Foundations of Math 11 - Chapter 5 and Chapter 6 Exam Review

Multiple Choice
Identify the choice that best completes the statement or answers the question.

___C___ 1. What is the boundary line for the linear inequality $y < -2x + 9$?

 A) $y = -2x + 18$
 B) $y = -4x + 36$
 C) $y = -2x + 9$
 D) $x = -2y + 18$

Change to an "=" sign

___A___ 2. Which test point is in the solution set for the linear inequality $\{(x, y) \mid x + y < 3, x \in W, y \in W\}$?

 A) $(1, 1)$
 B) $(-2, 5)$
 C) $(2, 2)$
 D) $\left(\dfrac{1}{2}, \dfrac{1}{2}\right)$

$(1,1)$ $x+y < 3$
$x \ y$ $1 + 1$
           2

Since $2 < 3$, $(1,1)$ is in the solution set for $x+y < 3$.

Dashed   *Solid*

___A___ 3. Describe the boundary lines for the following system of linear inequalities.
$\{y < 3x + 12, y \geq -x, x \in R, y \in R\}$

 A) Dashed line along $y = 3x + 12$; solid line along $y = -x$
 B) Dashed line along $y = 3x + 12$; dashed line along $y = -x$
 C) Solid line along $y = 3x + 12$; dashed line along $y = -x$
 D) Solid line along $y = 3x + 12$; solid line along $y = -x$

A

4. A vending machine sells pop and juice.
   • The machine holds, at most, 200 cans of drinks.
   • Sales from the vending machine show that at least 3 cans of juice are sold for each can of pop.
   • Each can of juice sells for $1.50, and each can of pop sells for $1.00.
   Let x represent the number of cans of pop.
   Let y represent the number of cans of juice.
   What are the restrictions on x and y?

   Ⓐ $x \in W, y \in W$
   B) $x \in I, y \in I$ (positives and negatives)
   C) $x \in R, y \in R$ (fractions and decimals)
   D) No constraints.

C

5. Which point in the model below would result in the maximum value of the objective function $W = 5y - 10x$?
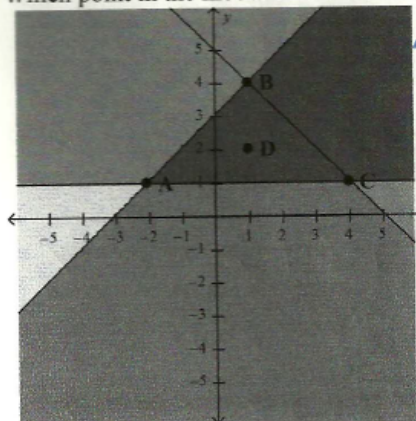
A) $W = 5y - 10x$
   $= 5(4) - 10(1)$
   $= 20 - 10$
   $= 10$

B) $W = 5y - 10x$
   $= 5(1) - 10(4)$
   $= 5 - 40$
   $= -35$

c) $W = 5y - 10x$
   $= 5(1) - 10(-2)$
   $= 5 + 20$
   $= 25$ *

D) $W = 5y - 10x$
   $= 5(2) - 10(1)$
   $= 10 - 10$
   $= 0$

A) B (1, 4)
B) C (4, 1)
Ⓒ A (−2, 1)
D) D (1, 2)

A.

6. Brent found spiders and grasshoppers in his barn.
   • There were at most 12 spiders and at least 10 grasshoppers.
   • There were no more than 36 spiders and grasshoppers, in total.
   Let s represent the number of spiders and let g represent the number of grasshoppers.
   Which inequality represents a restriction of s and g based on the given information?

   A) $s \leq 12$ B) $g \leq 12$ C) $g < 10$ D) $s < 10$

C.

7. Brent found spiders and grasshoppers in his barn.
   • There were at most 15 spiders and at most 20 grasshoppers.
   • There were no more than 30 spiders and grasshoppers, in total.
   Let s represent the number of spiders and let g represent the number of grasshoppers.
   Which inequality represents a restriction of s and g based on the given information?

