

Name: \_\_\_\_\_  
Date: Key  
Period: \_\_\_\_\_

### Algebra 1 Semester 1 Final Study Guide

Find each sum or difference

1.  $20 + (-7)$

13

2.  $18.4 - (-3.2)$

21.6

Find each product or quotient

3.  $11(-8)$

-88

4.  $63 \div (-9)$

-7

Replace each  with  $<$ ,  $>$ , or  $=$  to make a true statement

5.  $\frac{7}{20} < \frac{2.4}{5.4} \frac{8}{20}$

6.  $\frac{1}{8} < 0.15$

0.125

7. Order  $0.5, -\frac{1}{7}, -0.2, \frac{1}{3}$  from least to greatest

$0.5, -0.1428571429, -0.2, 0.\overline{3}$

$-0.2, -\frac{1}{7}, \frac{1}{3}, 0.5$

Find each sum or difference. Write your answer in simplest form.

8.  $\frac{1}{6} + \left(-\frac{1}{2}\right) \cdot 3$

$$\frac{1}{6} - \frac{3}{6} = \frac{-2}{6} \div 2$$
$$\boxed{= -\frac{1}{3}}$$

9.  $-\frac{1}{12} - \left(-\frac{3}{4}\right) \cdot 3$

$$-\frac{1}{12} + \frac{9}{12} = \frac{8}{12} \div 4$$
$$\boxed{= \frac{2}{3}}$$

Find each product or quotient

10.  $-1.2(9.3)$

$$\boxed{-11.16}$$

11.  $-20.93 \div (-2.3)$

$$\boxed{9.1}$$

Name the reciprocal of each number.

12.  $-2\frac{3}{7}$

$$-\frac{17}{7}$$
$$\boxed{-\frac{7}{17}}$$

13.  $\frac{8}{1}$

$$\boxed{\frac{1}{8}}$$

Find each product or quotient. Write your answer in simplest form.

14.  $\frac{2}{5} \cdot \frac{5}{9} = \frac{10}{45} \div 5$

$$\boxed{= \frac{2}{9}}$$

15.  $\frac{1}{3} \div 2\frac{1}{4}$

$$\frac{1}{3} \div \frac{9}{4}$$
$$\frac{1}{3} \cdot \frac{4}{9} = \frac{4}{27}$$
$$\boxed{= \frac{4}{27}}$$

Express each percent as a fraction in simplest form

16. 8%

$$\frac{8}{100} \div 4 = \frac{2}{25}$$

17. 155%

$$\frac{155}{100} \div 5 = \frac{31}{20}$$

Use the percent proportion to find each number.

$$\frac{is}{of} = \frac{percent}{100}$$

18. 75% of what number is 58?

$$\frac{58}{x} = \frac{75}{100}$$

$$\frac{75x}{75} = \frac{5800}{75}$$

$$x = 77.\bar{3}$$

19. What number is 95% of 95

$$\frac{x}{95} = \frac{95}{100}$$

$$\frac{100x}{100} = \frac{9025}{100}$$

$$x = 90.25$$

Find the perimeter and area of each figure

20.



P = Add all sides

$$P = 11 + 14 + 20$$

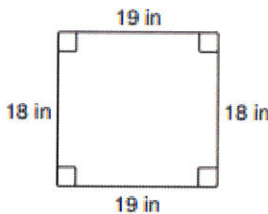
$$P = 45 \text{ km}$$

$$A = \frac{1}{2} b \cdot h$$

$$= \frac{1}{2} \cdot 20 \cdot 7.4$$

$$A = 74 \text{ km}^2$$

21.



$$P = 2l + 2w$$

$$= 2 \cdot 19 + 2 \cdot 19$$

$$P = 74 \text{ in}$$

$$A = lw$$

$$= 19 \cdot 19$$

$$A = 342 \text{ in}^2$$

22. A parallelogram has a base of 20 millimeters and a height of 6 millimeters. Find the area.

$$A = b \cdot h$$

$$= 20 \cdot 6$$

$$A = 120 \text{ mm}^2$$

The parallelogram has an Area of 120 mm<sup>2</sup>

$$C = 2\pi r$$

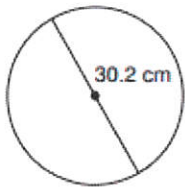
$$A = \pi r^2$$

$$d = 2r$$

$$r = \frac{d}{2}$$

Find the circumference and area of each circle. Round to the nearest 10<sup>th</sup>.

