Practice Packet for Math 091: Essentials of Intermediate Algebra and MyMathTest Test 2: Algebra Core

This packet contains:

- 30 problems that cover all topics in Math 91 and MyMathTest Test 2: Algebra Core.
- Answers to all problems (p. 10)
- Instructions for using online Study Plan to brush up (p. 11)

Instructions:

- Take this as a test, without any help or any notes. This should NOT be taken more than once. Instead, use your incorrect answers to target specific areas in the online Study Plan. It should take about an hour. You can use a calculator for these problems.
- Check your solutions after completing all problems (p. 10)
- If you scored 80% or higher, you should be prepared for MyMathTest Test 2: Algebra Core.
- If you did not score well, you can:
  Use the online Study Plan (p. 11)
  Attend a live brush-up workshop.

Go to https://placeandtest.highline.edu/ or call 206-592-3251 for more information about taking the placement test or to find the schedule for brush-up workshops.

MATH 091 - Essentials of Intermediate Algebra 5 credits

Prerequisite: MyMathTest Algebra Basics 75 or MyMathTest Algebra Core 50, or MATH 081 with 2.0 min.

Course Description: An intermediate algebra course that develops understanding of functions (linear, exponential, quadratic) as well as proficiency with simplifying expressions involving integer exponents, solving linear inequalities, and solving linear equations in two variables. GRAPHING CALCULATOR REQUIRED: TI-83 or 84 recommended.
Sample Content for Math 091: Essentials of Intermediate Algebra and MyMathTest
Test 2: Algebra Core

1. Solve the equation and check your solution.

\[ 6x + 5 = -(x - 40) \]

\[ x = \square \]

2. Solve the equation and check your solution.

\[ -\frac{1}{9}(x - 27) + \frac{1}{3}(x + 3) = x - 17 \]

\[ x = \square \]

3. Write a three-part inequality involving the variable \( x \) that describes the set of numbers graphed.

Choose the correct inequality below.

- A. \(-1 < x < 5\)
- B. \(-1 \leq x < 5\)
- C. \(-1 \leq x \leq 5\)
- D. \(-1 < x \leq 5\)

4. Solve the inequality.

\[ -20x - 40 \leq -5(3x + 13) \]

- A. \( x \geq 5\)
- B. \( x \leq 5\)
- C. \( x > 5\)
- D. \( x < 5\)
5. Solve the compound inequality. Graph the solution set and write it in interval notation.

\[ x \leq -3 \text{ or } x \geq 5 \]

Choose which graph represents the solution set of \( x \leq -3 \text{ or } x \geq 5 \).

\[ \bigcirc \text{A. } \quad \bigcirc \text{B. } \quad \bigcirc \text{C. } \quad \bigcirc \text{D.} \]

Write the solution set in interval notation. Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

\[ \bigcirc \text{A. } \text{ The solution set is } \square. \]

(Type your answer in interval notation. Simplify your answer. Use integers or fractions for any numbers in the expression.)

\[ \bigcirc \text{B. } \text{ There is no solution.} \]

6. Graph.

\[ 3x + 2y = -6 \]

Use the graphing tool on the right to graph the equation.

![Graphing tool](https://example.com/graphing-tool.png)

Click to enlarge graph
7. Find the y-intercept and the x-intercept for the equation.

\[-20x + y = 35\]

What is the y-intercept?

☐

(Type an ordered pair.)

What is the x-intercept?

☐

(Type an ordered pair. Type integers or fractions for coordinates.)

8. Graph the equation using the slope and the y-intercept.

\[y = \frac{6}{5}x + 4\]

Use the graphing tool to graph the line. Use the slope and y-intercept when drawing the line.

9. Write an equation, in slope-intercept form if possible, of the line through the pair of points.

\((\quad -4,0)\) and \((0, -3)\)

☐A. \[y = \frac{3}{4}x - 3\]

☐B. \[y = \frac{4}{3}x - 3\]

☐C. \[y = -\frac{3}{4}x - 3\]

☐D. \[y = \frac{4}{3}x - 3\]
### Sample Content for Math 091: Essentials of Intermediate Algebra and MyMathTest

**Test 2: Algebra Core**

10. Solve by the elimination method.

   \[
   \begin{align*}
   x + y &= 18 \\
   8x - y &= 63
   \end{align*}
   \]

   What is the solution of the system?

