## ALGEBRA PROBLEM SESSION \# 1 PRACTICE PROBLEMS

## Introduction to Algebra

How can you tell if two terms are like terms?
What does it mean to simplify an algebraic expression?

## Graphing Linear Equations

1. True or False: If a point is on the $y$-axis, its $x$-coordinate is 0 .
2. True or False: The ordered pair $(2,5)$ satisfies the equation $3 y-2 x=-4$
3. Graph using a table of values:
(a) $y=x^{2}-3$
(b) $y=|x|-4$
(c) $y=3 x-4$
(d) $y=-\frac{1}{3} x+3$
(e) $y=|x|+2$
(f) $y=-\frac{1}{4} x^{2}$

## Solving Equations

1. Explain how to "clear" an equation of fractions.
2. What is the difference between a conditional and inconsistent equation?
3. Write two equations that are equivalent to $\mathrm{y}=3$.
4. Explain why the equation $|\mathrm{x}|+5=0$ has no solution.
5. Solve for the variable:
(a) $2(\mathrm{x}-3)+3=\mathrm{x}-2(\mathrm{x}-1)$
(b) $2-(7 x-5)=13-6 x$
(c) $3[2 x-(4 x-6)]=5(x-3)$
(d) $\frac{x}{2}=\frac{3}{4} x+5$
(e) $\frac{x+1}{4}=\frac{1}{6}+\frac{2-x}{3}$
(f) $6 x-10-4 x=7-2 x$
(g) $12-5(2 x-3)-x=x-(4-3 x)$
6. Solve for x : $\frac{4}{15}-\frac{3}{5}=x-\frac{4}{3}$
7. Solve for $\mathrm{x}: \frac{1}{5} x-2=6$
8. Solve for $\mathrm{x}: \quad \frac{2}{5}+x=\frac{1}{2}-\frac{3}{10}$
9. Solve for $\mathrm{x}: 5 \frac{1}{6}+x=7$
10. Solve for $\mathrm{m}: \quad \frac{-1}{5}+m=-\frac{1}{4}$

## Solving Simple Verbal Problems

1. A pair of sneakers that regularly sells for $\$ 65$ is on sale for $15 \%$ off the regular price. Find the sale price.
2. The sale price for car battery is $\$ 48$, which is $25 \%$ off the regular price. Find the regular price.
3. You are an inspector for the Health Department. This week at the fish market, you found that 150 pounds of the shellfish were contaminated. This represents a $15 \%$ contamination rate. Find the total number of pounds of shellfish inspected by the Health Department that were not contaminated.
4. A TV dealer advertises a $15 \%$ mark-up over cost. Find the selling price of a TV that costs the dealer $\$ 300$.
5. The selling price for a leather jacket is $\$ 300$. The cost to the manufacturer is $\$ 250$. What is the mark-up rate?
6. An electronics store offered a $\$ 35$ discount on a TV that regularly sells for $\$ 500$. Find the discount rate.
7. In a class election, Joe received 72 votes. If he received $40 \%$ of the votes cast, how many votes were cast?
8. A student has 35 items correct on a test. If his grade was $70 \%$, how many items were on the test?
9. During a sale, a suit is discounted $\$ 12$. This is $15 \%$ off the regular price. Find the regular price.
10. The sum of three consecutive even integers is 132 . Find the largest even integer.
11. In a triangle, the first angle is 13 degrees less than twice the measure of the second angle. The third angle is 33 degrees more than the measure of the second angle. Find the measure of the largest angle.
12. The perimeter of a rectangle is 66 feet. The width of the rectangle is three less than twice the length. Find the length and width of the rectangle.
13. I have twice as many nickels as I have dimes and quarters together. I have 26 nickels and 4 dimes. How many quarters do I have?
14. A wire that is 14 feet long is cut into two pieces. Five times the length of the shorter piece is seven feet more than twice the length of the longer piece. Find the length of the shorter piece.
15. Eight less than four times a number is 32 . Find the number.
16. One-third of the sum of three consecutive integers is 0 . What are the integers?
17. You are scheduling passengers for cruise ships. One ship holds twice as many passengers as a second ship. Together they hold 225 passengers. How many can you schedule into the smaller ship?
18. A taxi company charges $\$ 1.15$ for the first mile and $\$ 0.15$ for each additional $1 / 5$ of a mile. If a taxi ride costs you $\$ 18$ including a tip of $\$ 1.70$, how far did you travel?
19. When six is added to three times a number the result is 15 . Find the number.
20. Solve for B: $\frac{A}{B C}=H$
21. Solve for $m: P=C+m C$
22. Solve for s: $p=\frac{2 s t}{D}$
23.Solve for d: $c=\frac{a d}{a+12}$

## Simplifying Algebraic Expressions

Simplify:

1. $\left(r^{6} t v\right)^{-5}$
2. $\quad\left(4 n^{2} y^{3}\right)^{-3}$
3. $\left(-2 x^{5} y^{3}\right)^{2}$
4. $\left(-3 r^{6} t\right)^{-1}$
5. $\left(2 x^{-2} y^{3}\right)^{-5}$
6. $\left(3 x^{4} y^{-2}\right)\left(2 x y^{-3}\right)^{-3}$ 7. $\left(\frac{4 a^{4} b^{-3}}{a b^{-5}}\right)^{-2}$
7. $\left(4 x^{2} y^{-3}\right)\left(2 x y^{2}\right)^{-3}$
8. $\left(\frac{3 a^{2} b^{-3}}{a b^{-2}}\right)^{-2}$
9. $\left(\frac{x^{2} y^{-1} z^{4}}{r s t}\right)^{-3}$
10. $\frac{\left(-4 x^{-2} y^{-4}\right)^{-2}}{x^{8} y^{7}}$
11. $\left(\frac{5 x^{-2} y^{3}}{x^{-3} y}\right)^{-2}$
12. $\left(\frac{2 a^{4} b^{-3}}{a b^{-2}}\right)^{-3}$
13. $\left(\frac{r^{3} s^{-2} t}{m^{-3} n p}\right)^{-2}$
14. $\left(\frac{-4 r^{2} t}{-6 m n^{-5} z}\right)^{-2}$
15. $\left(\frac{5 n^{4}}{-7 y^{7} z^{6}}\right)^{-2}$

## Wokring with Scientific Notation

1. How can you tell if a number is written in scientific notation?
2. Write $2.387 \times 10^{8}$ in standard form.
3. Compute: $\left(1.24 \times 10^{-23}\right)\left(0.08 \times 10^{2}\right)$
4. Compute: $\frac{1.08 \times 10^{-12}}{5.4 \times 10^{-11}}$
5. Write $4.1 \times 10^{-3}$ in standard form.
6. Compute: $\left(3.521 \times 10^{5}\right)\left(2 \times 10^{-3}\right)$
7. Compute: $\frac{1.24 \times 10^{-13}}{6.2 \times 10^{20}}$