23.



$$r = \frac{30.2}{2} = 15.1$$

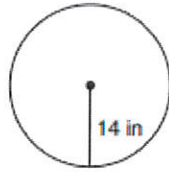
$$C = 2 \cdot \pi \cdot 15.1 \approx 94.87609814$$

$$C \approx 94.9 \text{ cm}$$

$$A = \pi \cdot 15.1^2 \approx 716.3145409$$

$$A \approx 716.3 \text{ cm}^2$$

24.



$$C = 2 \cdot \pi \cdot 14 \approx 87.9645943$$

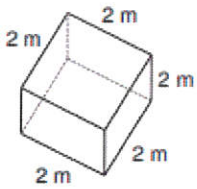
$$C \approx 88.0 \text{ in}$$

$$A = \pi \cdot 14^2 \approx 615.7521601$$

$$A \approx 615.8 \text{ in}^2$$

Find the volume and surface area of each rectangular prism given the measurements below.

25.



$$V = l \cdot w \cdot h$$

$$V = 2 \cdot 2 \cdot 2$$

$$V = 8 \text{ m}^3$$

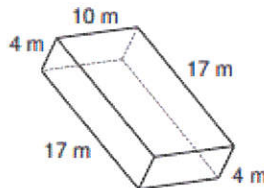
$$SA = 2lw + 2lh + 2wh$$

$$= 2 \cdot 2 \cdot 2 + 2 \cdot 2 \cdot 2 + 2 \cdot 2 \cdot 2$$

$$= 8 + 8 + 8$$

$$SA = 24 \text{ m}^2$$

26.



$$V = lwh$$

$$V = 17 \cdot 10 \cdot 4$$

$$V = 680 \text{ m}^3$$

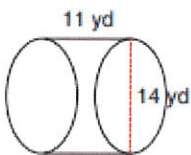
$$SA = 2lw + 2lh + 2wh$$

$$= 2 \cdot 17 \cdot 10 + 2 \cdot 17 \cdot 4 + 2 \cdot 10 \cdot 4$$

$$SA = 556 \text{ m}^2$$

Find the volume and surface area of each cylinder given the measurements below.

27.



$$r = \frac{11}{2} = 5.5$$

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

$$= \pi \cdot 5.5^2 \cdot 14$$

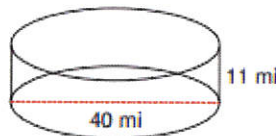
$$V = 1493.31844 \text{ yd}^3$$

$$SA = 2\pi r \cdot h + 2\pi r^2$$

$$= 2 \cdot \pi \cdot 5.5 \cdot 14 + 2 \cdot \pi \cdot 5.5^2$$

$$SA = 791.6813487 \text{ yd}^2$$

28.



