

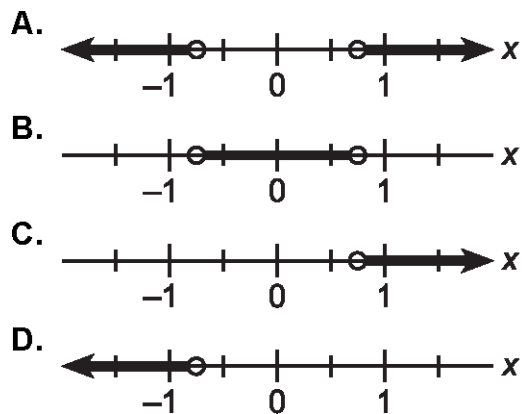
Name:
Teacher:

Date:
Class/Period:

1) Find the solution set of $|x - 2| < 6$.

- A. $\{x \mid -8 < x < 4\}$
- B. $\{x \mid -4 < x < 8\}$
- C. $\{x \mid x < 4\}$
- D. $\{x \mid x < 8\}$

2) Which graph represents the solution set of $4|x| - 3 > 0$?



3) What is the solution set to the inequality $|3x - 2| < 7$?

- A. $\{x \mid -\frac{5}{3} < x < 3\}$
- B. $\{x \mid -3 < x < \frac{5}{3}\}$
- C. $\{x \mid x > 3 \text{ or } x < -\frac{5}{3}\}$
- D. $\{x \mid x > \frac{5}{3} \text{ or } x < -3\}$

4) Which inequality represents this statement?

On the real number line, x is less than 3 units away from 5.

- A. $x - 5 < 3$
- B. $x - 3 < 5$
- C. $|x - 5| < 3$
- D. $|x - 3| < 5$

5) Which inequality represents the set of numbers shown by this number line?



- A. $|x + 1| < 8$
- B. $|x - 1| < 8$
- C. $|x + 1| < 4$
- D. $|x - 1| < 4$

6) A company wants to make ball bearings that have a standard diameter, d , of 24.000 mm. Acceptable ball bearings measure within ± 0.025 mm of this standard. Determine the solution set for the diameter of these ball bearings.

- A. $\{d \mid 24.025 \geq d \text{ or } d \leq 23.975\}$
- B. $\{d \mid 23.975 \leq d \leq 24.025\}$
- C. $\{d \mid d = 24.025\}$
- D. $\{d \mid 24.025 \leq d \leq 23.975\}$

7) Solve $|x - \frac{5}{2}| > \frac{5}{2}$.

- A. $x < 0$ or $x > 5$
- B. $x < -5$ or $x > 0$
- C. $0 < x < 5$
- D. $-5 < x < 0$

8) The target heart rate range during physical activity for a certain 16-year-old girl of average fitness is within 21 beats per minute of 141 beats per minute. Which inequality represents this target range?

- A. $|r - 141| \leq 21$
- B. $|r - 141| \leq 162$
- C. $|r| \leq 21$
- D. $|r| \leq 120$

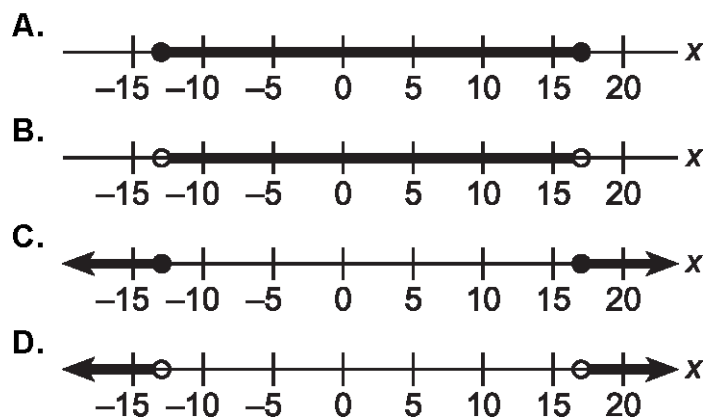
9) What is the solution set to $|2x - 4| < 6$?

