THE WRITTEN TEST

The written test is one hurdle in the Police Officer Recruit selection process. We will **not** be developing a cumulative score. This test represents a minimum standard that must be met in order for you to continue in the process. The purpose of our selection process is to identify those candidates that are most likely to succeed in the police academy. There are 3 components of the Written Test. A passing score of 70% is required in **each** component. The 3 components are:

- Basic Math
- Reading Comprehension
- Spelling/Grammar

If unsuccessful on the first attempt, applicants may reschedule for the next available testing session. Study guides prepared by the test developer, Stanard and Associates, are available for purchase for $5.00 (check or money order only; addressed to City Treasurer).

Test Etiquette:

- Be prompt. Late admittance will not be permitted.
- Bring photo identification. All other materials will be provided for you.
- Any discussion once the test has begun will be grounds for disqualification.
- Pagers, cell phones, etc. will not be permitted.
- Please refrain from wearing cologne or perfume.

Strategies for Success:

- Each section of the test is timed. Pace yourself.
- Answer the questions you know first. Work on the more difficult questions during the time you have remaining.
- The test booklet is for your use only. Feel free to make notes in your test booklet if this is helpful to you.
- Identify the correct answer in your mind before you read through the options provided.
- If you change your answer, mark your answer sheet as directed. The test evaluators cannot interpret your intent if it is not clear on your answer sheet.
- Choose your responses based on the information provided, not based on your own knowledge or opinions.

Types of Questions:

Basic Math- Find key information in charts to perform basic calculations; perform addition, subtraction and multiplication (including percentages) to solve word problems; and perform basic calculations relating to distance (convert inches to feet, etc.)

Reading Comprehension- Answer questions based on information provided in the passage; compare passage with information provided in chart or report format; and apply definitions of terms provided to situations described in questions.

Spelling/Grammar- Identify correct spelling of common words and choose word(s) that complete a sentence, applying correct grammar and word usage.

Page 2

Tips for the Police Written Examination

Math Review

Complete the following problems. Remember to follow each set of directions.

Questions 1-2
Write answer to the nearest hundredth.
Example - $17,568 ÷ 27 = $650.67

1. $36,570 ÷ 52 =

2. $13,472 ÷ 13 =

Questions 3-4
Multiply

3. $13 x 31 =

4. $314 x 5 =

Questions 5-6
Find the given percent for each

5. 20 % of 45,123 =

6. 10 % of $87,000 =

Student	A	B	C	D
Sarah	2	4	6	10
Jenny	6	12	3	1
Mark	5	13	9	2

A = 4 points,   B = 3 points,   C = 2 points, and D = 1 point

Questions 7-9
Use the above chart to answer each question.

7. How many total points did Mark earn?

8. How many points did Sarah earn from her A's and C's?

9. How many points did Jenny earn from her B's and D's?

U.S. Customary System: Length

Unit	Relation to Other U.S. Customary Units
Inch	$\frac{1}{12}$ foot
Foot	12 inches or $\frac{1}{3}$ yard
Yard	36 inches or 3 feet
Rod	16 ½ feet or 5 ½ yards
Furlong	220 yards or $\frac{1}{8}$ mile
Mile (statute)	5,280 feet or 1,760 yards
Mile (nautical)	2,025 yards

Word Problems

Review strategies on how to solve word problems before attempting the problems below.

1. Mrs. Yum placed an order for 25 graphing calculators for her geometry class. If the total cost of her order was $2475 that included a shipping cost of $75.00, what was the cost of each calculator?

2. If Jack receives 2 points for each math problem he completes after the first 20 problems, how many points did he receive if he completed 37 problems in class today?

3. Students receive one day of Saturday detention for every unexcused tardy or six. How many days of Saturday detention will John get if he had 13 unexcused tardies?

4. When Adina was at the mall, she saw a shirt that she had to have. She noticed that the shirt was also on sale; 15% off of the ticket price. If the ticket price for the shirt is $50.00, how much will the shirt cost after Adina takes the 15% off?

5. Michael and Richard have decided to split the profits of their business 60/40, respectively. If the business made $25,000.00 last month, how much did Michael earn for the month?

6. Kevin climbed on the roof of his house, which is 20 feet high to clean the gutters. How high is his roof in inches?

7. Craig is the new closing manager of the local movie theater, with responsibility of counting money in all the cash registers at the end of the night. When counting all of the money, he has 45 5-dollar bills, 30 20-dollar bills, 23 50-dollar bills, and 3 100-dollar bills. How much money will he have in total?