$$r = \frac{40}{2} = 20$$

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

$$= \pi \cdot 20^2 \cdot 11$$

$$V \approx 13823.00768 \text{ mi}^3$$

$$SA = 2\pi r \cdot h + 2\pi r^2$$

$$= 2 \cdot \pi \cdot 20 \cdot 11 + 2 \cdot \pi \cdot 20^2$$

$$SA \approx 3895.57489 \text{ mi}^2$$

mean =  $\frac{\text{Add them}}{\div \text{how many there are}}$

median: Order + Find middle

mode: most repeated

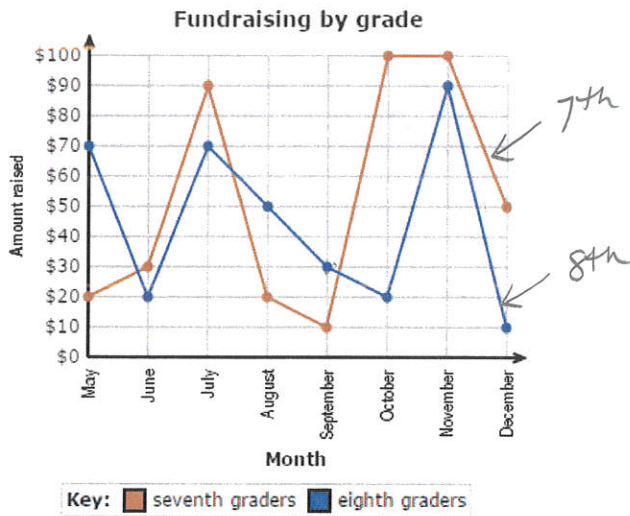
29. Find the mean, median, and mode for the given data set.  $\{30, 22, 38, 41, 33, 41, 30, 24\}$

mean:  $\frac{30 + 22 + 38 + 41 + 33 + 41 + 30 + 24}{8} = \frac{259}{8} \approx 32.375$

median: 22, 24, 30, 30, 33, 38, 41, 41  
 $\frac{30 + 33}{2} = \frac{63}{2} = 31.5$

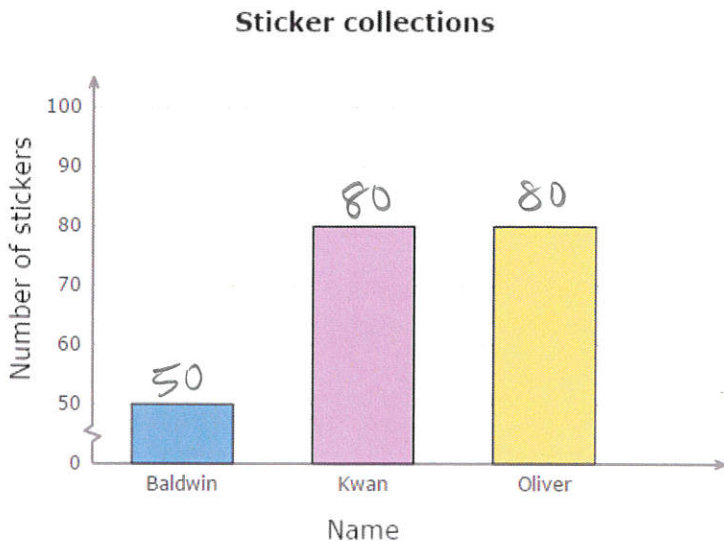
mode: 30, 41

30. Given the line graph below how much did the 8<sup>th</sup> grade earn in September?



\$30

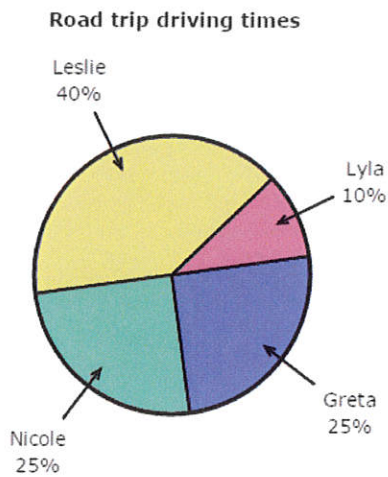
31. Given the bar chart below how many stickers do Baldwin, Kwan, and Oliver have in all?