   A) $g \leq 30$ B) $g \geq 30$ C) $g \leq 20$ D) $g \leq 15$

A.

8. Audrey notices the number of dogs and people in a dog park.
   • There are more people than dogs.
   • There are at least 12 dogs.
   • There are no more than 40 dogs and people, in total. $d + p \leq 40$
   Let d represent the number of dogs and let p represent the number of people.
   Which inequality represents a restriction of d and p based on the given information?
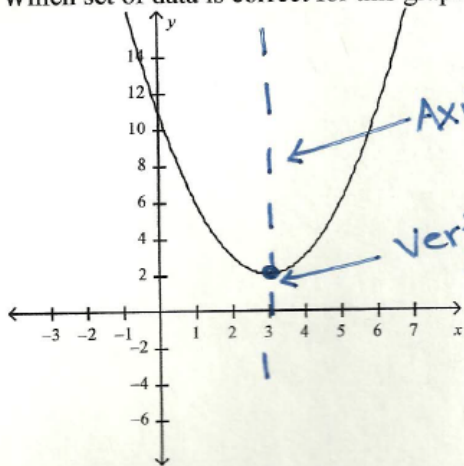
   A) $d + p \leq 40$ B) $d + p < 40$ C) $d + p \geq 40$ D) $d + p > 40$

A

9. Which set of data is correct for this graph?

Axis of Symmetry
$x = 3$

Vertex
$(3,2)$

* Domain
$\{x \in R\}$

** Range
$\{y | y \geq 2, y \in R\}$

	Axis of Symmetry	Vertex	Domain	Range
A.	$x = 3$	$(3, 2)$	$x \in R$	$y \geq 2$
B.	$x = 3$	$(2, 3)$	$x \in R$	$y \in R$
C.	$x = 2$	$(2, 3)$	$-1 \leq x \leq 7$	$y \geq 2$
D.	$x = 3$	$(3, 2)$	$-2 \leq x \leq 8$	$y \geq 0$

A) Set A.
B) Set C.
C) Set D.
D) Set B.

A 10. What are the x- and y-intercepts for the function $y = x^2 - 2x - 8$?

* To find ↑ y-int
x-ints... FACTOR

A) $x = -2, x = 4, y = -8$
B) $x = -2, x = 2, y = -8$
C) no x-intercepts, $y = -8$
D) $x = -4, x = 4, y = -8$

$x^2 - 2x - 8 = 0$ $2x - 4 = -8$
$(x+2)(x-4) = 0$ $\frac{2 + -4}{2} = -2$
$x+2 = 0$ or $x-4 = 0$
$x = -2$ $x = 4$

A 11. The points (–2, 4) and (1, 4) are located on the same parabola. What is the equation for the axis of symmetry for this parabola?

To find equation of axis of symmetry:

A) $x = -0.5$
B) $x = -1$
C) $x = 0.5$
D) $x = -1.5$

$x = -\dfrac{2+1}{2}$

$x = \dfrac{-1}{2}$ or -0.5

D 12. Solve $x^2 + 5x + 4 = 0$ by factoring.

A) $x = -5, x = -1$
B) $x = 5, x = 1$
C) $x = 4, x = 1$
D) $x = -4, x = -1$

$x^2 + 5x + 4 = 0$ $1 \cdot x \dfrac{4}{} = 4$
$(x+1)(x+4) = 0$ $1 + \dfrac{4}{} = 5$
$x+1 = 0$ or $x+4 = 0$
$x = -1$ $x = -4$

B 13. Solve $x^2 - 10x - 24 = 0$ by factoring.

