Summer Review Packet
Honors Algebra 1 / Geometry

Name: _____

This review packet contains the pre-requisite skills for Honors Algebra 1 / Geometry. Please complete all problems showing work when appropriate. All problems are meant to be completed with no calculator.

Topic 1: Basic Skills

1. $2 \cdot 3 - 1 \cdot 5^2$

$= 6 - 1 \cdot 25$

$= 6 - 25$

$= \boxed{-19}$

2. $\frac{1}{3}(7 + 4 \cdot 2)$

$= \frac{1}{3}(7 + 8)$

$= \frac{1}{3}(15)$

$= \boxed{5}$

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

$= 1 + 2(25) - 3$

$= 1 + 50 - 3$

$= 51 - 3$

$= \boxed{48}$

4. $26 - [(25 - 11) - 23]$

$= 26 - (14 - 23)$

$= 26 - (-9)$

$= \boxed{35}$

5. $(8^2 - 2^5) \div (24 \div 6) + 3^2$

$= (64 - 32) \div (4) + 9$

$= 32 \div 4 + 9$

$= 8 + 9$

$= \boxed{17}$

6. $\frac{5(16-5)-1}{4^2-7}$

$= \frac{5(11)-1}{16-7}$

$= \frac{55-1}{9} = \frac{54}{9} = \boxed{6}$

7. $\frac{3 \cdot \frac{5}{2} + \frac{4}{3} \cdot 2}{3 \cdot 2}$

$= \frac{15}{6} + \frac{8}{6}$

$= \boxed{\frac{23}{6}}$

8. $\frac{\frac{2}{5} \cdot \frac{2}{3}}{}$

$= \boxed{\frac{4}{15}}$

9. $\frac{3}{4} + \frac{1}{4} \div \frac{2}{3}$

$\frac{1}{4} \cdot \frac{3}{2} = \frac{3}{8}$

$= \frac{2 \cdot 3}{2 \cdot 4} + \frac{3}{8}$

$= \frac{6}{8} + \frac{3}{8} = \boxed{\frac{9}{8}}$

10. Evaluate $3x^2 + 1$ if $x = -4$

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

$= 3(16) + 1$

$= 48 + 1$

$= \boxed{49}$

11. Evaluate $2(3x + 6) \div (10m)$ if $x = 8$, $m = 3$

$= 2(3(8) + 6) \div (10(3))$

$= 2(24 + 6) \div (30)$

$= 2(30) \div 30$

$= 60 \div 30$

$= \boxed{2}$

12. Evaluate $\sqrt{x + 20} \cdot (y + 1)^2 - \sqrt{x} \cdot y^2$ if $x = 16$, $y = 2$

$= \sqrt{16 + 20} \cdot (2 + 1)^2 - \sqrt{16} \cdot (2)^2$

$= \sqrt{36} \cdot (3)^2 - \sqrt{16} \cdot (2)^2$

$= 6 \cdot 9 - 4 \cdot 4$

$= 54 - 16 = \boxed{38}$

13. $2(x - 6)$

$= \boxed{2x - 12}$

14. $n + 4 - 9 - 5(n + 1)$

$= n + 4 - 9 - 5n - 5$

$= \boxed{-4n - 10}$

15. $1a + 4b - 9a + 1 + 8b - 11$

$\boxed{-8a + 12b - 10}$

16. You have $500 saved up to be able to go out to lunch once per week senior year. Each time you go out to lunch, you spend $15. How much money will you have left 6 weeks into school?

$= 500 - 15(6)$

$= 500 - 90 = 410$

You will have $410 left after 16 weeks.

17. You have $3,200 in credit card debt when you graduate college. Each month you make a $200 payment (without adding any new debt). How long will it take you to get out of debt?

$-3200 + 200x = 0$

$\frac{200x}{200} = \frac{3200}{200}$

$x = 16$

It will take 16 months to get out of debt.

