Algebra 1 Chapter 1 Study Guide

Write a verbal expression for each algebraic expression

1. $16u^2 - 3$

   Sixteen u squared minus three

2. $\dfrac{7x^4}{2}$

   Seven x to the fourth power divided two

Write an algebraic expression for each verbal expression

3. 12 less than the product of 8 and g

   $8g - 12$

4. A number, p, more than 6

   $6 + p$

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

   b = people who get beverages

   p = people who get pastries

   $\dfrac{1}{8} \cdot b = p$

Evaluate each expression

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

$$6[32 - 5^2]$$
$$6[32 - 25]$$
$$6[7] = \boxed{42}$$

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

8. **Evaluate** $3x^2 + (2y + z^3)$ if x = 4, y = 5, and z = 3.

$$3 \cdot 4^2 + (2 \cdot 5 + 3^3)$$
$$3 \cdot 16 + (10 + 27)$$
$$48 + 37 \boxed{= 85}$$

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

$$7 \cdot 2 - 3 \cdot 6^3 + 4 \cdot 8 - 2^2$$
$$14 - 3 \cdot 216 + 32 - 4$$
$$14 - 648 + 32 - 4$$
$$\boxed{-606}$$

Use the Distributive Property to rewrite each expression. Then simplify.

10. $7 \cdot 49$

$$7(50-1)$$

$$350 - 7 = \boxed{343}$$

11. $65\left(2\frac{1}{2}\right)$

$$65\left(2 + \frac{1}{2}\right)$$

$$130 + 32.5 = \boxed{162.5}$$

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

12. $5y^3 + 4y - 6y + 8$

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

Combine Like terms

13. $6z^2 + 7z - 12$

$$\boxed{Simplified}$$

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

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

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

$$\boxed{4x^2 + 6y + 4z}$$

15. Find the solution set of the equation $2q+5=13$ if the replacement set is $\{2,\cancel{3},4,\cancel{5},\cancel{6}\}$

$$2(2)+5\overset{?}{=}13$$
$$9\neq 13$$
$$2(3)+5\overset{?}{=}13$$
$$11\neq 13$$
$$2(4)+5\overset{?}{=}13 \checkmark$$
$$13=13$$

$$2(5)+5\overset{?}{=}13$$
$$15\neq 13$$
$$2(6)+5\overset{?}{=}13$$
$$17\neq 13$$

$$\boxed{\{4\}}$$

Solve each equation.

16. $6+\left(5^2-5\right)\div 2 = p$

$$6+(25-5)\div 2 = p$$
$$6+20\div 2 = p$$
$$6+10 = p$$
$$\boxed{16=p \ \text{or} \ p=16}$$

17. $12(10-7)+9g = g\left(2^2+5\right)+36$

$$12(3)+9g = g(4+5)+36$$
$$36+9g = g(9)+36$$
$$36+\cancel{9g} = \cancel{9g}+36$$
$$\underline{\quad -9g \quad -9g \quad}$$
$$36=36 \quad \text{True Statement}$$

$$36 = 1 \quad \text{Fake Statement}$$
$$\varnothing$$
$$\text{No Solution}$$

$$\boxed{\infty \ \text{Solutions}}$$

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

$$x = \text{time she drives}$$
$$\frac{65x}{65} = \frac{36}{65}$$
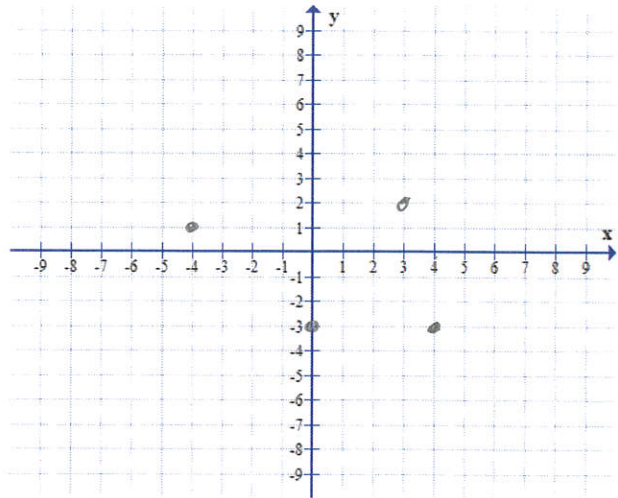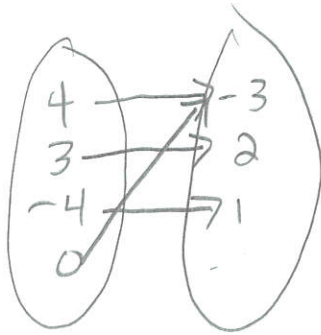$$x = 0.5538461538$$
$$\boxed{x = 0.6 \, hrs}$$

It takes Amelia about 0.6 hrs to drive 36 miles

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

Table

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

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

Does x repeat

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

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

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

Identify the independent and dependent variable for each relation

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

Stopping depends on speed
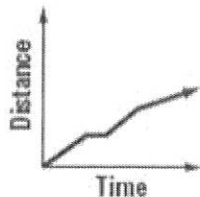
ind: speed
dep: time to stop

22. Joe is buying concert tickets. The more tickets he buys the greater his cost.
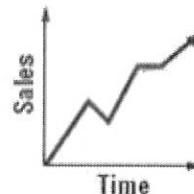
Cost depends on # of tickets

ind: # of tickets
dep: cost

23. **Describe what is happening in each graph**

a. The graph represents the distance the track team runs during a practice
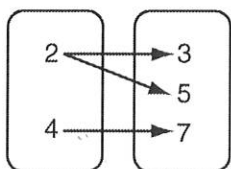