$50 + 80 + 80$

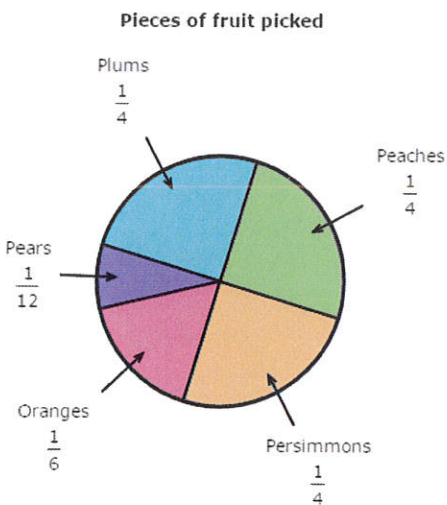
210 stickers

32. Put the Road trip drive times in order from least to greatest.



Lyla, Greta, Nicole, Leslie

33. If a total of 60 people picked fruit how many more people picked Peaches than Pears?



Peaches

$$\frac{60}{1} \cdot \frac{1}{4} = \frac{60}{4} = 15 \text{ people}$$

Pears

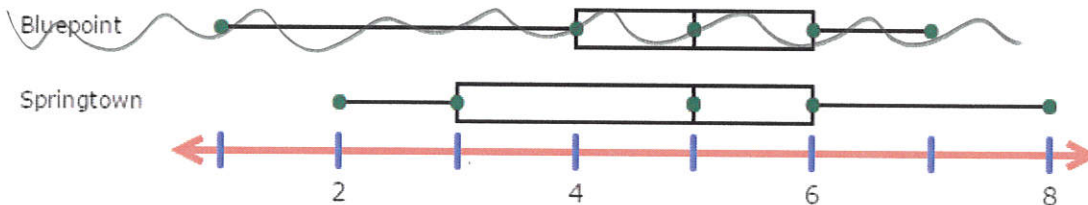
$$\frac{60}{1} \cdot \frac{1}{12} = \frac{60}{12} = 5 \text{ people}$$

$$15 - 5 = 10 \text{ more people}$$

34. What is the minimum, mean, maximum, and interquartile range for Springtown

Top of box - bottom of box

**February rainfall (inches)**



min = 2  
 mean = 5  
 max = 8  
 IQR = 3

$$IQR = 6 - 3 = 3$$

Write a verbal expression for each algebraic expression

35.  $16u^2 - 3$

Sixteen u squared minus three

36.  $\frac{7x^4}{2}$

Seven x to the fourth power divide by two.

37. Katie estimates that  $\frac{1}{8}$  of the people who order beverages also order pastries. Write an algebraic expression to represent this situation.

P = # of people who order pastries

b = # of people who order beverages

$$P = \frac{1}{8} b$$

Evaluate each expression

PEMDAS

38.  $6[32 - (2+3)^2]$

$$6[32 - 5^2]$$

$$6[32 - 25]$$

$$6[7] = \boxed{42}$$

$$39. \frac{(5-8)^3 + 9}{(-1+2^2+3)} = \frac{(-3)^3 + 9}{(-1+4+3)} = \frac{-27+9}{6} = \frac{-18}{6}$$

$$\boxed{= -3}$$

## PEMDAS

~~34<sup>2</sup>~~40. Evaluate  $3x^2 + (2y + z^3)$  if  $x = 4$ ,  $y = 5$ , and  $z = 3$ .

$$3 \cdot 4^2 + (2 \cdot 5 + 3^3)$$

$$3 \cdot 16 + (10 + 27)$$

$$48 + 37 = \boxed{85}$$

41. Evaluate  $7a - 3b^3 + 4c - a^2$  if  $a = 2$ ,  $b = 6$ , and  $c = 8$ .

$$7 \cdot 2 - 3 \cdot 6^3 + 4 \cdot 8 - 2^2$$

$$14 - 3 \cdot 216 + 32 - 4$$

$$14 - 648 + 32 - 4 = \boxed{-606}$$

Simplify each expression. If not possible, write *simplified*.

42.  $5y^3 + 4y - 6y + 8$

$$\boxed{5y^3 - 2y + 8}$$

Combine like terms

43.  $6z^2 + 7z - 12$

$$\boxed{\text{Simplified}}$$



44. Write and simplify the verbal expression 4 times the difference of x squared and y plus 2 times the sum of 2z and 5y

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

$$4x^2 - 4y + 4z + 10y$$

$$4x^2 + 6y + 4z$$

Solve each equation.