8. The senior class held a fundraiser to raise money for the local children's hospital. They sold 34 water bottles at $5.00 each; 16 T-shirts at $10.00 each; and 13 sweatshirts at $15.00 each. How much money did the students raise?

9. Kerry recently purchased a new cell phone and signed a membership contract for service. His contract states that he has 2,000 anytime minutes for $50.00 a month, but after those minutes, he will be charged 15 cents a minute for every minute he went over. If Kerry used 2450 minutes, how much will his bill be this month?

10. Your daughter has asked you to buy the rest of her Girl Scout cookies. She has 30 boxes left, and all of the boxes add up to $150.00. What is the average cost of each box?

HOW TO FIND PERCENTS

Percent is another method of describing parts of a whole. We can think of a percent as a part over the total number.

We describe a percent as part/whole, where whole = 100.

Example: Out of 100 students, (the total number of students and also the "whole") 85 of them (the "part") slept till noon the day after their finals exam.

From this word problem, we can set up the fraction:
$$\frac{85 \text{ students}}{100 \text{ students}} \Rightarrow \frac{\text{part}}{\text{whole}} \Rightarrow \frac{85}{100} \Rightarrow 85\% \text{ of the students slept till noon}$$

Percents can be fractions or decimals when a conversion step is made. The following shows these steps.

Percents & Fractions

 Percent means hundredths ($\frac{1}{100}$): So 75% converts to 75 x $\frac{1}{100}$ without the symbol (%). From this we see that when we have a percentage we can simply take the number, in this case 75, and put it over 100 making a faction.

> **Example:** $4\% = \frac{4}{100}$
> $2.5\% = \frac{2.5}{100}$
> $3000\% = \frac{3000}{100}$
>
> In the same way we might want to convert from a <u>fraction back to a percent</u>. (This conversion is usually used when one needs a percent for an answer to a word problem). To do this conversion we simply do away with the denominator, usually a hundred, and add the percentage symbol (%).
>
> **Example:** $\frac{2}{100} = 2\%$
> $\frac{600}{100} = 600\%$
> $\frac{3.4}{100} = 3.4\%$

Percents & Decimals

Since percent means hundreds ($\frac{1}{100}$) we can also look at a hundredth in decimal form (.01). So 75% also converts to 75 x (.01) = .75 without the symbol (%).

> From this we see that when we have a percentage we can simply take the number, in this case 75, and multiply it by the number .01.
>
> Note that 75% = 75/100 = .75
>
> **Example:**   4% = 4 x .01 = .04
> 3000% = 3000 x .01 = 30
> 2.5% = 2.5 x .01 = .025

Again, in the same way, we might want to convert from a <u>decimal back to a percent</u>. (This conversion is usually used when one needs a percent for an answer to a word problem). To do this conversion we take a number, sometimes a decimal and multiply it by 100%. To do this we multiply the number by 100 and add on a percentage symbol (%)

Example: .02 x 100% = 2%
3.4 x 100% = 340%
600 x 100% = 60,000%
.58 X 100% = 58%

What to do when the denominator is not 100:

In order to convert a fraction to a percent we must realize a fraction is simply a division problem.

Example:

$$\frac{16}{4} = 16 \div 4 = 4\overline{)16}^{\;4}$$

$$\frac{1}{2} = 1 \div 2 = 2\overline{)1.0}^{\;.5}$$

$$\frac{5}{8} = 5 \div 8 = 8\overline{)5.000}^{\;.625}$$
$$\underline{48}$$
$$20$$
$$\underline{16}$$
$$40$$

We now must realize we have a number (sometimes a decimal) to convert to a percent, which we already have done.

Example: 4 x 100% = 4.00 = 400%
.5 x 100% = .50 = 50%
.625 x 100% = .625 = 62.5%

Note: We can omit the multiplying step and just move the decimal 2 spaces to the right.

If we wish to convert a mixed number (a whole number and a fraction) to a percentage, we can convert it to a complete fraction. To do this we multiply the whole number and the denominator (the bottom number of the fraction) and add that result to the numerator (the top number of the fraction). The final result is left over the denominator of the fraction.

Example: 3½ to a fraction $4\frac{5}{6}$ to a fraction
(step 1) 3 x 2 = 6   (step 1) 4 x 6 = 24
(step 2) 6 + 1 = 7   (step 2) 24 + 5 = 29
(step 3) $\frac{7}{2}$ (step 3) $\frac{29}{6}$
3½ = $\frac{7}{2}$ $4\frac{5}{6} = \frac{29}{6}$

From this point we can go back to the directions on how to convert a fraction to a percent.