- A. $\{x \mid x < 1\}$
- B. $\{x \mid x < 5\}$
- C. $\{x \mid -1 < x < 5\}$
- D. $\{x \mid -2 < x < 10\}$

10) What is the solution set for $|2x + 9| \geq 3$?

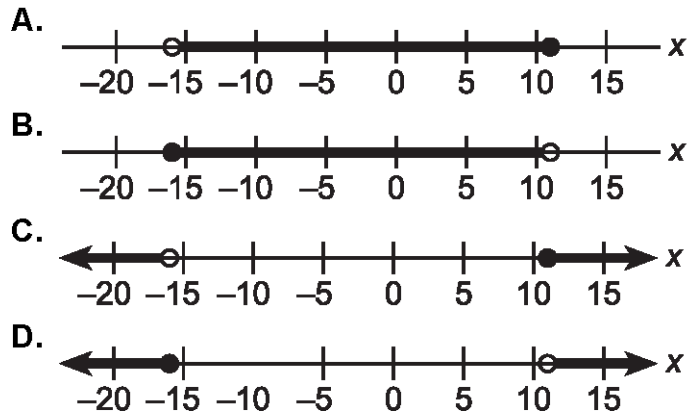
- A. $[3, \infty)$
- B. $(-\infty, -6] \cup [-3, \infty)$
- C. $(-\infty, 3] \cup [6, \infty)$
- D. $[-6, -3]$

11) Which graph represents the solution set of $-16 < x - 3 < 14$?

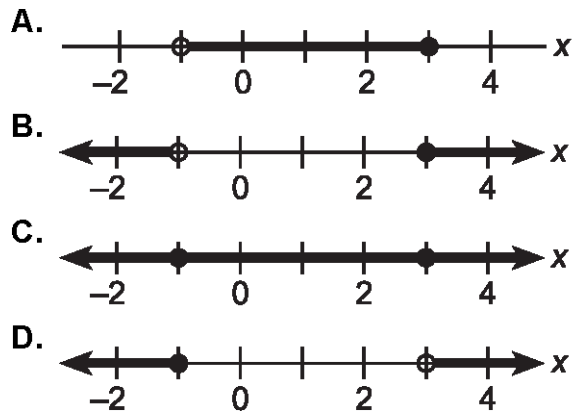


12) Which graph represents this statement?

-12 is less than $x + 4$, and $x + 4$ is less than or equal to 15.



13) Which is the graph of the solution set for $2x - 10 < -12$ or $4 - 3x \leq -5$?



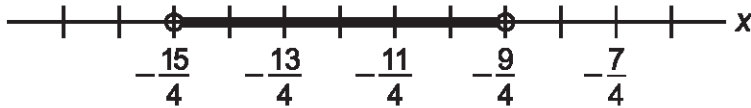
14) Kickball games last a maximum of 60 minutes and ties are allowed. However, there is a "mercy" rule. A game will end if at least 40 minutes have passed and one team is ahead by at least 10 points. If t is time, in minutes, and d is the difference in points, what compound inequality describes the "mercy" rule?

- A. $t \geq 40$ and $d \geq 10$
- B. $40 \leq t < 60$ and $d \geq 10$
- C. $t \leq 40$ or $d \geq 10$
- D. $40 \leq t < 60$ or $d \geq 10$

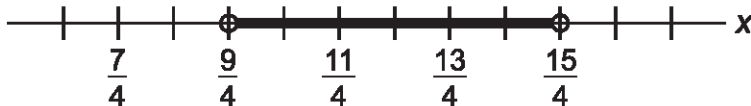
15) Which number line shows the solution for

$$|x + 3| < \frac{3}{4} ?$$

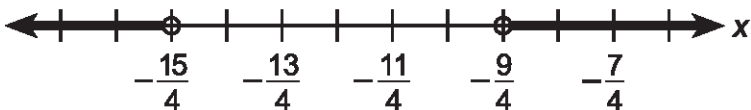
A.



