

Equations Review Answer Key

1. An equation is a mathematical sentence stating 2 expressions are equal.
2. The solution is the value for the variable that makes an equation true.
3. To check a solution means to substitute the solution into the variables of the equation to see if the equation is true.
4. coefficient \rightarrow number multiplied to a variable
5. inverse operations \rightarrow opposite operations that undo each other
6. use inverse operations on both sides of an equation to isolate the variable

①

$$\begin{array}{r} x + 15 = -20 \\ -15 \quad -15 \\ \hline x = -35 \end{array}$$

check: $x + 15 = -20$
 $-35 + 15 = -20$
 $-20 = -20 \checkmark$

②

$$\begin{array}{r} (0.6) \frac{m}{-0.6} = -5(-0.6) \\ \hline m = 3 \end{array}$$

$\frac{m}{-0.6} = -5$
 $\frac{3}{-0.6} = -5$
 $-5 = -5 \checkmark$

③

$$\begin{array}{r} -9n = -72 \\ -9 \quad -9 \\ \hline n = 8 \end{array}$$

$-9n = -72$
 $-9(8) = -72$
 $-72 = -72 \checkmark$

④

$$\begin{array}{r} (\frac{4}{3}) \frac{3}{4} a = -12(\frac{4}{3}) \\ \hline a = -\frac{48}{3} \\ \hline a = -16 \end{array}$$

check: $\frac{3}{4} a = -12$
 $\frac{3}{4}(-16) = -12$
 $-\frac{48}{4} = -12$
 $-12 = -12 \checkmark$

⑤

$$\begin{array}{r} \frac{x}{2} + 3 = -9 \\ \hline (2) \frac{x}{2} = -12(2) \\ \hline x = -24 \end{array}$$

$\frac{x}{2} + 3 = -9$
 $-\frac{24}{2} + 3 = -9$
 $-12 + 3 = -9$
 $-9 = -9 \checkmark$

⑥

$$\begin{array}{r} -3n - 6 = -30 \\ +6 \quad +6 \\ \hline -3n = -24 \\ -3 \quad -3 \\ \hline n = 8 \end{array}$$

$-3n - 6 = -30$
 $-3(8) - 6 = -30$
 $-24 - 6 = -30$
 $-30 = -30 \checkmark$

⑦

$$\begin{array}{r} -6m = 32 \\ -2 \quad -2 \\ \hline -6m = 30 \\ -6 \quad -6 \\ \hline m = -5 \end{array}$$

no check shown for 7 and 8

⑧

$$\begin{array}{r} 0.8a + 3.4 = -7.2 \\ -3.4 \quad -3.4 \\ \hline 0.8a = -10.6 \\ 0.8 \quad 0.8 \\ \hline a = -13.25 \end{array}$$

⑨ To write an equation where $x=10$, start by making up a number sentence. Example: $5(10) + 2 = 52$
 Then remove the 10 and replace
 with $x \rightarrow 5x + 2 = 52$

⑩ Do a check for $x=-10 \rightarrow$
 $2x - 4 = -16$
 $2(-10) - 4 = -16$
 $-20 - 4 = -16$
 $-24 \neq -16$
 So: $x=-10$ is not a solution ←

⑪ Let $x = a$ number
 $9x + 12 = 57$
 $\quad -12 \quad -12$

 $9x = 45$
 $\frac{9x}{9} = \frac{45}{9}$
 $x = 5$

The number is 5.

⑫ Let $x = a$ number
 $\frac{x}{4} - 10 = 2$
 $\quad \quad +10 \quad +10$

 $(4)\frac{x}{4} = 12(4)$
 $x = 48$

The number is 48.

⑬ $-2w + 14 + 10w = 34$
 $8w + 14 = 34$
 $\quad -14 \quad -14$

 $8w = 20$
 $\frac{8w}{8} = \frac{20}{8}$
 $w = 2.5$

check: $-2w + 14 + 10w = 34$
 $-2(2.5) + 14 + 10(2.5) = 34$
 $-5 + 14 + 25 = 34$
 $9 + 25 = 34$
 $34 = 34 \checkmark$

⑭ $7 + 4(2a + 15) = -13$
 $7 + 8a + 60 = -13$
 $8a + 67 = -13$
 $\quad -67 \quad -67$

 $8a = -80$
 $\frac{8a}{8} = \frac{-80}{8}$
 $a = -10$

check: $7 + 4(2a + 15) = -13$
 $7 + 4(2(-10) + 15) = -13$
 $7 + 4(-20 + 15) = -13$
 $7 + 4(-5) = -13$
 $7 + -20 = -13$
 $-13 = -13 \checkmark$

$$\begin{aligned} 5n-2 &= n+18 \\ 5(5)-2 &= 5+18 \\ 25-2 &= 23 \\ 23 &= 23 \checkmark \end{aligned}$$

check:



no check shown
for 16, 17 or 19.

$$\begin{aligned} (15) \quad 5n-2 &= n+18 \\ -n & \quad -n \\ \hline 4n-2 &= 18 \\ +2 & \quad +2 \\ \hline 4n &= 20 \\ \frac{4n}{4} &= \frac{20}{4} \\ n &= 5 \end{aligned}$$

$$\begin{aligned} (16) \quad 7m+32 &= 12(-m) \\ +m & \quad +m \\ \hline 8m+32 &= 12 \\ -32 & \quad -32 \\ \hline 8m &= -20 \\ \frac{8m}{8} &= \frac{-20}{8} \\ m &= -2.5 \end{aligned}$$

$$\begin{aligned} (17) \quad 2(4+3n) &= 12n-16 \\ 8+6n &= 12n-16 \\ -12n & \quad -12n \\ \hline 8-6n &= -16 \\ -8 & \quad -8 \\ \hline -6n &= -24 \\ \frac{-6n}{-6} &= \frac{-24}{-6} \\ n &= 4 \end{aligned}$$

$$\begin{aligned} (18) \quad -3(8-2x) &= 4(x+2) \\ -24+6x &= 4x+8 \\ -4x & \quad -4x \\ \hline -24+2x &= 8 \\ +24 & \quad +24 \\ \hline 2x &= 32 \\ \frac{2x}{2} &= \frac{32}{2} \\ x &= 16 \end{aligned}$$

$$\begin{aligned} (19) \quad A &= LW \\ 100 &= 8(2x+4) \\ \text{or} \\ 8(2x+4) &= 100 \\ 16x+32 &= 100 \\ -32 & \quad -32 \\ \hline 16x &= 68 \\ \frac{16x}{16} &= \frac{68}{16} \\ x &= 4.25 \end{aligned}$$

$$\begin{aligned} \text{check: } \#18 \quad -3(8-2x) &= 4(x+2) \\ -3(8-2(16)) &= 4(16+2) \\ -3(8-32) &= 4(18) \\ -3(-24) &= 72 \\ 72 &= 72 \checkmark \end{aligned}$$