   (Type an ordered pair.)

11. Find the domain and the range of the relation. Then determine whether the relation is a function.

   \[\{(−3, −6), (1, 4), (4, −3), (6, −2)\}\]

   - [ ] A. domain: \{-3, 1, 4, 6\}
     
     range: \{-6, 4, −3, −2\}
     
     function

   - [ ] B. domain: \{-6, 4, −3, −2\}
     
     range: \{-3, 1, 4, 6\}
     
     not a function

   - [ ] C. domain: \{-6, 4, −3, −2\}
     
     range: \{-3, 1, 4, 6\}
     
     function

   - [ ] D. domain: \{-3, 1, 4, 6\}
     
     range: \{-6, 4, −3, −2\}
     
     not a function

12. If \(f(x) = 3x^2 − 5\), find \(f(−3)\).

   \[f(−3) = \phantom{00} \]

13. Use the vertical line test to determine whether the graph is the graph of a function.

   Is the graph the graph of a function?

   [ ] Yes

   [ ] No
Sample Content for Math 091: Essentials of Intermediate Algebra and MyMathTest
Test 2: Algebra Core

14. Find the domain and the range of the relation. Use the vertical line test to determine whether the graph is the graph of a function.

\[ \text{A. domain: } (-\infty, \infty) \]
\[ \text{range: } [1, \infty) \]
\[ \text{B. domain: } (-\infty, \infty) \]
\[ \text{range: } [1, \infty) \]
\[ \text{not a function} \]
\[ \text{C. domain: } [1, \infty) \]
\[ \text{range: } (-\infty, \infty) \]
\[ \text{function} \]
\[ \text{D. domain: } [1, \infty) \]
\[ \text{range: } (-\infty, \infty) \]
\[ \text{not a function} \]

15. Solve the equation. Express radicals in simplest form.

\[ x^2 - x = 12 \]
\[ \text{A. } 3, 4 \]
\[ \text{B. } -3, 4 \]
\[ \text{C. } 1, 12 \]
\[ \text{D. } -3, -4 \]

16. Use the quadratic formula to solve the equation.

\[ 3x^2 - 5x - 7 = 0 \]
Select the correct choice below and fill in any answer boxes within your choice.

\[ \text{A. The solutions are } x = \_ \_ \_ \_ \_ \_. \]
\[ \text{(Type an exact answer, using radicals as needed. Use a comma to separate answers as needed.)} \]
\[ \text{B. There is no real solution.} \]

17. Find the vertex of the graph of the quadratic function.

\[ f(x) = x^2 - 4x - 3 \]
\[ \text{A. } (2, -15) \]
\[ \text{B. } (-2, 9) \]
\[ \text{C. } (2, -7) \]
\[ \text{D. } (-4, 29) \]

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18. Find the vertex of the graph of the quadratic function shown below. Determine whether the graph opens upward or downward, find any intercepts, and sketch the graph.

\[ f(x) = -x^2 - 4x + 5 \]

The vertex is \( \square \).
(Simplify your answer. Type an ordered pair.)

Does the graph open upward or downward?

- The parabola opens upward.
- The parabola opens downward.

Find any x-intercepts of the graph.

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- A. The x-intercept(s) is(are) \( \square \).
  (Simplify your answer. Type an ordered pair. Use a comma to separate answers as needed.)
- B. There is no x-intercept.

Find any y-intercepts of the graph.

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- A. The y-intercept(s) is(are) \( \square \).
  (Simplify your answer. Type an ordered pair. Use a comma to separate answers as needed.)
- B. There is no y-intercept.

Choose the correct graph below.

- A.
- B.
- C.
- D.
19. Multiply.

\[(5x + 2)^2\]

\[(5x + 2)^2 = \square\]

(Simplify your answer.)