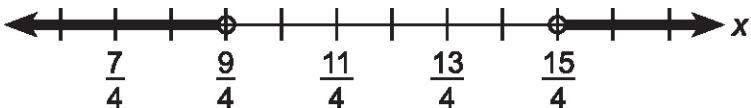
B.



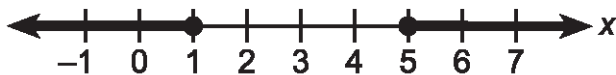
C.



D.



16) Which inequality describes this number line?



A. $|x + 3| \leq 2$

B. $|x + 3| \geq 2$

C. $|x - 3| \leq 2$

D. $|x - 3| \geq 2$

17) What is the solution set to the compound inequality $x^2 > 3$ and $x < 2$?

A. $\{x \mid 2 < x < \sqrt{3}\}$

B. $\{x \mid \sqrt{3} < x < 2\}$

C. $\{x \mid x < -\sqrt{3} \text{ or } \sqrt{3} < x < 2\}$

D. $\{x \mid -\sqrt{3} < x \text{ and } x < \sqrt{3}\}$

18) Sally observes that the data derived from an experiment seems to be parabolic when plotted on ordinary graph paper. Three of the observed points are $(1,20)$, $(2,21)$, and $(3,18)$. Use the equation of the parabola that contains these 3 points to determine the y -value at $x = 4$.

- A. $y = -8$
- B. $y = 11$
- C. $y = 17$
- D. $y = 27$

19) What ordered triple is the solution to this system?

$$\begin{cases} 3a + 4b + c = 5 \\ a - 6b + 2c = 14 \\ \frac{1}{2}a - 2b + \frac{1}{3}c = 4 \end{cases}$$

- A. $(2, -1, 3)$
- B. $(0, 1, 1)$
- C. $(12, 2, 7)$
- D. $(6, 1, 6)$

20) The graph of a quadratic function passes through the points $(-1, 5)$, $(1, 11)$, and $(3, 1)$. Which system of linear equations in terms of a , b , and c can be used to find the function?

A. $\begin{cases} a - b + c = 5 \\ a + b + c = 11 \\ 9a + 3b + c = 1 \end{cases}$

C. $\begin{cases} a - b + c = 5 \\ a + b + c = 11 \\ 3a + 3b + c = 1 \end{cases}$

B. $\begin{cases} a + b + 9c = 5 \\ -a + b + 3c = 11 \\ a + b + c = 1 \end{cases}$

D. $\begin{cases} -a + b + 3c = 5 \\ -a + b + 3c = 11 \\ a + b + c = 1 \end{cases}$

21) What is the value of y in the solution to this system of equations?

$$\begin{cases} 2x + y = 0 \\ 3x - z = 4 \\ x - y + z = 2 \end{cases}$$

- A. -6
- B. -2
- C. 1
- D. 3

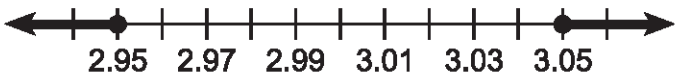
22) Determine the value of x in the following system of equations.

$$\begin{cases} 4x - y + z = 2 \\ x - 2y - 3z = 3 \\ -5y - 4z = -14 \end{cases}$$

- A. -9
- B. -4
- C. 0.45
- D. 3

23) Mark works in a factory as a quality-control engineer. The inequality $|w - 3| < 0.05$ represents all acceptable widths, w cm, for a particular part that is made in the factory.

- A. Explain what the inequality means in terms of the acceptable widths of the part.
- B. Mark solves the inequality and graphs the solution set. Explain what Mark did incorrectly.