18. Given the recipe below, adjust the recipe in order to make 30 cookies. Adjust the recipe to make 120 cookies.

Chocolate Chip Cookies

$2\frac{1}{2}$ cups flour
1 tsp. baking soda
$\frac{3}{4}$ teaspoon salt
1 cup butter
$\frac{3}{4}$ cup sugar
1 tsp. vanilla
2 eggs
$\frac{3}{4}$ pound of Chocolate Chips

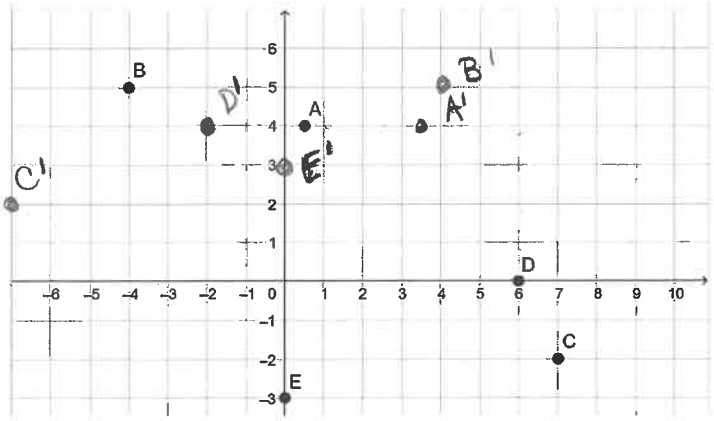
Makes 60 cookies. ×1/2

1¼ c flour
½ tsp b.s.
3/8 tsp salt
½ c butter
3/8 c sugar
½ tsp vanilla
1 egg
3/8 lb of C.C.
30 cookies ×2

5 c flour
2 tsp b.s
3/2 or 1½ tsp salt
2 c butter
3/2 or 1½ c sugar
2 tsp vanilla
4 eggs
3/2 or 1½ lb of C.C.
120 cookies

Topic 2: Geometry

19. Given the points in the grid, perform the indicated transformation. Label the transformation of A as A', etc.



a) Translate point A three units to the right.

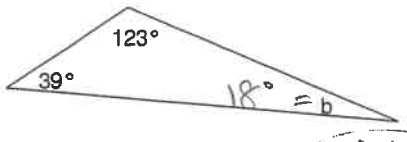
b) Reflect point B over the y-axis

c) Rotate point C 180° about the origin.

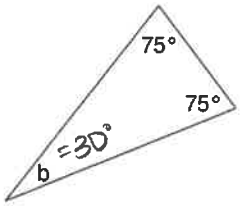
d) Translate point D four units up and eight units to the left.