45.  $6 + (5^2 - 5) \div 2 = p$

$$6 + (25 - 5) \div 2 = p$$

$$6 + 20 \div 2 = p$$

$$6 + 10 = p$$

$$16 = p$$

$$p = 16$$

46.  $12(10 - 7) + 9g = g(2^2 + 5) + 36$

$$12(3) + 9g = g(4 + 5) + 36$$

$$\begin{array}{r} 36 + 9g = 9g + 36 \\ -36 \quad -36 \\ \hline 9g = 9g \\ -9g \quad -9g \\ \hline 0 = 0 \end{array}$$

$\infty$  solution

47. Amelia drives an average of 65 miles per hour. Write and solve an equation to find the time it will take her to drive 36 miles.

$T = \text{time}$      $m = \text{miles}$

$$m = 65t$$

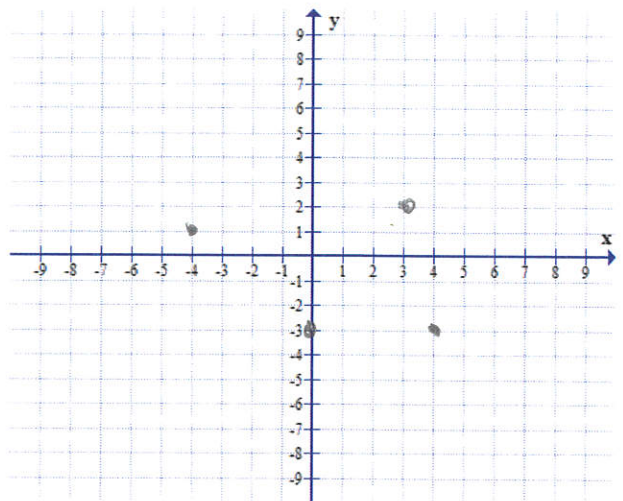
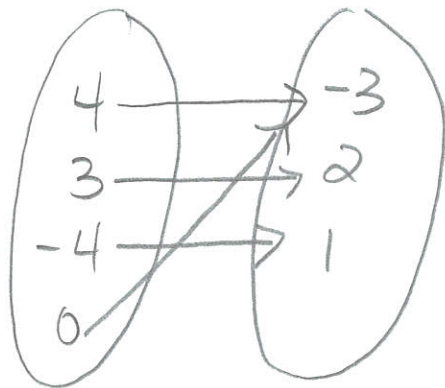
$$\frac{36}{65} = \frac{65 \cdot t}{65}$$

$$t = 0.5538461538 \text{ hrs}$$

It will take her about  
0.55 hrs to drive  
36 miles

48. Express  $\{(4,-3)(3,2)(-4,1)(0,-3)\}$  as a table, graph, and a mapping diagram.

x	y
4	-3
3	2
-4	1
0	-3



49. State the domain and range of the relation  $\{(1,6)(2,4)(3,7)(-2,3)(1,5)\}$ . Is this relation a function?

Domain:  $\{1, 2, 3, -2, \}$

Range:  $\{6, 4, 7, 3, 5\}$

Repeat x-values w/  
different y-values

Not Function  
 $1 \rightarrow 6$  and  $1 \rightarrow 5$

Identify the independent and dependent variable for each relation

50. The faster you drive your car the longer it will take you come to a complete stop

Stopping depends on speed

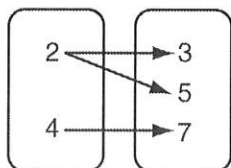
ind: speed      depend: stopping

51. Joe is buying concert tickets. The more tickets he buys the greater his cost.

Cost depends on # of tickets

ind: # of tickets      depend: cost

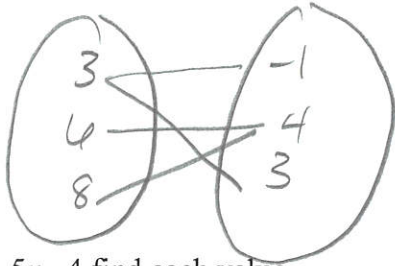
52. State the relation represented by the mapping diagram below? Is the relation a function?