1. $w + 3 < -0.05$ and $w + 3 > 0.05$	I removed the absolute value bars and changed $w - 3$ to $w + 3$ since the expression was in absolute value bars. I used -0.05 with the less than sign and 0.05 with the greater than sign.
2. $w < 3 - 0.05$ and $w > 3 + 0.05$	I added 3 to both sides of each inequality.
3. $w < 2.95$ and $w > 3.05$	I simplified the right sides of the inequalities.
4. 	I used closed dots since there are less than and greater than signs. I shaded to the outsides because the less than sign tells me to go to the left of 2.95 and the greater than sign tells me to go to the right of 3.05.

- C. Solve and graph the correct solution set of the inequality. Show your work, and explain why your solution is correct.

24) Solve the system of equations shown. Show your work algebraically, explain the approach you used to find your answer and verify that your answer is correct.

$$\begin{cases} 3x + y - 2z = 3 \\ 2x - y + 4z = 5 \\ 4x + 2y - 3z = 1 \end{cases}$$

Please use the space below to write your response(s) to the writing assignment provided by your teacher. If there are multiple tasks to the question, please clearly label the number or letter of each task in the column to the left of your answers. If you need additional pages for your response, your teacher can provide them.

Please write the name of the writing assignment here: _____

Task



Reference Sheet for the QualityCore™ Algebra II End-of-Course Assessment

Equations of a Line

Standard Form	$Ax + By = C$	A , B , and C are constants with A and B not both equal to zero.
Slope-Intercept Form	$y = mx + b$	(x_1, y_1) is a point.
Point-Slope Form	$y - y_1 = m(x - x_1)$	m = slope b = y-intercept

Quadratics

Standard Form of a Quadratic Equation	$ax^2 + bx + c = 0$	a , b , and c are constants, where $a \neq 0$.
Quadratic Formula	$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$	

Conic Sections

Circle	$(x - h)^2 + (y - k)^2 = r^2$	center (h, k) r = radius
Parabola	$y = a(x - h)^2 + k$	axis of symmetry $x = h$ vertex (h, k) directrix $y = k - \frac{1}{4a}$ focus $(h, k + \frac{1}{4a})$
Parabola	$x = a(y - k)^2 + h$	axis of symmetry $y = k$ vertex (h, k) directrix $x = h - \frac{1}{4a}$ focus $(h + \frac{1}{4a}, k)$
Ellipse	$\frac{(x - h)^2}{a^2} + \frac{(y - k)^2}{b^2} = 1$	foci $(h \pm c, k)$ where $c^2 = a^2 - b^2$, center (h, k)
Ellipse	$\frac{(y - k)^2}{a^2} + \frac{(x - h)^2}{b^2} = 1$	foci $(h, k \pm c)$ where $c^2 = a^2 - b^2$, center (h, k)
Hyperbola	$\frac{(x - h)^2}{a^2} - \frac{(y - k)^2}{b^2} = 1$	foci $(h \pm c, k)$ where $c^2 = a^2 + b^2$, center (h, k)
Hyperbola	$\frac{(y - k)^2}{a^2} - \frac{(x - h)^2}{b^2} = 1$	foci $(h, k \pm c)$ where $c^2 = a^2 + b^2$, center (h, k)

Lines and Points

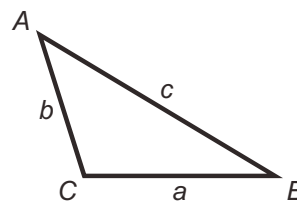
Slope	$m = \frac{y_2 - y_1}{x_2 - x_1}$	(x_1, y_1) and (x_2, y_2) are 2 points. m = slope
Midpoint	$M = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$	M = midpoint d = distance
Distance	$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$	

Miscellaneous

Distance, Rate, Time	$D = rt$	$D =$ distance $r =$ rate $t =$ time
Simple Interest	$I = prt$	$I =$ interest $p =$ principal
Compound Interest	$A = p\left(1 + \frac{r}{n}\right)^{nt}$	$A =$ amount of money after t years $n =$ number of times interest is compounded annually
Pythagorean Theorem	$a^2 + b^2 = c^2$	a and $b =$ legs of right triangle $c =$ hypotenuse

