ALGEBRA

Review w/ Answer Key

Quiz 2.5 to 2.7
Solving Equations with Absolute Value,
Ratios and Proportions, and Percent of Change

Mrs. Yakubov
2.5 Solving Absolute Value Equations

Evaluate each expression if $x = -1$, $y = 3$, and $z = -4$.

1. $16 - |2z + 1|$
2. $|x - y| + 4$

3. $|-3y + z| - x$
4. $3|z - x| + |2 - y|$

Solve each equation. Then graph the solution set.

5. $|2z - 9| = 1$
6. $|3 - 2r| = 7$
Solve each equation. Then graph the solution set.

7. \(|3t + 6| = 9\)  

8. \(|2g - 5| = 9\)

Write an equation involving absolute value for each graph.

9. \(\ldots\)  

10. \(\ldots\)

11. \(\ldots\)  

12. \(\ldots\)
2.6 Ratios and Proportions

Determine whether each pair of ratios are equivalent ratios. Write yes or no.

1. \( \frac{7}{6}, \frac{52}{48} \) \hspace{2cm} 2. \( \frac{3}{11}, \frac{15}{66} \)

4. \( \frac{12}{11}, \frac{108}{99} \) \hspace{2cm} 5. \( \frac{8}{9}, \frac{72}{81} \)

7. \( \frac{3.4}{5.2}, \frac{7.14}{10.92} \) \hspace{2cm} 8. \( \frac{1.7}{1.2}, \frac{2.9}{2.4} \)

Solve each proportion. If necessary, round to the nearest hundredth.

10. \( \frac{5}{a} = \frac{30}{54} \) \hspace{2cm} 11. \( \frac{v}{46} = \frac{34}{23} \)

25. \( \frac{v}{0.23} = \frac{7}{1.61} \) \hspace{2cm} 26. \( \frac{3}{0.72} = \frac{12}{b} \)

28. \( \frac{7}{a - 4} = \frac{14}{6} \) \hspace{2cm} 29. \( \frac{3}{12} = \frac{2}{y + 6} \)
2.7 Percent of Change

State whether each percent of change is a percent of increase or a percent of decrease. Then find each percent of change. Round to the nearest whole percent.

1. original: 18
   new: 10

4. original: 10
   new: 25

7. original: 15
   new: 35.5

Find the total price of each item.

13. class ring: $325.00
    tax: 6%

14. blanket: $24.99
    tax: 7%

20. prescription glasses: $149
    discount: 20%

21. pair of shorts: $24.99
    discount: 45%

22. television: $375.00
    discount: 25%
    tax: 6%

23. DVD player: $269.00
    discount: 20%
    tax: 7%
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Quiz 2.5 to 2.7
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2.5 Solving Absolute Value Equations

Evaluate each expression if \( x = -1, y = 3, \) and \( z = -4. \)

1. \( 16 - |2z + 1| \)
   \[ 16 - |2(-4) + 1| \]
   \[ 16 - |-8 + 1| \]
   \[ 16 - |-7| \]
   \[ 16 - 7 \]
   \[ 9 \]

2. \( |x - y| + 4 \)
   \[ |-1 - 3| + 4 \]
   \[ |-4| + 4 \]
   \[ 4 + 4 \]
   \[ 8 \]

3. \( |-3y + 2| - x \)
   \[ |-3(3) + 4| - (-1) \]
   \[ |-9 + 4| + 1 \]
   \[ |-5| + 1 \]
   \[ 13 + 1 \]
   \[ 14 \]

4. \( 3|z - x| + |2 - y| \)
   \[ 3|-4 - (-1)| + |2 - 3| \]
   \[ 3|-4 + 1| + |-1| \]
   \[ 3|-3| + |-1| \]
   \[ 3(3) + 1 \]
   \[ 9 + 1 \]
   \[ 10 \]

Solve each equation. Then graph the solution set.

5. \( |2z - 9| = 1 \)
   \[ \frac{2z - 9 = 1}{+9 +9} \]
   \[ 2z = 10 \]
   \[ \frac{2z = 10}{2} \]
   \[ z = 5 \]

6. \( |3 - 2r| = 7 \)
   \[ \frac{3 - 2r = 7}{+2 -2} \]
   \[ -2r = 4 \]
   \[ \frac{-2r = 4}{-2} \]
   \[ r = -2 \]

\[ -5 \quad -4 \quad -3 \quad -2 \quad -1 \quad 0 \quad 1 \quad 2 \quad 3 \quad 4 \quad 5 \]
Solve each equation. Then graph the solution set.

7. \[ |3t + 6| = 9 \]
\[
\begin{align*}
\frac{3t + 6 = 9}{\text{-6}} & \Rightarrow \frac{3t = 3}{\frac{3}{3}} \Rightarrow t = 1 \\
\frac{3t + 6 = -9}{\text{-6}} & \Rightarrow \frac{3t = -15}{\frac{-3}{3}} \Rightarrow t = -5
\end{align*}
\]

8. \[ |2g - 5| = 9 \]
\[
\begin{align*}
\frac{2g - 5 = 9}{\text{+5}} & \Rightarrow \frac{2g = 14}{\frac{2}{2}} \Rightarrow g = 7 \\
\frac{2g - 5 = -9}{\text{+5}} & \Rightarrow \frac{2g = -4}{\frac{-2}{2}} \Rightarrow g = -2
\end{align*}
\]

Write an equation involving absolute value for each graph.