e) Reflect point E over the x-axis

20. Find the missing angles.

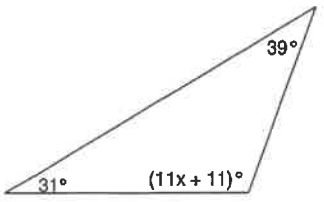


180 − 123 − 39 = 18° = b

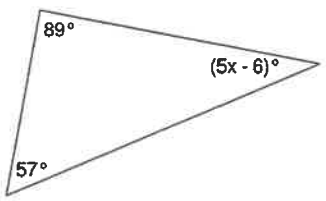


180 − 2(75)
b = 30°

21. Solve for x. Then find the missing angle.

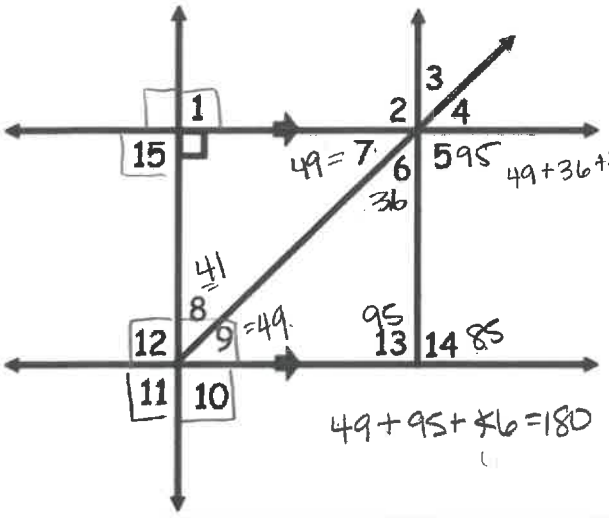


31 + 39 + (11x + 11) = 180
11x + 81 = 180
11x = 99
x = 9



89 + 57 + (5x − 6) = 180
140 + 5x = 180
5x = 40
x = 8

22. Solve the following angle puzzle.



m∠1 = 90 m∠6 = 36 m∠11 = 90

m∠2 = 95 m∠7 = 49 m∠12 = 90

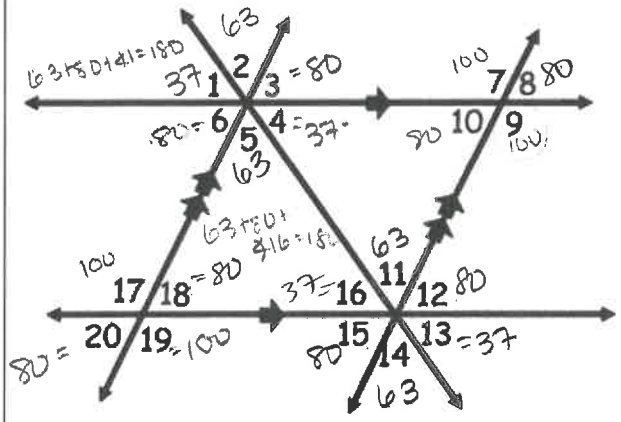
m∠3 = 36 m∠8 = 41 m∠13 = 95

m∠4 = 49 m∠9 = 49 m∠14 = 85

m∠5 = 95 m∠10 = 90 m∠15 = 90

Given: m∠7 = 49° and m∠14 = 85°

23. Solve the following angle puzzle.



m∠1 = 37° m∠7 = 100° m∠14 = 63°

m∠2 = 63° m∠8 = 80° m∠15 = 80°

m∠3 = 80° m∠9 = 100° m∠16 = 37°

m∠4 = 37° m∠10 = 80° m∠17 = 100°

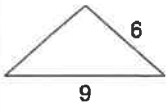
m∠5 = 63° m∠11 = 63° m∠18 = 80°

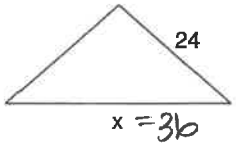
m∠6 = 80° m∠12 = 80° m∠19 = 100°

m∠13 = 370° m∠20 = 80°

Given: m∠5 = 63° and m∠8 = 80°

24. Each set of figures below are similar. Solve for the missing side.

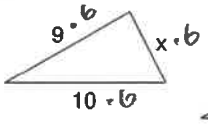


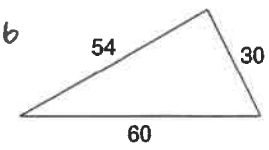


$\frac{6}{24} = \frac{9}{x}$

$\frac{1}{4} = \frac{9}{x}$

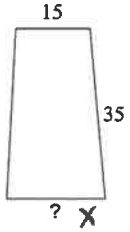
$36 = x$

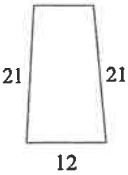




$6x = 30$

$x = 5$

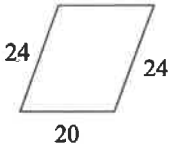


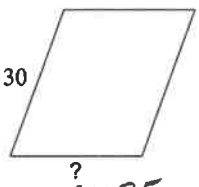


$\frac{21}{35} = \frac{12}{x}$

$\frac{3 \cdot 4}{5 \cdot 4} = \frac{12}{x}$

$x = 20$

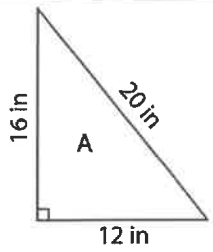


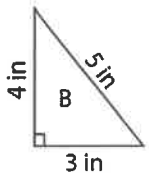


$\frac{24}{30} = \frac{20}{x}$

$\frac{4 \cdot 5}{5 \cdot 5} = \frac{20}{x}$

25.





What is the scale factor of figure A to figure B?

$A \cdot \frac{1}{4} = B$

Find the areas of figure A and figure B.

A: $A = \frac{1}{2}(12)(16) = 96\,in^2$ B: $A = \frac{1}{2}(3)(4) = 6\,in^2$

Determine the perimeters of figures A and B.

A: $P = 12+16+20 = 48\,in$ B: $P = 3+4+5 = 12\,in$

What is the ratio of areas of figure A to figure B?

