Solving Equations Chapter Test Review

Directions: Complete this Review on your own paper. Go back and review the lesson for any answers that are incorrect.

**Part 1:** Two Step Equations and Equations with the Distributive Property (Less 1-7)

1. \(-3x + 7 = -21\)
2. \(5(x+4) = -10\)
3. \(-5(y+6) + 3y = 12\)
4. \(-15.5 = 2(-3.1x + 4) – 8\)

**Part 2:** Solving Equations with Fractions (Less 8)

1. \(\frac{1}{4}(3x – 1) – \frac{3}{4} = -4\)
2. \(\frac{p}{3} + 9 = \frac{5}{2}\)

**Part 3:** Solving Literal Equations and Using Formulas (Less 9)

1. Solve for \(F\).
   
   \[C = \frac{5}{9}(F – 32)\]

2. Solve for \(W\).
   
   \[P = 2(L+ W)\]

3. The formula for converting temperatures from the Kelvin scale to the Celsius scale is: \(C = K-273\).
   - Solve this formula for \(K\).
   - Suppose you wanted to change \(280^\circ C\) to the Kelvin scale. What would the equivalent temperature be in degrees Kelvin?

4. If the length of a rectangle measures \(4x – 6\) units and the width measures \(2x+1\), units find the measurement of the length if the perimeter is 98 units.

**Part 4:** Solving Equations with Variables on Both Sides (Less 10)

1. \(8x + 3 = 2(-2x – 5) + 4\)
2. \(4 – \frac{y}{3} = \frac{2}{3}y + 6\)

**Part 5:** Word Problems (Less 11)

1. A technician charges $16.50 an hour plus parts to repair televisions. The parts for John’s TV cost $155. The total bill was $196.25. How many hours did the technician work on John’s TV?
2. Jenny has $25 and is saving at the rate of $9 per week. Brian has $100 and is spending $6 per week. After how many weeks will Jenny and Brian have the same amount of money? How much will they have?

3. A rectangle has a width of 4x. The length of the rectangle is 3 less than 2 times the width. The perimeter of the rectangle is 114 units. What is the length of the longest side of the rectangle?
Solving Equations Chapter Test Review – Answer Key

Directions: Complete this Review on your own paper. Go back and review the lesson for any answers that are incorrect.

Part 1: Two Step Equations and Equations with the Distributive Property (Less 1-7)

1. \(-3x + 7 = -21\)

\[
\begin{align*}
-3x + 7 - 7 &= -21 - 7 \\
-3x &= -28 \\
\frac{-3x}{-3} &= \frac{-28}{-3} \\
x &= \frac{28}{3} \text{ or } 9.3
\end{align*}
\]

2. \(5(x+4) = -10\)

\[
\begin{align*}
5x + 20 &= -10 \\
5x + 20 - 20 &= -10 - 20 \\
5x &= -30 \\
\frac{5x}{5} &= \frac{-30}{5} \\
x &= -6
\end{align*}
\]

3. \(-5(y+6) + 3y = 12\)

\[
\begin{align*}
-5y - 30 + 3y &= 12 \\
-2y - 30 &= 12 \\
-2y - 30 + 30 &= 12 + 30 \\
-2y &= 42 \\
\frac{-2y}{-2} &= \frac{42}{-2} \\
y &= -21
\end{align*}
\]

4. \(-15.5 = 2(-3.1x + 4) - 8\)

\[
\begin{align*}
-15.5 &= -6.2x + 8 - 8 \\
-15.5 &= -6.2x \\
\frac{-15.5}{-6.2} &= \frac{-6.2x}{-6.2} \\
x &= 2.5
\end{align*}
\]

Part 2: Solving Equations with Fractions (Less 8)

1. \(\frac{1}{4}(3x - 1) - \frac{3}{4} = -4\)

\[
\begin{align*}
\frac{4}{4}[\frac{1}{4}(3x - 1) - 1 - \frac{3}{4}] &= -4(4) \\
3x - 1 &= -16 \\
3x - 1 &= -16 \\
3x - 4 &= -16 \\
3x - 4 + 4 &= -16 + 4 \\
3x &= -12 \\
3x &= -12 \\
\frac{3x}{3} &= \frac{-12}{3} \\
x &= -4
\end{align*}
\]

2. \(\frac{p}{3} + 9 = \frac{5}{2}\)

\[
\begin{align*}
6\left[\frac{p}{3} + 9\right] &= \frac{5}{2} (6) \\
2p + 54 &= 15 \\
2p + 54 - 54 &= 15 - 54 \\
2p &= -39 \\
\frac{2p}{2} &= \frac{-39}{2} \\
p &= -39/2 \text{ or } -19.5
\end{align*}
\]
Part 3: Solving Literal Equations and Using Formulas (Less 9)

1. Solve for \( F \).

\[
C = \frac{5}{9}(F - 32)
\]

\[
c/(5/9) = 5/9(F-32)/5/9 \quad \text{Divide by 5/9}
\]

\[
9/5c = f - 32 \quad \text{Simplify}
\]

\[
9/5c + 32 = f - 32+32 \quad \text{Add 32}
\]

\[
9/5c +32 = f
\]

Or if you get rid of the fraction first:

\[
9(C) = 9[5/9(F-32)] \quad \text{Multiply by 9}
\]

\[
9c = 5f - 160 \quad \text{Simplify}
\]

\[
9c +160= 5f - 160+160 \quad \text{Add 160}
\]

\[
9c +160 = 5f \quad \text{Simplify}
\]

\[
9c = 5f - 160 \quad \text{Distribute 5}
\]

\[
9c +160 = 5f - 160+160 \quad \text{Add 32}
\]

\[
9c +32 = f
\]

Simplifies to: \( 9/5c + 32 = f \)