A) $x = -8, x = -3$
B) $x = -2, x = 12$
C) $x = 2, x = -12$
D) $x = -6, x = -4$

$x^2 - 10x - 24 = 0$ $-12 \times 2 = -24$
$(x-12)(x+2) = 0$ $-12 + 2 = -10$
$x - 12 = 0$ or $x + 2 = 0$
$x = 12$ $x = -2$

B 14. Solve $100x^2 - 121 = 0$ by factoring.

A) $x = 10, x = -11$
B) $x = \dfrac{11}{10}, x = -\dfrac{11}{10}$
C) $x = \dfrac{10}{11}, x = -\dfrac{10}{11}$
D) $x = 11, x = -11$

$100x^2 - 121 = 0$
$(10x - 11)(10x + 11) = 0$
$10x - 11 = 0$ or $10x + 11 = 0$
$\dfrac{10x = 11}{10 \quad 10}$ $\dfrac{10x = -11}{10 \quad 10}$
$x = \dfrac{11}{10}$ $x = -\dfrac{11}{10}$

B 15. Which set of data is correct for the quadratic relation $f(x) = -2(x-12)^2 + 15$?

	Direction parabola opens	Vertex	Axis of Symmetry
A.	downward	$(15, -12)$	$x = 15$
B.	downward	$(12, 15)$	$x = 12$
C.	upward	$(-12, 15)$	$x = -12$
D.	upward	$(15, 12)$	$x = 15$

A) Set D.
B) Set B.   Watch Order!
C) Set A.
D) Set C.

A 16. Which quadratic function represents this parabola?
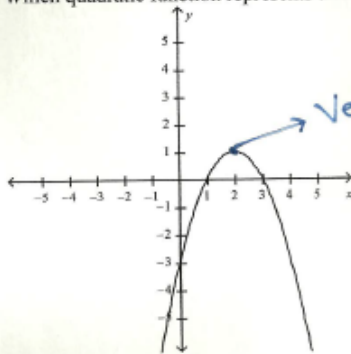
→ Vertex: (2, 1)
※ Opens downward
   ↳ begins with a "-".

(A) $y = -(x-2)^2 + 1$
B) $y = -(x+2)^2 - 1$
C) $y = (x-2)^2 + 1$
D) $y = -(x+2)^2 + 1$

D 17. Solve $2x^2 - 3x + 1 = 0$ using the quadratic formula.

$a = 2, b = -3, c = 1$

A) $x = 1, x = -\frac{1}{2}$

B) $x = 1, x = -\frac{1}{2}$

C) $x = -1, x = \frac{1}{2}$

(D) $x = 1, x = \frac{1}{2}$

$x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

$x = \dfrac{3 \pm \sqrt{(-3)^2 - 4(2)(1)}}{2(2)}$

$x = \dfrac{3 \pm \sqrt{9 - 8}}{4}$

$x = \dfrac{3 \pm \sqrt{1}}{4}$

$x = \dfrac{3 \pm 1}{4}$

$x = \dfrac{3+1}{4}$ or $x = \dfrac{3-1}{4}$

$x = \dfrac{4}{4}$ $x = \dfrac{2}{4}$

$x = 1$ $x = \frac{1}{2}$

B 18. Solve $9x^2 + 6x + 1 = 0$ using the quadratic formula.

$a = 9, b = 6, c = 1$

A) $x = \dfrac{1}{3}$

B) $x = -\dfrac{1}{3}$

C) $x = 0, x = -\dfrac{1}{3}$

D) $x = 0, x = \dfrac{1}{3}$

$$x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$x = \dfrac{-6 \pm \sqrt{(6)^2 - 4(9)(1)}}{2(9)}$$

$$x = \dfrac{-6 \pm \sqrt{36 - 36}}{18}$$

$$x = \dfrac{-6 \pm \sqrt{0}}{18}$$

$$x = -6/18 \text{ or } -1/3.$$

19. Graph the solution set for the following system of inequalities.
$$\{(x, y) \mid x + 5y \leq 5, y + 5 > x, x \in R, y \in R\}$$