$A \cdot \frac{1}{16} = B$

What is the ratio of perimeters of figure A to figure B?

$A \cdot \frac{1}{4} = B$

Express the relationship between scale factor and the ratio of perimeters.

They are =

What is the relation between scale factor and the ratio of areas?

squared.

Topic 3: Linear Relationships

26. Evaluate the following equation into a table of values. Then find the slope.

$y = 3x + 5$

x	y
0	5
1	8
2	11
3	14

$m =$ 3

27. Find the slope between the two points

(2,3) and (7,5)
$x_1 y_1$ $x_2 y_2$

$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{5-3}{7-2} = \frac{2}{5}$

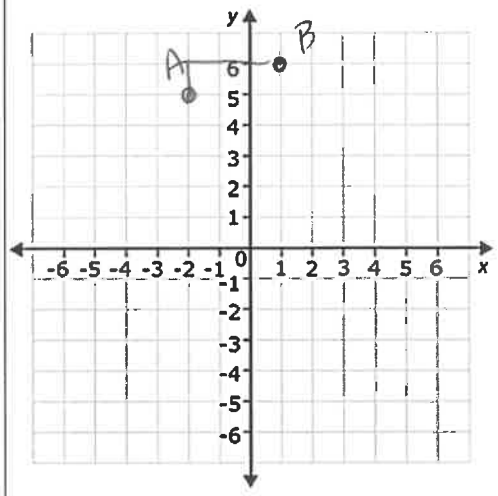
$m =$ $\frac{2}{5}$

28. Identify the slope of the line represented by the table below

x	y	
0	14	
1	11	−3
2	8	−3
3	5	−3

$m =$ −3

29. Plot the points A $(-2,5)$ and B $(1,6)$ then find the slope of the line between the points



$m = \frac{\text{rise} \updownarrow}{\text{run} \rightarrow}$

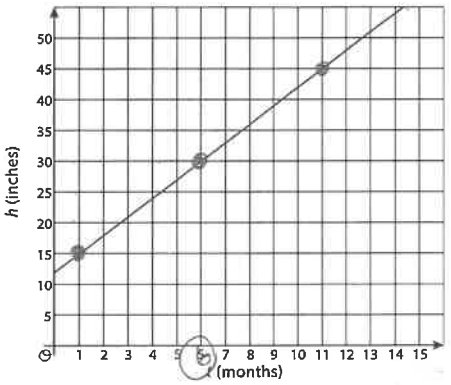
$m =$ $\frac{1}{3}$

30.

The graph shows the height in inches, h, of a bamboo plant t months after it has been planted.

a. Write an equation that describes the relationship between h and t.

b. After how many months will the bamboo plant be 66 inches tall? Explain or show your reasoning.



(1, 15) (6, 30)

$m = \frac{30-15}{6-1} = \frac{15}{5} = 3$

pt slope: $y - y_1 = m(x - x_1)$

$y - 15 = 3(x-1)$

$y - 15 = 3x - 3$

a.) $y = 3x + 12$

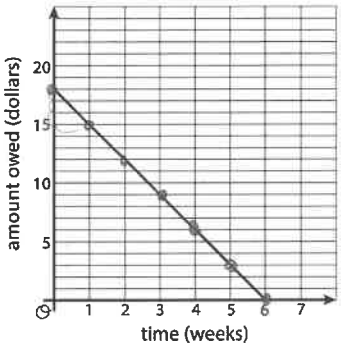
b.) $66 = 3x + 12$

$54 = 3x$

$18 = x$ | 18 months

31.

Elena borrowed some money from her brother. She pays him back by giving him the same amount every week. The graph shows how much she owes after each week.



Answer and explain your reasoning for each question.

1. What is the slope of the line? $m = \frac{\text{rise}}{\text{run}} = \frac{-3}{1} = -3$
2. Explain how you know whether the slope is positive or negative. the line is trending down → or she owes less money each week.
3. What does the slope represent in this situation? $m = \frac{-3 \to \$}{1 \to \text{week}}$ Each week, Elena owes $3 less (or pays back $3 each wk)
4. How much did Elena borrow? $18 → y int (0, 18)
5. How much time will it take for Elena to pay back all the money she borrowed?
   6 weeks → x int (6, 0) After 6 weeks Elena owes $0.