Distance / Time

The team is running, then they take break, then run faster, and finally the jog

b. The graph represents the revenues generated through an online store

Sales / Time

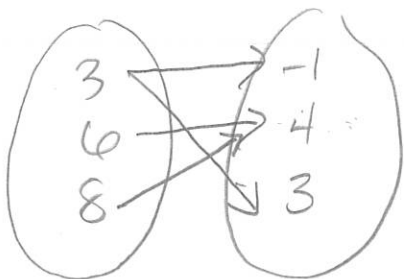The sell a lot, then lose $, they sell a lot, they lose a little, and finally they sell some more

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

2 → 3
2 → 5
4 → 7

$\{(2,3), (2,5)(4,7)\}$ Not a Function

$2 \to 3$ and $2 \to 5$

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

3, 6, 8 → -1, 4, 3

Not a Function

$3 \to -1$ and $3 \to 3$

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

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

$= 15 - 4$

$\boxed{f(3) = 11}$

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

$f(-3) = 5(-3) - 4$
$= -15 - 4$
$f(-3) = -19$

$f(5) = 5(5) - 4$
$= 25 - 4$
$f(5) = 21$

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

$\boxed{f(-3) + f(5) = 2}$

27. For $h(t) = -16t^2 + 68t + 2$ find each value

a. $2[h(-2)] + 5$

$2[-198] + 5$

$-396 + 5$

$2[h(-2)] + 5 = -391$

$h(-2) = -16(-2)^2 + 68(-2) + 2$

$= -16 \cdot 4 - 136 + 2$

$= -64 - 136 + 2$

$h(-2) = -198$

b. $h(3) - h(1)$

$h(3) = -16(3)^2 + 68(3) + 2$

$= -16 \cdot 9 + 204 + 2$

$= -144 + 204 + 2$

$h(3) = 62$

$h(1) = -16(1)^2 + 68(1) + 2$

$= -16 \cdot 1 + 68 + 2$
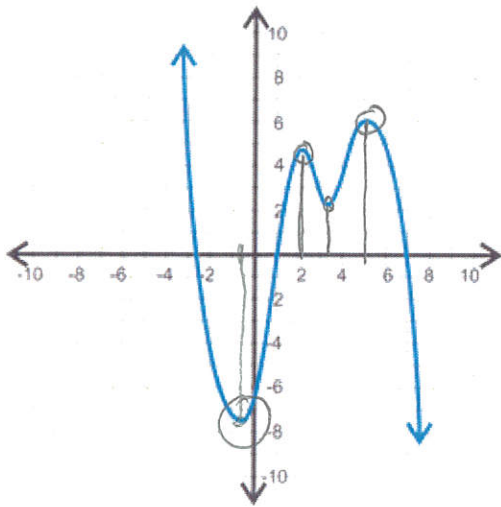
$= -16 + 68 + 2$

$h(1) = 54$

$h(3) - h(1) = 62 - 54$

$h(3) - h(1) = 8$

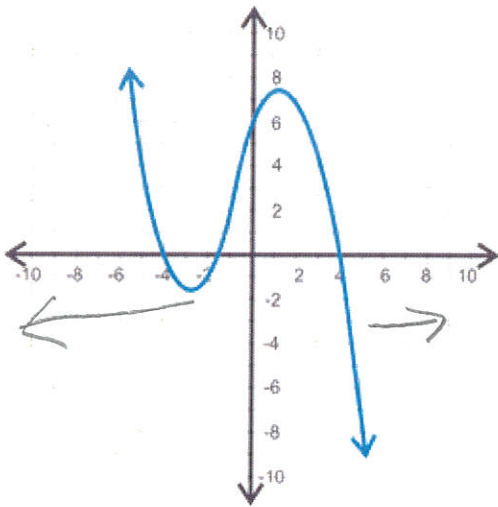28. Estimate and interpret where the function is positive, negative, increasing, and decreasing.
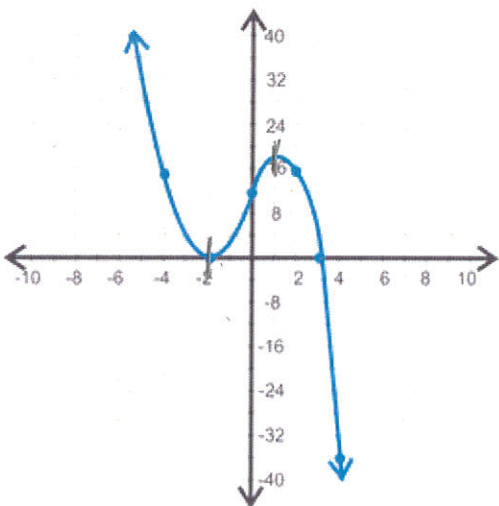
positive: $(-\infty, 3)$

negative: $(3, \infty)$

increasing: $(-2, 1)$

decreasing: $(-\infty, -2)$ and $(1, \infty)$

29. Find the relative minimums and/or the relative maximums of the graph.

min @ $x \approx -0.5$
and $x \approx 3.5$
max @ $x \approx 2$
and 5

30. Describe the end behavior of the graph.

Left
$x \to -\infty$ $y \to \infty$

Right
$x \to \infty$ $y \to -\infty$