Date Completed: _____
Mentor Initials: _____

Solving Equations for One Variable

1. The circumference c of a circle is $2\pi r$. What is the radius r of a circle in terms of its circumference?

A) $r = \frac{2\pi}{c}$

B) $r = \frac{c}{2\pi}$

C) $r = \frac{\pi}{2c}$

D) $r = \frac{c\pi}{2}$

2. A pediatrician uses the formula $h = 4a + 18.4$ to estimate the height h of a child, in inches in terms of its age a, in years, between the ages of 1 and 5. Which of the following expresses the age of a child between 1 and 5 in terms of h?

A) $a = \frac{h-18.4}{4}$

B) $a = -4h + 18.4$

C) $a = 4h - 18.4$

D) $a = \frac{-h+18.4}{4}$

3. The density, d, of an object is found by dividing the mass, m, of the object by its volume, V. Which of the following equations expresses the volume V in terms of d and m?

A) $V = dm$

B) $V = \frac{d}{m}$

C) $V = \frac{m}{d}$

D) $V = d - m$

4. The volume, v, of a cylinder is found by using the formula $v = \pi r^2 h$. What is the radius, r, of a sphere in terms of v and h?

A) $r = \sqrt{\frac{v}{h\pi}}$

B) $r = (vh\pi)^2$

C) $r = \frac{v}{h\pi}$

D) $r = \frac{h\pi}{v^2}$

5. $KE = \frac{1}{2}mv^2$

The formula for calculating kinetic energy is shown above. What is the mass, m, in terms of KE and v?

A) $m = \frac{KE}{2v^2}$

B) $m = \frac{KE}{\sqrt{v}}$

C) $m = 2(KE)v^2$

D) $m = \frac{2KE}{v^2}$

6. $\frac{4x+3y}{2z} = 12$

Which of the following expresses x in terms of y and z?

A) $x = \frac{24z}{4-3y}$

B) $x = \frac{24z-3y}{4}$

C) $x = \frac{12z-3y}{2}$

D) $x = \frac{24z+3y}{4}$

7. The perimeter, p, of a rectangle is the sum of twice its length, l, and twice its width, w. Which of the following expresses the width of a rectangle in terms of p and l?

A) $w = \frac{p}{2} - l$

B) $w = l - 2p$

C) $w = \frac{p}{l-2}$

D) $w = 2pl^2$

8. $16p^2 + 4q = r^2 - 9$

Which of the following expresses p, where $p > 0$, in terms of q and r?

A) $p = \frac{\sqrt{(r^2-4q-9)}}{16}$

B) $p = \sqrt{(4r^2 - 16q - 36)}$

C) $p = \frac{\sqrt{(r^2-4q-9)}}{4}$

D) $p = 16\sqrt{r^2 - 4q - 9}$

9. $z^v = x^y$

The given equation relates the distinct positive real numbers $v, x, y,$ and z. Which equation correctly expresses z in terms of $v, y,$ and x ?

A) $z = x^{\frac{y}{v}}$

B) $z = x^{\frac{v}{y}}$

C) $z = x^{y-v}$

D) $z = \frac{x^y}{v}$

10. $Q = R(sx - 1)$

The equation shown gives Q in terms of $R, s,$ and x, where R and s are not equal to 0. Which equation gives x in terms of $Q, R,$ and s?

A) $x = \frac{Q}{\mathrm{R}} + \frac{1}{s}$

B) $x = \frac{Q}{\mathrm{Rs}} + \frac{1}{Rs}$

C) $x = \frac{Q}{\mathrm{Rs}} + \frac{1}{s}$

D) $x = \frac{Q}{\mathrm{s}} + \frac{R}{s}$

11. $S = \frac{C+A}{A+B+C+D}$

Dee is starting up a film review website called Ripening Rutabagas. Each film is certified a score S based on the number of positive reviews it gets from critics, C, and positive reviews from audience members, A, as well as the number of negative reviews it gets from critics, D, and negative reviews it gets from audience members, B, using the above equation. Which of the following expresses the number of positive reviews from critics in terms of the other variables?

A) $C = \frac{SA+SB+SD}{1-S}$

B) $C = \frac{SA+SB+SD-A}{1-S}$

C) $C = \frac{1-S}{SA+SB+SD-A}$

D) $C = \frac{SBD}{1-S}$

12. The distance d of a cross-country trip is found by multiplying the rate, r, of John's car by the hours, t, spent driving. If the distance of the trip was 3,000 miles and the average speed of the car was 50 miles per hour, which of the following equations could be solved for the time spent driving?

A) $t = \frac{3{,}000}{50}$

B) $t = (3{,}000)(50)$

C) $t = \frac{50}{3{,}000}$

D) $t = 3{,}000^{50}$

13. If $\frac{x}{y+2} = 2 - 3x$, then:

A) $x = \frac{6y}{y+1}$

B) $x = \frac{2y}{3y+3}$

C) $x = \frac{3y}{2-3y}$

D) $x = \frac{2y+4}{3y+7}$

14. For the formula $a = 3b^2 - 2c + \frac{1}{4}d$, what is b in terms of a, c, and d?

A) $b = \sqrt{\frac{4a+8c-d}{12}}$

B) $b = \sqrt{\frac{a+8c-4d}{3}}$

C) $b = a - \sqrt{\frac{8c-d}{12}}$

D) $b = 2a + \sqrt{\frac{8c-4d}{3}}$

15. If $\frac{9y+6}{z-2y} = 3y$, then:

A) $z = 2y + 3$

B) $z = \frac{3y+2-2y^2}{y}$

C) $z = \frac{2y^2-3y-2}{y}$

D) $z = \frac{2y^2+3y+2}{y}$