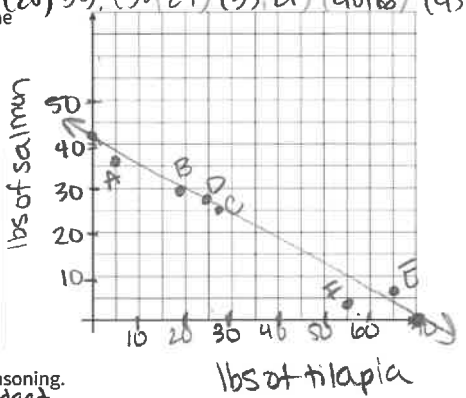
32.

The Fabulous Fish Market orders tilapia, which costs $3 per pound, and salmon, which costs $5 per pound. The market budgets $210 to spend on this order each day.

1. What are five different combinations of salmon and tilapia that the market can order?
   (70, 0) (0, 42) (25, 27) (5, 39) (10, 36) (15, 33) (20, 30) (30, 24) (35, 21) (40, 18) (45, 15) (50, 12) (55, 9) (60, 6) (65, 3)
2. Define variables and write an equation representing the relationship between the amount of each fish bought and how much the market spends.
   2.) x = lbs of tilapa y = lbs of salmn
   $3x + 5y \leq 210$ ← $3x + 5y = 210$
3. Sketch a graph of the relationship. Label your axes.
4. On your graph, plot and label the combinations A—F.

x int: $3x + 5(0) = 210$, $x = 70$

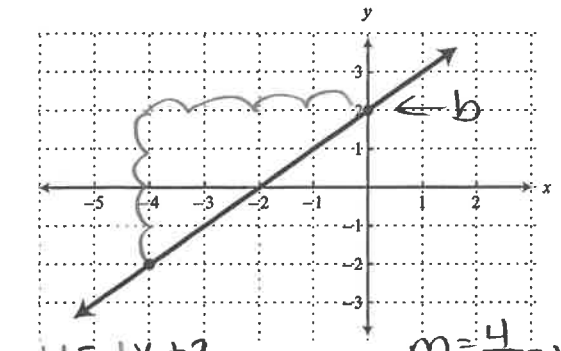
y int: $3(0) + 5y = 210$, $y = 42$



	A	B	C	D	E	F
x **pounds of tilapia**	5	19	27	25	65	55
y **pounds of salmon**	36	30.6	25	27	6	4

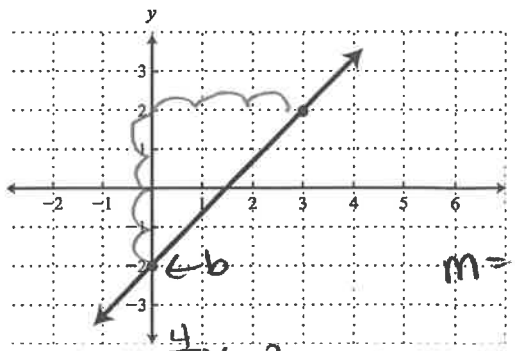
a. Which of these combinations can the market order? Explain or show your reasoning.
   All but E works → E's combo is above the $210 budget.
5. List two ways you can tell if a pair of numbers is a solution to an equation.
   ① Plug the pt into the equation to see if it makes a true statement
   ② Plot the point to see if it is on the line.

33. Write the equation of the line.



$y = 1x + 2$ $\quad m = \frac{4}{4} = 1$

34. Write the equation of the line.



$m = \frac{4}{3}$

$y = \frac{4}{3}x - 2$

35. Given slope = $-\frac{2}{3}$, y-intercept is (0, 12), write an equation of the line.

$y = -\frac{2}{3}x + 12$

36. Given slope = 8, y-intercept is (0, -5), write an equation of the line.

$y = 8x - 5$

37. A line passes through (5, 3) and (4, -3). Find the slope of the line, then write the equation of the line.

$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-3-3}{4-5} = \frac{-6}{-1} = 6$

pt-slope: $y - y_1 = m(x - x_1)$

$y - 3 = 6(x - 5)$ or $y + 3 = 6(x - 4)$

Slope 6 *Equation* $y + 3 = 6(x - 4)$

38. Given the equation below, convert to slope-intercept form. $y = mx + b$

$y - 2 = \frac{1}{2}(x + 6)$

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

$+2 \quad +2$

$y = \frac{1}{2}x + 5$

Slope-intercept form $y = \frac{1}{2}x + 5$

Topic 4: Solving Linear Equations

Solve each equation for x.