Laws of Sines and Cosines

Law of Sines	$\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$
Law of Cosines	$a^2 = b^2 + c^2 - 2bc \cos A$



Sequences, Series, and Counting

Arithmetic Sequence	$a_n = a_1 + (n - 1)d$	$a_n =$ n^{th} term
Arithmetic Series	$s_n = \frac{n}{2}(a_1 + a_n)$	$n =$ number of the term $d =$ common difference
Geometric Sequence	$a_n = a_1(r^{n-1})$	$s_n =$ sum of the first n terms $r =$ common ratio
Geometric Series	$s_n = \frac{a_1 - a_1 r^n}{1 - r}$ where $r \neq 1$	$k =$ number of objects in the set $m =$ number of objects selected
Combinations	${}_k C_m = C(k, m) = \frac{k!}{(k-m)! m!}$	
Permutations	${}_k P_m = P(k, m) = \frac{k!}{(k-m)!}$	

Circumference, Area, and Volume

Triangle	$A = \frac{1}{2}bh$	$A =$ area $b =$ base $h =$ height
Parallelogram	$A = bh$	$r =$ radius
Trapezoid	$A = \frac{1}{2}(b_1 + b_2)h$	$C =$ circumference $d =$ diameter
Circle	$A = \pi r^2$ $C = \pi d$	$V =$ volume
General Prism	$V = Bh$	$B =$ area of base $\pi \approx 3.14$
Right Circular Cylinder	$V = \pi r^2 h$	
Pyramid	$V = \frac{1}{3}Bh$	
Right Circular Cone	$V = \frac{1}{3}\pi r^2 h$	
Sphere	$V = \frac{4}{3}\pi r^3$	

ACT[®]

Answer Key

- 1) B
- 2) A
- 3) A
- 4) C
- 5) C
- 6) B
- 7) A
- 8) A
- 9) C
- 10) B
- 11) B
- 12) A
- 13) B
- 14) B
- 15) A
- 16) D
- 17) C
- 18) B
- 19) A
- 20) A
- 21) B
- 22) D

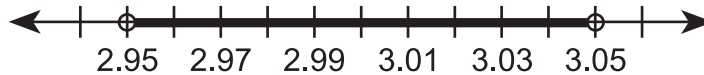
Scoring Criteria:

23)

A 4-point response may include, but is not limited to, the following points:

- A. Correct explanation of the inequality:** All acceptable widths are within 0.05 cm of 3 cm.
- B. Explanation of what Mark did incorrectly:** In step 1, Mark used $w + 3$ instead of $w - 3$ and 0.05 and -0.05 are in the wrong inequalities. First, Mark should have written the original inequality without the absolute value bars. Then, Mark should have rewritten the original inequality, changing the inequality sign to greater than and the right-hand side of inequality to -0.05 . In step 2, Mark added 3 to the right-hand side of both inequalities but subtracted 3 from the left-hand side of both inequalities. He should have subtracted 3 from both sides of the inequalities. In step 4, Mark used closed dots instead of open dots. Closed dots indicate that 2.95 and 3.05 are part of the solution set. However, these values should not be included in the solution set.
- C. Correct solution to the inequality:** $2.95 < w < 3.05$

Correct graph:



Appropriate work needed to find the answer:

$$-0.05 < w - 3 < 0.05$$

$$3 - 0.05 < w < 3 + 0.05$$

Explanation of why the solution is correct: I made a compound inequality with -0.05 on the left of the given inequality and then removed the absolute value bars. Then, I added 3 to each of the 3 parts of the inequality. I put open dots at 2.95 and 3.05 because inequality uses less than signs instead of less than or equal to signs. I shaded between 2.95 and 3.05 because there are less than signs instead of greater than signs.

Note: In Part C, the student does not have to explain the things that Mark has already done correctly in Part B.

