Section 2.4
Formulas

A formula is an equation where the variables have some sort of meaning. By solving the formula (equation), we can find the value of one variable, if we know the value of all the others.

Example: The formula for distance is $d = rt$, where ***d*** represents distance, ***r*** represents speed, and ***t*** represents time. Therefore, if we know the values of any two, the third value is found by solving the formula.

Distance from Miami to Orlando = 235 miles
Average speed to Orlando = 60 miles per hour

Solving formula for time: $\frac{d}{r} = \frac{rt}{r}$ $\frac{d}{r} = t$ or $t = \frac{d}{r}$

Therefore: $t = \frac{235}{60} = 3.92$ hours

Notice that it is easier to solve the formula for the variable you want, then place the numbers accordingly.

Example: The formula for computing interest is $i = Prt$, where ***i*** represents interest, ***P*** the principal (amount of money), ***r*** the rate of interest, and ***t*** time that the money is held.

If a person borrows $5,000 for 12 months (1 year) at 0.5% per month compounded annually, then the interest will be:

$$i = (5{,}000)(0.005)(12) = \$300 \text{ per month}$$

Notice that the percent was written as its decimal equivalent by moving the decimal point twice to the left (see percent section 1.5). Also notice that the rate of interest (%) is stated in the same units (months) as the variable time (t), thus the amount paid is per month.

Example: The formula for computing the circumference of a circle is $C = d\pi$, where ***C*** is the circumference, ***d*** the diameter, and π (*pi*) the constant 3.14. Find the diameter of the circle whose circumference is 20 ft.

Solving for d, $\frac{C}{\pi} = \frac{d\pi}{\pi}$ $\frac{C}{\pi} = d$ or $d = \frac{C}{\pi}$

Substituting 20 for C and 3.14 for π we get

$$d = \frac{20}{3.14} \qquad d = 6.37 \text{ ft.}$$

Practice:
Solve.

1. $F = ma$ Find value of F when m is 3 and a is 9.8.
2. $Q = 3.2ht$ Find the value of Q when h is 0.9 and t is 20.
3. $P = \frac{F}{A}$ Find the value of P if $F = 200$ and $A = 0.5$.
4. $W = va$ Find a if $W = 3{,}500$ and $v = 110$.
5. $S = \sqrt{p + ab}$ Find S if $p = 8$, $a = 4$, and $b = 14$.
6. $M = \frac{C}{f}$ Find f if $M = 10$ and $C = 95$.
7. $h = er$ Find the value of h when e is 7.2 and r is 12.
8. $k = 5.1zx$ Find k when z is 20 and x is 20.
9. $J = \frac{y}{t}$ Find the value of J if $y = 63$ and $t = 9$.
10. $b = SG$ Find b if $S = 0.035$ and $G = 98$.
11. $Z = \sqrt{y + xw}$ Find Z if $y = 36$, $x = 9$, and $w = 32$.
12. $g = \frac{t}{d}$ Find t if $g = 3$ and $d = 24$.
13. $r = BF$ Find value of F when r is 18 and B is 4.5.
14. $R = 6.81gt$ Find g when R is 67 and t is 4.
15. $S = \frac{e}{w}$ Find the value of w if $S = 0.5$ and $e = 525$.
16. $q = rt$ Find r if $q = 80$ and $t = 16$.
17. $y = \sqrt{s - gh}$ Find y if $s = 88$, $g = 13$, and $h = 3$.
18. $j = \frac{a}{c}$ Find j if $a = 56$ and $c = 128$.
19. $d = a + b$ Find d when a is 5, and b is –6.
20. $t = 4.1 + uv$ Find t when u is 76 and v is 0.4.
21. $h = \frac{k}{n}$ Find the value of k if $h = 89$ and $n = 12$.
22. $u = v - y$ Find v if $u = 2{,}567$ and $v = 330$.
23. $T = r\sqrt{pq}$ Find T if $r = 7$, $p = 2$, and $q = 50$.
24. $B = \frac{Q}{t} + \frac{R}{2}$ Find B if $Q = 8$, $t = 3$, and $R = 16$.
25. $D = ce - 2.8$ Find c when D is 7.2 and e is 2.5.
26. $N = 4.53KL$ Find L when N is 19 and K is 38.
27. $j = \frac{m}{g}$ Find the value of j if $m = 90$ and $g = 0.03$.
28. $B = xz$ Find z if $B = 0.345$ and $z = 300$.
29. $T = \sqrt{u + xy}$ Find T if $u = 9$, $x = 0$, and $y = 34$.