39. $2x + 5 - 4x = 17$

$-2x + 5 = 17$

$-2x = 12$

$x = -6$

40. $\frac{2x}{3} - 2 = 6$

$3 \cdot \frac{2x}{3} = 8 \cdot 3$ or $\frac{3}{2} \cdot \frac{2}{3}x = \frac{8}{1} \cdot \frac{3}{2}$

$2x = 24$ $\quad x = \frac{24}{2}$

$x = 12$ $\quad x = 12$

41. $\frac{1}{2}(4x - 2) = 10$

$2x - 1 = 10$

$2x = 11$

$x = \frac{11}{2}$ or 5.5

42. $-8 - 5x = 64 + 3x$

$-8 = 64 + 8x$

$-72 = 8x$

$-9 = x$

43. $2(x + 1) = 3x - 5$

$2x + 2 = 3x - 5$

$2 = x - 5$

$7 = x$

44. $-4x + 3 = 4x - 13$

$3 = 8x - 13$

$16 = 8x$

$2 = x$

45. $2x-4(x+5)=3x-4-x$

$2x-4x-20=3x-4-x$

$-2x-20=2x-4$

$-20=4x-4$

$-16=4x$

$-4=x$

46. $\frac{1}{2}(4x-2)-x=5x-13$

$2x-1-x=5x-13$

$x-1=5x-13$

$-1=4x-13$

$12=4x$

$3=x$

47. $3x+7-4x=5(2-x)-7$

$3x+7-4x=10-5x-7$

$-1x+7=3-5x$

$4x+7=3$

$4x=-4$

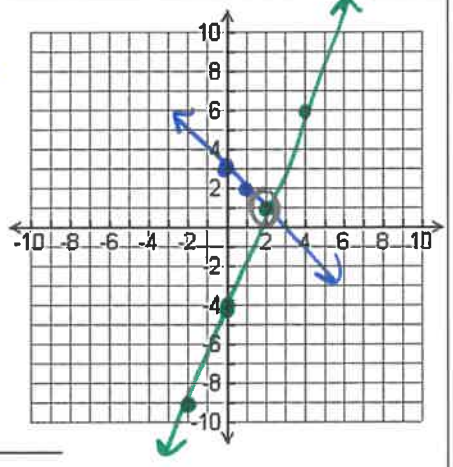
$x=-1$

Topic 4: Solving Systems of equations

Find the solution to each system of equations by graphing.

48. $y=\frac{5}{2}x-4$

$y=-x+3$



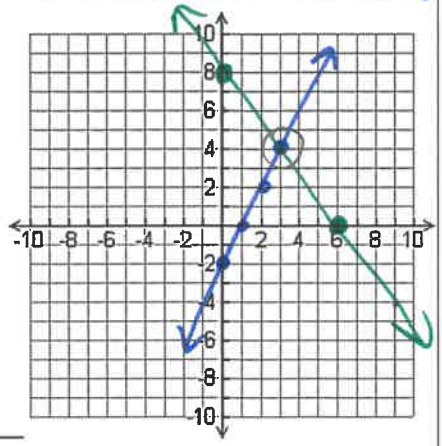
solution: (2, 1)

49. $4x+3y=24$

$y=2x-2$

x-int: $4x+3(0)=24$, $4x=24$, $x=(6,0)$

y-int: $4(0)+3y=24$, $3y=24$, $y=8$ (0, 8)



solution: (3, 4)

Solve the following system using any method. Show your work! Be aware of special cases (∞ or no solutions)

50. $3x+y=4$

$y=-3x-2$ substitution

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

$-2=4$

No sol.

51. $x+4y=3$

$4(4x-y=-5)$ Elimination.