2. Solve for \( W \).

\[
P = 2(L+ W)
\]

\[
P/2 = 2(L+W)/2 \quad \text{Divide by 2}
\]

\[
P/2 = L+ W \quad \text{Simplify}
\]

\[
P/2 – L = L-L +W \quad \text{Subtract L}
\]

\[
P/2 – L = W
\]

Or if you get rid of the fraction first:

\[
P/2 = 2L + 2W \quad \text{Distribute 2}
\]

\[
P-2L = 2L – 2L +2W \quad \text{Subtract 2L}
\]

\[
P-2L = 2W \quad \text{Simplify}
\]

\[
(P-2L)/2 = 2W/2 \quad \text{Divide by 2}
\]

\[
(P-2L)/2 = W \quad \text{Simplify}
\]

Simplifies to: \( P/2 – L = W \)

3. The formula for converting temperatures from the Kelvin scale to the Celsius scale is: \( C = K-273 \).

- Solve this formula for \( K \).

\[
C = K – 273 \quad \text{Original Problem}
\]

\[
C +273 = K -273+273 \quad \text{Add 273 to both sides}
\]

\[
C + 273 = K
\]

- Suppose you wanted to change 280° C to the Kelvin scale. What would the equivalent temperature be in degrees Kelvin?

\[
K = C +273 \quad \text{where } C = 280
\]

\[
K = 280 + 273
\]

\[
K = 553 \text{ degrees} \quad \text{The equivalent temperature would be 553 degrees Kelvin.}
\]

4. If the length of a rectangle measures \( 4x – 6 \) units and the width measures \( 2x+1 \), units find the measurement of the length if the perimeter is 98 units.

\[
L = 4x-6 \quad W = 2x+1 \quad P = 98
\]

\[
P = 2L + 2W \quad \text{Perimeter Formula}
\]

\[
98 = 2(4x-6) + 2(2x+1) \quad \text{Substitute for } P, L \text{ and } W
\]

\[
98 = 8x – 12 + 4x +2 \quad \text{Distribute}
\]

\[
98 = 12x – 10 \quad \text{Combine like terms}
\]

\[
98 +10 = 12x – 10 +10 \quad \text{Add 10 to both sides}
\]

\[
108 = 12x \quad \text{Simplify}
\]

\[
108/12 = 12x/12 \quad \text{Divide by 12}
\]

\[
9 = x \quad \text{Since } x = 9, \text{ the length equals: } 4(9) – 6 \quad \text{which is: } 30 \text{ units.} \quad \text{The length is 30 units.}
\]
Part 4: Solving Equations with Variables on Both Sides (Less 10)

1.  \[8x + 3 = 2(-2x - 5) + 4\]

\[
\begin{align*}
8x +3 & = -4x -10 + 4 \\
8x + 3 & = -4x-6 \\
8x +3-3 & = -4x -6-3 \\
8x & = -4x -9 \\
8x +4x & = -4x+4x - 9 \\
12x & = -9 \\
12x/12 & = -9/12 \\
X & = -9/12 or -3/4
\end{align*}
\]

2.  \[4 - \frac{y}{3} = \frac{2}{3} y + 6\]

\[
\begin{align*}
3[4 - \frac{y}{3}] & = 3[\frac{2}{3} y + 6] \\
12 - y & = 2y + 18 \\
12-18 - y & = 2y +18-18 \\
-6 - y & = 2y \\
-6 - y + y & = 2y + y \\
-6 & = 3y \\
-6/3 & = 3y/3 \\
-2 & = y
\end{align*}
\]

Part 5: Word Problems (Less 11)

1. A technician charges $16.50 an hour plus parts to repair televisions. The parts for John’s TV cost $155. The total bill was $196.25. How many hours did the technician work on John’s TV?

First write an equation: rate(# hours) + parts = total

Let x = # of hours

16.50 x + 155 = 196.25

Equation for this problem – Now solve for x.

16.50x + 155 – 155 = 196.25-155

16.50x = 41.25

16.50x/16.50 = 41.25/16.50

\[X = 2.5\] It took the technician 2.5 hours to work on John’s tv.

2. Jenny has $25 and is saving at the rate of $9 per week. Brian has $100 and is spending $6 per week. After how many weeks will Jenny and Brian have the same amount of money? How much will they have?

Equation for Jenny: 9x+25

Equation for Brian: 100 – 6x

Let x = number of weeks

Since we want to know when they will have the same amount of money, we will set them equal to each other.

9x+25 = 100-6x

9x +6x +25 = 100 – 6x +6x

15x +25 = 100

15x + 25 – 25 = 100 – 25

15x = 75

15x/15 = 75 / 15

\[X = 5\] After 5 weeks they will have the amount of money. They will have $70.

9(5)+25 = 70 or 100-6(5) = 70
3. A rectangle has a width of 4x. The length of the rectangle is 3 less than 2 times the width. The perimeter of the rectangle is 114 units. What is the length of the longest side of the rectangle?

\[
\begin{align*}
W &= 4x \\
L &= 2(4x) - 3 \text{ or } 8x - 3 \text{ (3 less than 2 times the width)} \\
P &= 114
\end{align*}
\]

\[
\begin{align*}
P &= 2L + 2W \\
114 &= 2(8x - 3) + 2(4x) \\
114 &= 16x - 6 + 8x \\
114 &= 24x - 6 \\
114 + 6 &= 24x \\
120 &= 24x \\
120/24 &= 24x/24 \\
5 &= x
\end{align*}
\]

The problem asks for the length of the longest side. Let’s substitute:

\[
\begin{align*}
W &= 4(5) \\
L &= 8(5) - 3 \\
W &= 20 \\
L &= 37
\end{align*}
\]

The length of the longest side is 37 units.