$\{(2,3), (2,5), (4,7)\}$

Not Function  
 $2 \rightarrow 3$  and  $2 \rightarrow 5$

53. Draw a mapping diagram shows the relation  $\{(3, -1), (6, 4), (3, 3), (8, 4)\}$ ? Is this relation a function?



Not a function

$3 \rightarrow -1$  and  $3 \rightarrow 3$

54. For  $f(x) = 5x - 4$  find each value

a.  $f(3)$

$x = 3$

$$f(3) = 5 \cdot 3 - 4$$

$$= 15 - 4$$

$$f(3) = 11$$

b.  $f(-3) + f(5)$

$x = -3$      $x = 5$

$$f(-3) = 5(-3) - 4$$

$$= -15 - 4$$

$$f(-3) = -19$$

$$f(5) = 5(5) - 4$$

$$= 25 - 4$$

$$f(5) = 21$$

$$f(-3) + f(5) = -19 + 21$$

$$= 2$$

Solve each equation

55.  $-21 = 7 - 4y$

$$\begin{array}{r} -7 \quad -7 \\ \hline -28 = -4y \\ \hline -4 \quad -4 \end{array}$$

$$7 = y$$

$$y = 7$$

56.  $\frac{m}{6} - 3 = 8$

$$\frac{m}{6} = 11$$

$$m = 66$$

57.  $-4 = \frac{d+3}{5}$

$$\begin{array}{r} -20 = d + 3 \\ -3 \quad -3 \\ \hline -23 = d \end{array}$$

$$d = -23$$

Write an equation and solve each problem

58. Three less than three fourths of a number is negative 9. Find the number

$$\begin{array}{r} \frac{3}{4}x - 3 = -9 \\ \quad +3 \quad +3 \\ \hline \frac{3}{4}x = -6 \\ \frac{4}{3} \cdot \frac{3}{4}x = -6 \cdot \frac{4}{3} \\ x = -8 \end{array}$$

$X = -\frac{24}{3}$   
 $X = -8$

59. Find four consecutive integers with a sum of 106.

$$\begin{array}{r} n + n + 1 + n + 2 + n + 3 = 106 \\ 4n + 6 = 106 \\ \quad -6 \quad -6 \\ \hline 4n = 100 \quad n = 25 \\ \frac{4n}{4} = \frac{100}{4} \end{array}$$

$25, 26, 27, 28$

Solve each equation

60.  $\frac{3}{4}w + 6 = 9 - \frac{1}{4}w$

$$\begin{array}{r} \frac{3}{4}w + 6 = 9 - \frac{1}{4}w \\ +\frac{1}{4}w \quad +\frac{1}{4}w \\ \hline 1w + 6 = 9 \\ \quad -6 \quad -6 \\ \hline 1w = 3 \quad w = 3 \end{array}$$

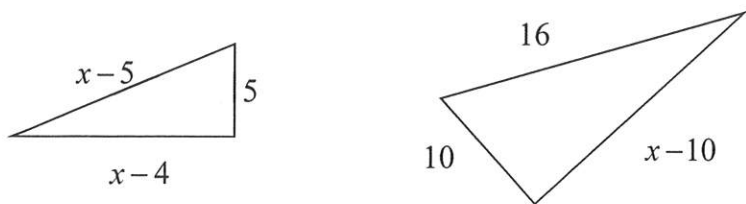
61.  $\frac{z+6}{3} = \frac{2z}{4}$       Cross multiply and divide

$$\begin{array}{r} 4(z+6) = 3 \cdot 2z \\ 4z + 24 = 6z \\ -4z \quad -4z \\ \hline 24 = 2z \\ \frac{24}{2} = \frac{2z}{2} \quad 12 = z \end{array}$$