$16x-4y=-20$

$1x+4y=3$

$17x=-17$

$x=-1$

$(-1)+4y=3$

$4y=4$

$y=1$

(-1, 1)

52. $2x+3y=10$

$4x+6y=20$ Elimination

$-4x-6y=-20$

$0=0$

∞ sol.

Identify what each variable represents, write a system of equations, then solve the system.

53. The cost of 5 crates of oranges and 8 crates of apples is $62. The cost of 12 crates of oranges and 2 crates of apples is $80. Find the cost of a crate of oranges and the cost of a crate of apples.

a) Identify your variables

x: $ of orange crate y: $ of apple crate

b) Write two equations

$5x+8y=62$ $12x+2y=80$

c) Solve the system

Elim: $5x+8y=62 \rightarrow 5x+8y=62$

$-4(12x+2y=80) \rightarrow -48x-8y=-320$

$-43x=-258$

$x=6$

$5(6)+8y=62$

$30+8y=62$

$8y=32$

$y=4$

A crate of oranges costs $6, and a crate of apples is $4.

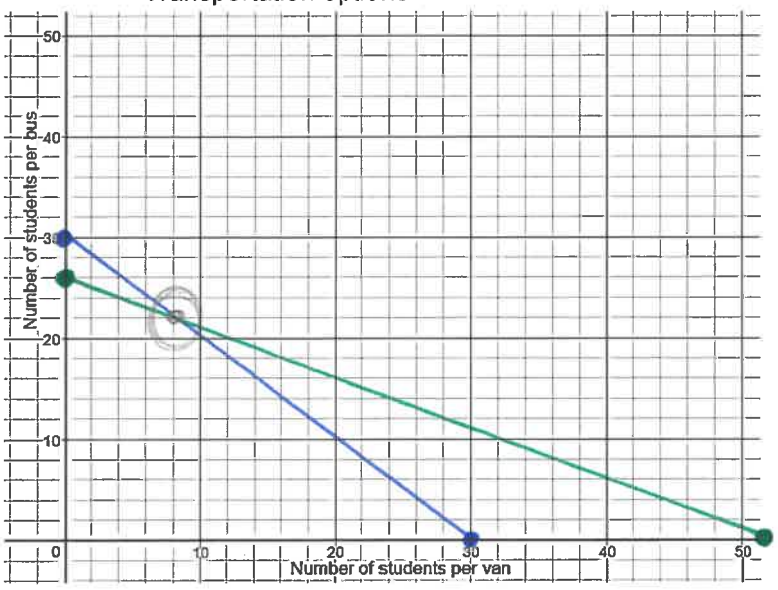
54. Grandview High School is playing Cherry Creek High School in a playoff football game. The teams can take vans and busses to get their athletes to the game. Grandview takes 8 vans and 8 busses for their 240 students. Cherry Creek takes 5 vans and 10 busses for their 260 students

Let x stand for number of students a van can hold and let y stand for the number of students a bus can hold.

a) Write an equation that relates x and y to the 240 Grandview students. $8x+8y=240$

b) Write an equation that relates x and y to the 260 Cherry Creek students. $5x+10y=260$

c) Graph your two equations below. Then find the solution to the system of equations.



$8x+8y=240$

x int: $8x+8(0)=240$, $8x=240$, $x=30$

y int: $8(0)+8y=240$, $8y=240$, $y=30$

$5x+10y=260$

x int: $5x+10(0)=260$, $5x=260$, $x=52$

y int: $5(0)+10y=260$, $y=26$

solution: (8, 22)

d) Now use your equations from part a) and b) to solve the system algebraically. You may use either substitution or elimination. Show all work.

8 vans : 22 busses

sub:

$8x+8y=240$ $5x+10y=260$

$8x=-8y+240$

$x=-y+30$

$5(-y+30)+10y=260$

$-5y+150+10y=260$

$5y=110$

$y=22$

$x=-(22)+30$

$x=8$

solution: (8, 22)

Topic 5: Functions and Volume

55.

