Press F1: 1Var



```
1-Variable
x̄ = 45
Σx = 630
Σx² = 29700
σx = 9.81980506
Sx = 10.1904933
n = 14
```

\bar{x} = arithmetic mean of the data set

Σx = sum of the x values

Σx^2 = sum of the x^2 values

σx = population standard deviation

Sx = sample standard deviation

n = number of data points (elements)

NOTE: “ σx ” will represent the standard deviation (σ). Squaring σ will yield the variance (σ^2).

PRACTICE A.9

Major League Baseball Salaries (1998)		NBA Salaries (1997 - 19980)	
Player	Salary (in millions of dollars)	Player	Salary (in millions of dollars)
Albert Belle	\$10	Michael Jordan	\$33.1
Gary Sheffield	\$10	Patrick Ewing	\$20.5
Greg Maddux	\$9.6	Horace Grant	\$14.3
Barry Bonds	\$8.9	Shaquille O'Neal	\$12.9
Mark McGwire	\$8.3	David Robinson	\$12.4
Roger Clemens	\$8.25	Alonzo Mourning	\$11.26
Bernie Williams	\$8.25	Juwan Howard	\$11.25
Andres Galarraga	\$8	Hakeem Olajuwon	\$11.16
Mike Piazza	\$8	Gary Payton	\$10.5
Sammy Sosa	\$8	Dikembe Mutumbo	\$9.6

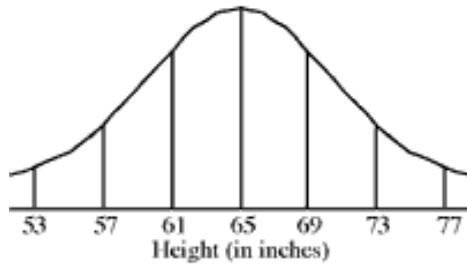
Apply 1. Calculate the standard deviation, variance, and mean absolute deviation (remember you need an extra step beyond 1-var stats for this) for the Baseball and Basketball Salaries.

Apply 2. According to your results, make three comparison statements using your statistics vocabulary about basketball and baseball salaries?

Apply 3. IQ scores are normally distributed with a mean of 100 and a standard deviation of 15. What would be the z-score for a student that scored a 125, and what does that mean?

Practice A.9 Continued

1. The heights of 750 students at a local school were recorded and found to be approximated by this normal curve. What could the mean and standard deviation for these data be?



- A 69,5
B 65,8
C 65,4
D 53,4
2. A set of data that is normally distributed has a mean of 35.6 and standard deviation of 2.5. Which number is between 1 and 2 standard deviations of the mean?
- F 29
H 34.1
G 38.3
J 41.2

3. The class average on a math test was 84.5 and the standard deviation was 4.4. Find the z-score for a test score of 94.

- A 21.36
B 2.16
C -2.16
D -21.36

4. Determine the number of standard deviations that includes all data values listed for the situation.

The mean height of a tree in an orchard is 11.8 feet; the standard deviation is 1.43 feet.

12.5 ft, 9.8 ft, 13.5 ft, 11.2 ft, 12.3 ft, 14.2 ft, 11.7 ft, 9.8 ft, 12.6 ft, 10.4 ft

- F 1 standard deviations
G 2 standard deviations
H 3 standard deviations
J 4 standard deviations

A.9 Skills Checklist: *I can...*

- Analyze descriptive statistics to determine the implications for the real-world situations from which the data was derived.
- Given data, including data in a real-world context, calculate and interpret the mean absolute deviation of a data set.
- Given the data, including data in a real-world context, calculate the variance and standard deviation of dataset and interpret the standard deviation.
- Given data, including data in a real world context, calculate and interpret z-scores for a data set.
- Explain ways in which standard deviation addresses dispersion by examining the formula for standard deviation.
- Compare and contrast mean absolute deviation and standard deviation in a real-world context.

SOL A.10

The student will compare and contrast multiple univariate data sets, using box-and-whisker plots.

HINTS and NOTES

Mean (average)

- Add up all the data and divide by number of data

Median (middle)

- Put data in numerical order and find the middle
- If there are an even number of data, find the middle two and average them

Mode (most)

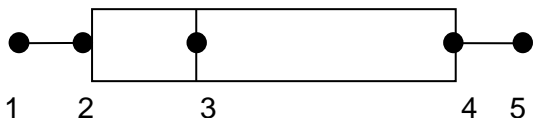
- Data that occurs the most often
- If all data occurs the same amount of time, then the mode is NO MODE

Range

- The difference between the largest data point and the smallest data point

Box and Whisker

1. Lower extreme (Lowest point)
2. Q1 (median of lower half)
3. Q2 (Median)
4. Q3 (median of upper half)
5. Upper Extreme (Highest point)



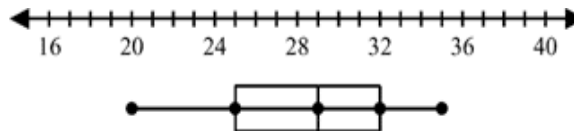
- Each quartile represents 25% of the data set.
- The IQR is the interquartile range Q3-Q1

PRACTICE A.10

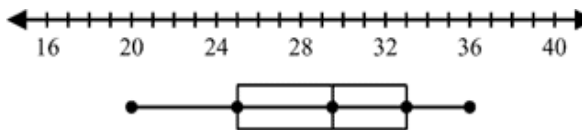
1. Only one of the box-and-whisker plots correctly displays data about the ages of team members on a company baseball team. The statements below are all true about the team. Use the statements to correctly choose the box-and-whisker plot.

