

***ISTEP*+ Grade 10**

Indiana Statewide Testing for Educational Progress-Plus

Part 1 Practice Test

Mathematics • English/Language Arts



Student Name: _____

Use only a Number 2 pencil to respond to the questions in this book. Responses written in pen CANNOT be scored.



If you see this symbol, you may use a calculator to solve problems in the test.



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Mathematics

You may use a calculator to solve any of the problems in this test.

NOTE: A correct answer **CANNOT** receive full credit if no work is shown.

Since you may receive partial credit for all problems in this test, it is important to show ALL work in the spaces provided in this book. When you see the words **Show All Work**, be sure to

- **show all the steps needed to solve the problem**
- **make your handwriting clear and easy to read**
- **write the answer on the answer line**

As you complete each problem, remember to

- READ** the problem carefully
- PLAN** how to solve the problem
- SOLVE** the problem showing all steps
- CHECK** your work

STOP! _____ STOP! _____ STOP! _____ STOP! _____



Section 1: Mathematics



1. Consider the equation.

$$3(x - 2) = 3x - 2$$

Part A

Determine whether the equation has one solution, no solutions, or an infinite number of solutions. Use words, numbers, and/or symbols to justify your answer.

Show All Work

Part B

Create a linear equation that has one solution. Include the variable on BOTH sides of the equal sign.

Equation _____

GO ON 



Section 1: Mathematics

Part C

Solve your equation from Part B.

Show All Work

Answer _____

STOP! _____ STOP! _____ STOP! _____ STOP! _____



ATTENTION!
Do NOT go on
until you are
told to do so.



English/Language Arts

In this section, you will read a passage and then answer a question about what you have read. You may look at the passage as often as you like.

STOP! _____ STOP! _____ STOP! _____ STOP! _____



Section 1: English/Language Arts

Directions

Read the article “Smart Stuff.” Then answer the question.

Smart Stuff

- 1 Your absent-minded friend leaves her glasses in a chair, and you come along and innocently sit down in that chair—but wait . . . you reach behind you and extract your friend’s glasses, the metal frames of which are now bent beyond recognition. You try to wrestle them back into shape, but you find it impossible to get them to look exactly right. You start apologizing to your friend, who waves a hand and says, “No big deal.” She goes to the kitchen and heats a pan of water; she drops the glasses into the pan and, like magic, they spring back to their original configuration. She pulls them out, dries them off, and puts them on: they’re perfect, and you’re dumbfounded.
- 2 A metal alloy with the ability to “remember” its original shape and return to it at a specific temperature is known as a shape-memory alloy (SMA). SMAs are just one category of “smart materials,” which are defined as (usually) human-engineered substances designed to change in a particular way under particular conditions. Different smart materials undergo different sorts of changes in response to different conditions, which in turn means they have different applications in the real world. SMAs, as described above, change in response to temperature. Regular metals change in response to temperature, too, of course; they melt at high temperatures and then solidify at lower ones. They do not, however, remember their original shapes. Molten gold that was once jewelry will not, upon hardening, turn itself back into a bracelet or a necklace.
- 3 SMAs differ from regular metals in another important way. If regular metals are bent, they can usually, with difficulty, be returned to their original shape. But if they are bent and reshaped again, over and over—particularly at a single point—the metal weakens. SMAs tend not to weaken like this as much, so they can be used over and over again.
- 4 One SMA, a mixture of nickel and titanium known as nitinol, is superelastic, which means it can return to its original shape after absorbing stress. (Glasses

Section 1: English/Language Arts

frames made of nickel-titanium can absorb the stress of being bent or twisted and simply spring back into shape.) Researchers are investigating several extremely exciting possibilities for using this material. One with great promise is the prospect of making bridges that are better able to withstand earthquakes. Nitinol can be incorporated into the mix of materials that is usually used in bridge construction. For example, steel and concrete are used in constructing bridge columns and must be strong enough to withstand the regular stresses exerted by vehicle traffic. But steel and concrete are not very good at absorbing the stress of earthquakes. Scientists who tested columns made of nickel-titanium and concrete composites against traditional steel-and-concrete columns found that the former far outperformed the latter when subjected to extreme stress—great promise for the future.

- 5 SMAs are not the only smart materials that are useful in earthquakes and other potentially hazardous situations. Piezoelectric materials generate an electrical field when squeezed. Quartz is a piezoelectric material found in nature, but scientists have engineered ceramics and polymers to have piezoelectric properties as well. These materials are effective in sensors that need to react to physical forces, such as the seismic force of earthquakes. Piezoelectric sensors can warn that an earthquake is underway, and they can trigger other systems designed to protect against damage from earthquakes. Another application in which a sensor needs to respond to rapid, compressing mechanical force is in car airbag systems. An impact triggers the sensor or sensors, and the airbags inflate.
- 6 Clearly, these materials can help provide protection in extreme situations. Other types of smart materials help in everyday settings. A common example of a smart material is the coating on glasses that darkens in response to the UV rays in sunlight: the glasses become sunglasses outdoors, but they return to normal when they are no longer exposed to sunlight. The coating is made from a material referred to as photochromic. Light (“photo-”) causes it to change color (“-chromic”). Photochromic inks are often used to authenticate security documents. These inks, which become visible only under ultraviolet light, are difficult to forge. Driver’s licenses, for example, are usually printed with “invisible” photochromic seals.
- 7 Some materials are photochromic; others are thermochromic. These change color depending on temperature. Contact thermometers are one clear use for

Section 1: English/Language Arts

these materials: you can hold a thermochromic plastic strip to your forehead to determine whether you're running a fever. Such a thermometer is far safer to have around the house than a traditional mercury thermometer.