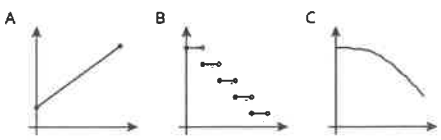
Match the graph to the following situations (you can use a graph multiple times). For each match, name possible independent and dependent variables and how you would label the axes.

a. Tyler pours the same amount of milk from a bottle every morning. B

b. A plant grows the same amount every week. A

c. The day started very warm but then it got colder. C

d. A carnival has an entry fee of $5 and tickets for rides cost $1 each. B



a.) x → days y → milk

b.) x → weeks y → plant growth

c.) x → time y → temp

d.) x → # of rides y → $

56.

Recall the formula for area of a circle.

a. Write an equation relating a circle's radius, r, and area, A. $A=\pi r^2$

b. Is area a function of the radius? Is radius a function of the area? Area is a function of radius.

c. Fill in the missing parts of the table.

r	3	4	$\frac{1}{2}$	10
A	9π	16π	$\frac{1}{4}\pi$	100π

$r=3$: $A=\pi(3)^2$

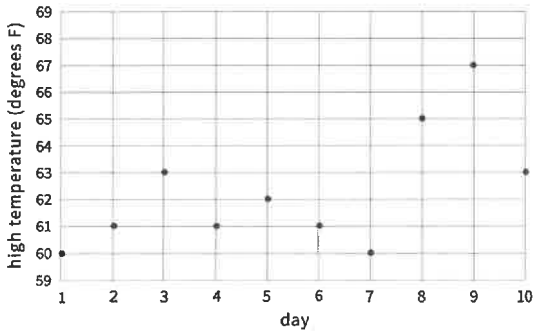
$A=16\pi$: $16\pi=\pi r^2$, $16=r^2$, $r=4$

$r=\frac{1}{2}$: $A=\pi(\frac{1}{2})^2$, $A=\pi\cdot\frac{1}{4}$

$A=100\pi$: $100\pi=\pi r^2$, $100=r^2$, $r=10$

57.

1. The graph and the table show the high temperatures in a city over a 10-day period.



day	1	2	3	4	5	6	7	8	9	10
temperature (degrees F)	60	61	63	61	62	61	60	65	67	63

a. What was the high temperature on Day 7? 60°F

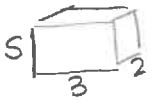
b. On which days was the high temperature 61 degrees? Days 2, 4, 6

c. Is the high temperature a function of the day? Explain how you know. Yes → day = independent, temp = dependent

d. Is the day a function of the high temperature? Explain how you know. No →

58.

At a farm, animals are fed bales of hay and buckets of grain. Each bale of hay is in the shape a rectangular prism. The base has side lengths 2 feet and 3 feet, and the height is 5 feet. Each bucket of grain is a cylinder with a diameter of 3 feet. The height of the bucket is 5 feet, the same as the height of the bale.



□ base = $3 \cdot 2 = 6\text{ft}^2$



○ base: $\pi(1.5)^2 = 7.06\text{ft}^2$

a. Which is larger in area, the rectangular base of the bale or the circular base of the bucket? Explain how you know. Area of circle base is bigger

b. Which is larger in volume, the bale or the bucket? Explain how you know. bucket has bigger base, both have same height so bucket will have a larger volume.

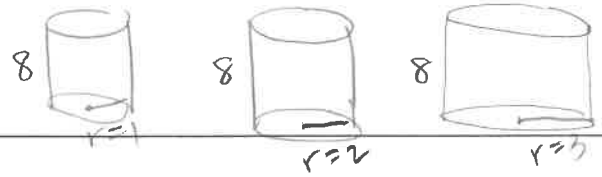
□ $V = l \cdot w \cdot h = 3 \cdot 2 \cdot 5 = 30\text{ft}^3$

○ $V = \pi r^2 \cdot h = (1.5)^2 \cdot \pi \cdot 5 = 35.343\text{ft}^3$

59.

Three cylinders have a height of 8 cm. Cylinder 1 has a radius of 1 cm. Cylinder 2 has a radius of 2 cm. Cylinder 3 has a radius of 3 cm. Find the volume of each cylinder.

$V = \pi r^2 \cdot h$



① $V = \pi(1)^2 \cdot 8$, $V = 8\pi\text{cm}^3$

② $V = \pi(2)^2 \cdot 8$, $V = 32\pi\text{cm}^3$

③ $V = \pi(3)^2 \cdot 8$, $V = 72\pi\text{cm}^3$