9. \[
\begin{align*}
(1) \quad MP &= \frac{11 + 1}{2} = 6 \\
(2) \quad d &= 11 - 6 = 5 \\
(3) \quad |x - MP| &= d \quad |x - 6| = 5
\end{align*}
\]

10. \[
\begin{align*}
(1) \quad MP &= \frac{-6 + 2}{2} = -2 \\
(2) \quad d &= -2 - 4 = 2 \\
(3) \quad |x - MP| &= d \quad |x + 4| = 2 \quad |x - 4| = 2
\end{align*}
\]

11. \[
\begin{align*}
(1) \quad MP &= \frac{-7 + 1}{2} = -3 \\
(2) \quad d &= 1 - (-3) = 4 \\
(3) \quad |x - 3| &= 4 \quad |x + 3| = 4
\end{align*}
\]

12. \[
\begin{align*}
(1) \quad MP &= \frac{6 + 2}{2} = 4 \\
(2) \quad d &= 6 - 2 = 4 \\
(3) \quad |x - 2| &= 4
\end{align*}
\]
2.6 Ratios and Proportions

Determine whether each pair of ratios are equivalent ratios. Write yes or no.

1. \( \frac{7}{6} \times \frac{52}{48} \quad \frac{7(48)}{336} = \frac{6(52)}{312} \quad \boxed{\text{no}} \)

2. \( \frac{3}{11} \times \frac{15}{66} \quad \frac{3(66)}{198} = \frac{11(15)}{165} \quad \boxed{\text{no}} \)

3. \( \frac{12}{11} \times \frac{108}{99} \quad \frac{12(99)}{1188} = \frac{11(108)}{1188} \quad \boxed{\text{yes}} \)

4. \( \frac{8}{9} \times \frac{72}{81} \quad \frac{8(81)}{648} = \frac{9(72)}{648} \quad \boxed{\text{yes}} \)

5. \( \frac{3.4}{5.2} \times \frac{7.14}{10.92} \quad \frac{3.4(10.92)}{37.128} = \frac{5.2(11.4)}{37.128} \quad \boxed{\text{yes}} \)

6. \( \frac{1.7}{2.4} \times \frac{2.9}{3.4} \quad \frac{1.7(3.4)}{4.08} \neq \frac{2.9(4.5)}{3.48} \quad \boxed{\text{no}} \)

Solve each proportion. If necessary, round to the nearest hundredth.

7. \( \frac{5}{a} \times \frac{30}{54} \quad \frac{5(54)}{270} = \frac{a(30)}{30a} \quad \boxed{9 = a} \)

8. \( \frac{v}{46} \times \frac{34}{23} \quad \frac{v(23)}{23} = \frac{46(34)}{23} \quad \boxed{v = 68} \)

9. \( \frac{v}{0.23} \times \frac{7}{1.61} \quad \frac{v(1.61)}{1.61} = \frac{7(0.23)}{1.61} \quad \boxed{v = 1} \)

10. \( \frac{3}{0.72} \times \frac{12}{b} \quad \frac{3(0.72)}{3} = \frac{12(0.72)}{b} \quad \boxed{b = 2.88} \)

11. \( \frac{7}{6 \times a - 4} \times \frac{14}{6} \quad \frac{7(6)}{108} = \frac{14(a - 4)}{14a} \quad \boxed{7 = a} \)

12. \( \frac{3}{12} \times \frac{2}{y + 6} \quad \frac{3(2)}{3y} = \frac{12(2)}{3y + 18} \quad \boxed{3y = 6, y = 2} \)
2.7 Percent of Change

State whether each percent of change is a percent of increase or a percent of decrease. Then find each percent of change. Round to the nearest whole percent.

1. original: 18
   new: 10
   \[ \text{Poc} = \frac{\text{diff}}{\text{orig}} = \frac{18 - 10}{18} = \frac{8}{18} = 0.44 = 44.4\% \text{ decrease} \]

4. original: 10
   new: 25
   \[ \text{Poc} = \frac{\text{diff}}{\text{orig}} = \frac{25 - 10}{10} = \frac{15}{10} = 1.5 = 150\% \text{ increase} \]

7. original: 15
   new: 35.5
   \[ \text{Poc} = \frac{\text{diff}}{\text{orig}} = \frac{35.5 - 15}{15} = \frac{20.5}{15} = 1.36\overline{6} = 136.\overline{6}\% \text{ increase} \]

Find the total price of each item.

13. class ring: $325.00
tax: 6\%
   \[ 325 (0.06) = 19.50 \]
   \[ 325 + 19.50 = $344.50 \]

14. blanket: $24.99
tax: 7\%
   \[ 24.99 (0.07) = 1.7493 \]
   \[ 24.99 + 1.75 = $26.74 \]

20. prescription glasses: $149
discount: 20\%
   \[ 149 (0.20) = 29.80 \]
   \[ 149 - 29.80 = $119.20 \]

21. pair of shorts: $24.99
discount: 45\%
   \[ 24.99 (0.45) = 11.2455 \]
   \[ 24.99 - 11.25 = $13.74 \]

22. television: $375.00
discount: 25\%
tax: 6\%
   \[ 375 (0.25) = 93.75 \]
   \[ 375 - 93.75 = $281.25 \]
   \[ 281.25 (0.06) = 16.88 \]
   \[ 281.25 + 16.88 = $298.13 \]

23. DVD player: $269.00
discount: 20\%
tax: 7\%
   \[ 269 (0.20) = 53.80 \]
   \[ 269 - 53.80 = 215.20 \]
   \[ 215.20 (0.07) = 15.06 \]
   \[ 215.20 + 15.06 = $230.26 \]