Rubric:

- 4 A response at this level provides evidence of thorough knowledge and understanding of the subject matter.**
- The response addresses all parts of the question or problem correctly.
 - The response demonstrates efficient and accurate use of appropriate procedures.
 - The explanation of strategies used in the response shows evidence of a good understanding of mathematical concepts and principles, and it does not contain any misconceptions.
 - The explanation in the response is clear and coherent.
- 3 A response at this level provides evidence of competent knowledge and understanding of the subject matter.**
- The response addresses most parts of the question or problem correctly.
 - The response includes some minor errors but generally uses appropriate procedures accurately.
 - The explanation of strategies used in the response shows some evidence of a good understanding of mathematical concepts and principles, and it contains few, if any, misconceptions.
 - The explanation in the response is mostly clear and coherent.
- 2 A response at this level provides evidence of a basic knowledge and understanding of the subject matter.**
- The response addresses some parts of the question or problem correctly.
 - The response includes a number of errors but demonstrates some use of appropriate procedures.
 - The explanation of strategies used in the response shows a little evidence of understanding of mathematical concepts and principles, but it may contain some evidence of misconceptions.
 - The explanation in the response is partially clear, but some parts may be difficult to understand.
- 1 A response at this level provides evidence of minimal knowledge and understanding of the subject matter.**
- The response addresses a few parts of the problem correctly, but the response is mostly incorrect.
 - The response includes inappropriate procedures or simple manipulations that show little or no understanding of correct procedures.
 - The explanation of strategies used in the response shows little or no evidence of understanding of mathematical concepts and principles, and it may contain evidence of significant misconceptions.
 - Many parts of the explanation are difficult to understand.
- 0 A response at this level is not scorable.** The response is off-topic, blank, hostile, or otherwise not scorable.

Scoring Criteria:

- 24) A 4-point response may include, but is not limited to, the following points:

Correct solution: $(2, -5, -1)$

Appropriate work needed to find the answer:

$$3x + y - 2z = 3$$

$$2x - y + 4z = 5$$

$$5x + 2z = 8$$

$$2x - y + 4z = 5 \quad \times 2 \quad 4x - 2y + 8z = 10$$

$$4x + 2y - 3z = 1$$

$$8x + 5z = 11$$

$$5x + 2z = 8 \quad \times 5 \quad 25x + 10z = 40$$

$$8x + 5z = 11 \quad \times (-2) \quad -16x - 10z = -22$$

$$9x = 18$$

$$\frac{9x}{9} = \frac{18}{9}$$

$$x = 2$$

$$5(2) + 2z = 8$$

$$10 + 2z = 8$$

$$2z = -2$$

$$z = -1$$

$$3(2) + y - 2(-1) = 3$$

$$6 + y + 2 = 3$$

$$8 + y = 3$$

$$y = -5$$

Explanation of the approach used to find the answer: I picked 2 pairs of equations and eliminated y from each. For the second pair, I had to multiply the top equation by 2 in order to eliminate y . I added down the columns to eliminate y because $y + (-y) = 0$ and $-2y + 2y = 0$. Then, I decided to eliminate z . I multiplied the top equation by 5 and the bottom equation by -2 so that $10z$ and $-10z$ would cancel out. Then, I solved for x , and substituted $x = 2$ back into one of the equations with no y . Next, I substituted $x = 2$ and $z = -1$ back into one of the original equations. To verify my answer, I substituted my solutions for x , y , and z back into all 3 original equations.

Verification of the answer:

$$3(2) + (-5) - 2(-1) = 6 - 5 + 2 = 3 \text{ yes}$$

$$2(2) - (-5) + 4(-1) = 4 + 5 - 4 = 5 \text{ yes}$$

$$4(2) + 2(-5) - 3(-1) = 8 - 10 + 3 = 1 \text{ yes}$$

Rubric:

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- The response addresses all parts of the question or problem correctly.
 - The response demonstrates efficient and accurate use of appropriate procedures.
 - The explanation of strategies used in the response shows evidence of a good understanding of mathematical concepts and principles, and it does not contain any misconceptions.
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 - The response includes some minor errors but generally uses appropriate procedures accurately.
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 - The explanation in the response is mostly clear and coherent.
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