20. Find the square root.

\[\sqrt{529}\]

Select the correct choice below and, if necessary, fill in the answer box within your choice.

☐ A. The square root is \square.
   (Simplify your answer.)

☐ B. The square root is not a real number.

21. In a right triangle, find the length of the side not given.

\[a = 12, \quad b = 16\]

The length of the third side is \square.
(Simplify your answer. Type an exact answer, using radicals as needed.)

22. Simplify the exponents.

\[(6m^5n^4p^3)^2\]

The answer is \square.

23. Find the product.

\[-9x^7(-2x^7 - 5x^2 + 1)\]

☐ A. \[18x^{14} + 45x^9 - 9\]

☐ B. \[18x^{14} + 45x^9 - 9x^7\]

☐ C. \[18x^{14} - 5x^2 + 1\]

☐ D. \[18x^{14} + 45x^9\]
24. Divide.

\[
\frac{18y^5}{6y^3}
\]

The quotient is \[\square\].
(Simplify your answer.)

25. Write an equivalent expression with positive exponents only.

\[x^7y^{-3}\]

Which choice is correct?

- [ ] A. \(xy^4\)
- [ ] B. \(\frac{x^7}{y^3}\)
- [ ] C. \(\frac{1}{x^7y^3}\)
- [ ] D. \((xy)^4\)

26. Write an equivalent expression with positive exponents.

\[
\frac{3y^{-4}}{(5y)^3}
\]

Choose an equivalent expression with positive exponents.

- [ ] A. \(\frac{3}{125y^7}\)
- [ ] B. \(\frac{3}{5y^7}\)
- [ ] C. \(\frac{3y^{-7}}{125}\)

27. Write the expression in lowest terms.

\[
\frac{27z^3}{3z}
\]

The simplified form is \[\square\].
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28. Write the expression in lowest terms.
\[
\frac{7a - 35}{6a - 30}
\]
\[\frac{7a - 35}{6a - 30} = \boxed{\phantom{0}} \text{ (Type an integer or a simplified fraction.)}\]

29. Graph the exponential function.
\[f(x) = 5^x\]

- □
- □
- □
- □

30. The equation \(y = 84,941 (1.095)^x\) models the number of college students who study abroad each year from 1995 through 2006. In the equation, \(y\) is the number of American students studying abroad and \(x\) represents the number of years after 1995. Complete parts a and b below.

a. Estimate the number of American students studying abroad in 2002.

□

(Round to the nearest whole number as needed.)

b. Assuming this equation continues to be valid in the future, use this equation to predict the number of American students studying abroad in 2016.

□

(Round to the nearest whole number as needed.)
Sample Content Answers

1. 5

2. 27

3. D

4. A

5. A, $(-\infty, -3) \cup [5, \infty)$

6.

7. (0.35) $\begin{pmatrix} -7 \\ 4 \end{pmatrix}$

8.

9. C

10. (9,9)

11. A

12. 22

13. No

14. A

15. B

16. A, $\frac{5 + \sqrt{109}}{6}$, $\frac{5 - \sqrt{109}}{6}$

17. C

18. $(-2.9)$
   The parabola opens downward.
A, $(-5,0),(1,0)$
A, $(0,5)$
C

19. $25x^2 + 20x + 4$

20. A, 23

21. 20

22. $36m^{10}n^8p^6$
How to Use the Online Study Plan

You can access a free online Study Plan to brush up the math skills you have found that need attention by going to https://mymathtest.highline.edu/. You will need an activated MyHighline account (https://helpdesk.highline.edu/myHCC.php) in order to access practice questions. It can take up to an hour to get the MyMathTest account activated, so please be patient!

The chart on the next page shows which problems to practice in the Study Plan.

Once you are in MyMathTest, choose “Practice in the STUDY PLAN” on the left sidebar to access the Study Plan Sections. Then choose the chapter you want. The screen shot shows how to access Chapter 1.2 (Chapter 1, Section 2).

Click on the Chapter you want, selected the objective listed in the chart on the next page. You can access practice problems, watch videos, and take short quizzes on the concepts. The screen shot below shows the objectives for Chapter 1.2.
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