Thermochromics can be useful in relation to food, as in packaging that shows when food has been heated to the appropriate temperature, or baby bottles that turn a particular color when the heated liquid inside cools sufficiently for a baby to drink. Or how about a nonelectric toothbrush that tells you when to stop brushing? A thermochromic coating on a toothbrush handle will change color after being held by a person's hand (i.e., exposed to a temperature of 98.6°F) for two minutes—the ideal length of brushing time.

8 Science writer Philip Ball says that smart materials function as what he calls “the ‘invisible machine’: a device that has no cogs, gears, and levers, but instead grows, extends, or shapes itself to the task at hand.” More and more of these invisible machines will be hidden in plain sight, all around us, as time goes on. Scientists have known about many smart materials for decades and are working out new uses for them. They are constantly developing and testing new materials. Dropped your smartphone? Not a problem if it's in a “smart” case. Clearly, smart materials can do some hugely important things. But simply rescuing us from our run-of-the-mill, not-so-smart mistakes? That seems like a pretty good use for something smart.

GO ON 

Section 1: English/Language Arts

1. Explain the author's use of the word "smart" and the connotations of the word in the article. Support your answer with details from the article.

STOP! _____ STOP! _____ STOP! _____ STOP! _____



ATTENTION!
Do NOT go on
until you are
told to do so.



English/Language Arts

In this section, you will reread the passage from Section 1 and then respond to the writing prompt based on the passage. You may look at the passage as often as you like.

Your writing will not be scored on your personal opinions or choices but will be scored objectively on

- how clearly you address the prompt
- how well you organize your ideas
- how effectively you express yourself
- how consistently you use correct paragraphing, grammar, spelling, and punctuation

Be sure to use the rules of Standard English. Standard English is the English commonly used in formal writing. It does not include slang or jargon.

NOTE: Only your writing on the lined pages in this book will be scored.

In this Part 1 Practice Test, you will read only one passage. In the ISTEP+ English/Language Arts Part 1 Test, different passages will be used for each section.

STOP! _____ STOP! _____ STOP! _____ STOP! _____



Section 2: English/Language Arts

Directions

Read the article “Smart Stuff.” Then answer the question.

Smart Stuff

- 1 Your absent-minded friend leaves her glasses in a chair, and you come along and innocently sit down in that chair—but wait . . . you reach behind you and extract your friend’s glasses, the metal frames of which are now bent beyond recognition. You try to wrestle them back into shape, but you find it impossible to get them to look exactly right. You start apologizing to your friend, who waves a hand and says, “No big deal.” She goes to the kitchen and heats a pan of water; she drops the glasses into the pan and, like magic, they spring back to their original configuration. She pulls them out, dries them off, and puts them on: they’re perfect, and you’re dumbfounded.
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GO ON 

Section 2: English/Language Arts

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Section 2: English/Language Arts

these materials: you can hold a thermochromic plastic strip to your forehead to determine whether you're running a fever. Such a thermometer is far safer to have around the house than a traditional mercury thermometer.

Thermochromics can be useful in relation to food, as in packaging that shows when food has been heated to the appropriate temperature, or baby bottles that turn a particular color when the heated liquid inside cools sufficiently for a baby to drink. Or how about a nonelectric toothbrush that tells you when to stop brushing? A thermochromic coating on a toothbrush handle will change color after being held by a person's hand (i.e., exposed to a temperature of 98.6°F) for two minutes—the ideal length of brushing time.

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Section 2: English/Language Arts

1. "Smart Stuff" describes how new technologies are being developed to solve problems. Using details from the article, write an essay explaining how the author supports the idea that these technologies could improve the quality of life.

Be sure to include

- problems this technology can solve
- details supporting how this technology could improve the quality of life
- an introduction, a body, and a conclusion to your essay

Use the following Prewriting/Planning page to help you plan your writing. Then write your final draft on the lined pages.

Section 2: English/Language Arts

Use the blank Prewriting/Planning space below for notes, lists, webs, outlines, or anything else that might help you plan your writing. If you need additional paper for planning, raise your hand and your teacher will give you more paper. **You must write your final draft on the lines beginning at the top of the next page.**

Prewriting/Planning

GO ON 

Section 2: English/Language Arts

A large rectangular box containing 25 horizontal lines for writing.

GO ON 

Section 2: English/Language Arts

A large rectangular box containing 25 horizontal lines for writing.

Section 2: English/Language Arts

Blank writing area with horizontal lines.

Now check your writing using this Editing Checklist.

Editing Checklist

- 1 Check your capitalization and punctuation.
- 2 Spell all words correctly.
- 3 Check for sentence fragments or run-on sentences.
- 4 Keep verb tense consistent.
- 5 Make sure subject and verb agree.
- 6 Use words according to the rules of Standard English.
- 7 Remember to paragraph correctly.

STOP! _____ STOP! _____ STOP! _____ STOP! _____



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