- The youngest member is 20 years old.
- About 75% of the members are between 25 and 34 years old.
- No one is older than 34 years old.
- About 50% of the members are at least 29 years old.

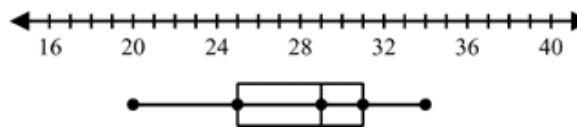
A



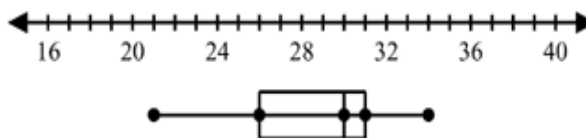
B



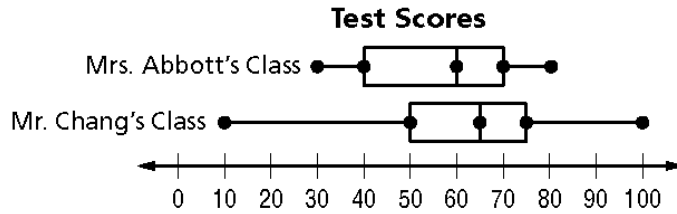
C



D



PRACTICE A.10



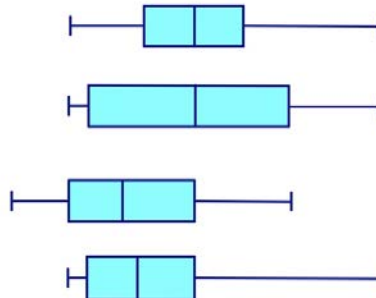
2. Which is true about the class medians?
 - F Mrs. Abbott's is 60 and Mr. Chang's is 65
 - G Mrs. Abbott's is 80 and Mr. Chang's is 75
 - H Mrs. Abbott's is 40 and Mr. Chang's is 50
 - J Mrs. Abbott's is 50 and Mr. Chang's is 90

3. What percent of the scores in Mrs. Abbott's class are between 60 and 80?
 - A 25%
 - B 40%
 - C 50%
 - D 75%

4. Which is true about the class ranges?
 - F Mrs. Abbott's is 50 and Mr. Chang's is 25
 - G Mrs. Abbott's is 50 and Mr. Chang's is 90
 - H Mrs. Abbott's is 40 and Mr. Chang's is 25
 - J Mrs. Abbott's is 40 and Mr. Chang's is 90

5. What percent of the scores in Mr. Chang's class are greater than 50?
 - A 25%
 - B 50%
 - C 75%
 - D 100%

6. *(Critical Thinking)* Describe how the box-and-whisker plots below are alike and different. Discuss possible scenarios that these could represent.



A.10 SKILLS CHECKLIST: I can...

- Compare, contrast, and analyze data, including data from real-world situations displayed in box-and-whisker plots.

SOL A.11

The student will collect and analyze data, determine the equation of the curve of best fit in order to make predictions, and solve real-world problems, using mathematical models. Mathematical models will include linear and quadratic functions.

HINTS and NOTES

Line of Best Fit- an equation that best represents a set of ordered pairs with a linear relationship.

(Meaning they almost make a line)

Curve of Best Fit- an equation that best represents a set of ordered pairs with a quadratic relationship.

(Meaning they almost make a curve)

CASIO CFX-9850GC PLUS HELP

To calculate Line of Best Fit or Curve of Best Fit-Stat Menu

1. Enter first column in List 1 and the second column in List 2
2. Press F1 three times to get the Linear Regression
3. Plug in values in the equation:
 $y = ax + b$

To predict data

1. In WINDOW, select Copy: F5
2. Also, make sure that the equation is in Y1 and you have graphed the line with the data
3. Draw: F6
4. G-Solv: F5 to tab over click F6
5. To predict for y select F2:x-cal- enter value given
6. To predict for x select F1: y-cal- enter value given
7. Remember answers given are estimates select closest value

PRACTICE A.11

1. Bill rode his bike to a store 5 kilometers from his house. The table shows the distance from the store paired with the number of minutes after leaving his house.

Minutes (x)	Kilometers from Store (y)
0	5
3	4
5	3.2
8	2.9

- A** $y = -0.2x + 4.5$
B $y = -0.2x + 6.1$
C $y = -0.3x + 4.9$
D $y = -0.3 + 6.4$

2. Using the data in the table below find the curve of best fit, write an equation and sketch the graph of your findings. If a new planet was found at an average distance of 6204 from the sun, what would be your prediction for how many earth days it would take for this planet to rotate around the sun?

Planet	Average Distance from Sun (in Millions of kilometers)	Time of orbit in Earth Days
Mercury	57.9	88
Venus	108.2	225
Earth	149.6	365
Mars	227.9	687
Jupiter	778.3	4333
Saturn	1427	10759
Uranus	2871	30685
Neptune	4497	60189
Pluto	5913	90800

A.11 SKILLS CHECKLIST: I can...

- Write an equation for a curve of best fit, given a set of no more than twenty data points in a table, a graph, or a real-world situation.
- Make predictions about unknown outcomes, using the equation of the curve of best fit.
- Design experiments and collect data to address specific, real-world questions
- Evaluate the reasonableness of a mathematical model of a real world situation.