$z = 12$

P = Add all sides

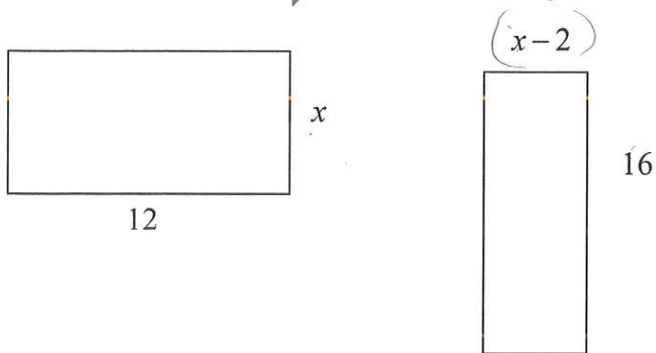
62. Find the value of  $x$  so that the triangles have the same perimeter.



$$x-5 + x-4 + 5 = 10 + 16 + x-10$$
$$2x-4 = x+16$$

$$\begin{array}{r} 2x-4 = x+16 \\ -x \quad -x \\ \hline x-4 = 16 \\ +4 \quad +4 \\ \hline \boxed{x=20} \end{array}$$

63. Find the value of  $x$  so that the rectangles have the same area.  $A = lw$



$$12x = 16(x-2)$$
$$12x = 16x - 32$$
$$\begin{array}{r} -16x \quad -16x \\ \hline -4x = -32 \\ \hline \frac{-4x}{-4} = \frac{-32}{-4} \end{array} \quad \boxed{x=8}$$

Evaluate each expression if  $x = -4$ ,  $y = 7$ , and  $z = 9$ .

64.  $|3x-2|+2y$

$$|3 \cdot -4 - 2| + 2 \cdot 7$$
$$|-12 - 2| + 14$$
$$|-14| + 14$$
$$14 + 14 = \boxed{28}$$

65.  $|-4y+2z|-7z$

$$|-4 \cdot 7 + 2 \cdot 9| - 7 \cdot 9$$
$$|-28 + 18| - 63$$
$$|-10| - 63 = 10 - 63 = \boxed{-53}$$

# Case 1 and Case 2

Solve each absolute value equation

66.  $|6m-3|=9$

Case 1

$$\begin{array}{r} 6m-3=9 \\ +3 \quad +3 \\ \hline \end{array}$$

$$\frac{6m}{6} = \frac{12}{6}$$

$$m=2$$

Case 2

$$\begin{array}{r} 6m-3=-9 \\ +3 \quad +3 \\ \hline \end{array}$$

$$\frac{6m}{6} = \frac{-6}{6}$$

$$m=-1$$

67.  $|2x-3|+4=15$

$$\begin{array}{r} |2x-3|+4=15 \\ -4 \quad -4 \\ \hline |2x-3|=11 \end{array}$$

Case 1

$$\begin{array}{r} 2x-3=11 \\ +3 \quad +3 \\ \hline \end{array}$$

$$\frac{2x}{2} = \frac{14}{2}$$

$$x=7$$

Case 2

$$\begin{array}{r} 2x-3=-11 \\ +3 \quad +3 \\ \hline \end{array}$$

$$\frac{2x}{2} = \frac{-8}{2}$$

$$x=-4$$

68.  $|5x-1|=24$

Case 1

$$\begin{array}{r} 5x-1=24 \\ +1 \quad +1 \\ \hline \end{array}$$

$$\frac{5x}{5} = \frac{25}{5}$$

$$x=5$$

Case 2

$$\begin{array}{r} 5x-1=-24 \\ +1 \quad +1 \\ \hline \end{array}$$

$$\frac{5x}{5} = \frac{-23}{5}$$

$$x = \frac{-23}{5}$$