Equations of boundary lines:
→ $x + 5y = 5$ (Solid)   → $y + 5 = x$ (dashed)

x-int:
$x + 5(0) = 5$
$x = 5$

y-int:
$0 + 5y = 5$
$\dfrac{5y}{5} = \dfrac{5}{5}$
$y = 1$

x-int:
$0 + 5 = x$
$5 = x$

y-int:
$y + 5 = 0$
$y = -5$

Test Point; $(0,0)$

L.S	$\leq$	R.S
$x + 5y$		5
$0 + 5(0)$		
$0 + 0$		
0		

$0 \leq 5$, therefore $(0,0)$ is located in the solution region.

Test Point; $(0,0)$

L.S.	$>$	R.S
$y + 5$		x
$0 + 5$		0
5		

$5 > 0$, therefore $(0,0)$ is located in the solution region.
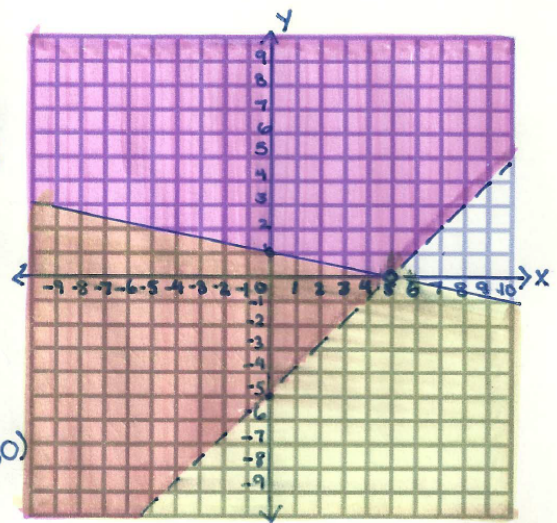
20. Jennifer has two summer jobs.
   - She works no more than a total of 40 h a week.
     Both jobs allow her to have flexible hours but in whole hours only.
   - At the ice cream shop, Jennifer works no less than 18 h and earns $10.00/h.
   - At the pool, Jennifer works no more than 20 h and earns $10.75/h.

List the Defining Statements.

Let x represent the # of hours Jennifer works at the ice cream shop

Let y represent the # of hours Jennifer works at the pool.

Let E represent her total earnings.

List the restrictions.

$x \in W, y \in W$

List the constraints.

$x \geq 18$

$y \leq 20$

$x + y \leq 40$

State the objective function.

$E = 10.00x + 10.75y$

21. Solve $x^2 - x - 5 = 0$ using the quadratic formula. State the solution as exact values.

$$a = 1, b = -1, c = -5$$

$$x = -\frac{b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$x = \frac{1 \pm \sqrt{(-1)^2 - 4(1)(-5)}}{2(1)}$$

$$x = \frac{1 \pm \sqrt{1 + 20}}{2}$$

$$x = \frac{1 \pm \sqrt{21}}{2}$$

22. Solve $2x^2 + 8x + 2 = 0$ using the quadratic formula. State the solution as exact values.

$$a = 2, \ b = 8, \ c = 2$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$x = \frac{-8 \pm \sqrt{(8)^2 - 4(2)(2)}}{2(2)}$$

$$x = \frac{-8 \pm \sqrt{64 - 16}}{4}$$

$$x = \frac{-8 \pm \sqrt{48}}{4}$$

23. A parabola with the vertex (–7, –2) passes through the point (–9, 10).
Determine the equation for this parabola. **Express your final answer in vertex form.**

$$y = a(x-h)^2 + k$$
$$y = a(x--7)^2 - 2$$
$$y = a(x+7)^2 - 2$$

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

$$10 = a(-9+7)^2 - 2$$
$$10 = a(-2)^2 - 2$$
$$10 = a(4) - 2$$
$$10 = 4a - 2$$
$$10 + 2 = 4a$$
$$\frac{12}{4} = \frac{4a}{4}$$
$$3 = a$$