Dividing a 4–digit Number by a 2-digit Number

How to divide a four-digit number by a two-digit number (e.g. 4138 ÷ 17):

Place the divisor (17) before the division bracket and place the dividend (4138) under it.

$$17\overline{)4138}$$

Examine the first digit of the dividend (4). It is smaller than 17 so can't be divided by 17 to produce a whole number. Next take the first two digits of the dividend (41) and determine how many 17's it contains. In this case 41 holds two seventeen's (2 x 17 = 34) but not three (3 x 17 = 51). Place the 2 above the division bracket.

$$17\overline{)\overset{2}{4138}}$$

Multiply the 2 by 17 and place the results (34) below the 41 of the dividend.

$$17\overline{)\overset{2}{4138}}$$
$$34$$

Draw a line under the 34 and subtract it from 41 (41 - 34 = 7). Bring down the 3 from the 4138 and place it to the right of the 7.

$$17\overline{)\overset{2}{4138}}$$
$$\underline{34}$$
$$73$$

Divide 73 by 17 and place that answer above the division bracket and to the right of the two.

$$17\overline{)\overset{24}{4138}}$$
$$\underline{34}$$
$$73$$

Multiply the 4 of the quotient by the divisor (17) to get 68 and place this below the 73 under the dividend. Subtract 68 from 73 to give an answer of 5. Bring down the 8 from the dividend 4138 and place it next to the 5.

$$17\overline{)\overset{24}{4138}}$$
$$\underline{34}$$
$$73$$
$$\underline{68}$$
$$58$$

Divide 58 by 17 and place that answer (3) above the division bracket and to the right of the four.

$$
\begin{array}{r}
243 \\
17\,\overline{\smash{)}\,4138} \\
\underline{34} \\
73 \\
\underline{68} \\
58
\end{array}
$$

Multiply the 3 of the quotient by the divisor (17) to get 51 and place this below the 58 under the dividend. Subtract 51 from 58 to give an answer of 7.

$$
\begin{array}{r}
243 \\
17\,\overline{\smash{)}\,4138} \\
\underline{34} \\
73 \\
\underline{68} \\
58 \\
\underline{51} \\
7
\end{array}
$$

There are no more digits in the dividend to bring down so the 7 is a remainder. The final answer could be written in several ways:

243 with remainder of 7
243r7
243 $^{7}/_{17}$

Finding a Percent of a Number

To find a percent of a number, change the percent to a decimal or to a fraction and multiply.

Example: Find 25% of 80

Method 1.
Step 1. Change the percent to a decimal. $25\% = .25$

Step 2. Multiply

$$
\begin{array}{r}
80 \\
\times\ \ .25 \\
\hline
400 \\
\underline{160} \\
20.00
\end{array}
$$

Method 2.
Step 1. Change the percent to a fraction $25\% = \frac{1}{4}$

Step 2. Multiply

$$
\frac{1}{\cancel{4}_{1}} \ \times\ \frac{\cancel{80}^{20}}{1} = \frac{20}{1} = 20
$$

Solving Math Word Problems

There are two steps to solving math word problems:

1. Translate the wording into a numeric equation
2. Solve the equation

Usually, once you get the math equation, you're fine. But getting to the equation can seem difficult. These strategies may help you translate, but practice will determine your success.

- **Read the problem entirely**
  Get a feel for the whole problem
- **List information and the variables you identify**
  Attach units of measure to the variables (gallons, miles, inches, etc.)
- **Define what answer you need as well as its units of measure**
- **Work in an organized manner**
  Working clearly will help you think clearly
  - Draw and label all graphs and pictures clearly
  - Note or explain each step of your process;
    this will help you track variables and remember their meanings
- **Look for "key" words**
  Certain words indicate certain mathematical operations:

Addition	Subtraction	Multiplication	Division	Equals
increased	decreased by	of	per	is, are
by	minus, less	times	a	was
more than	difference	multiplied by	out of	were,
combined	between/of	product of	ratio of	will
together	less than,	increased/decreased	quotient of	be
total of	fewer		percent (divide	gives
sum	than	by a factor of*	by 100)	yields
added to	by a factor of*			sold for
by a factor of*				

*This can be used for addition, subtraction, and multiplication

Vocabulary

"per" means "dividend by"
as in "I drove 90 miles on three gallons of gas, so I got 30 miles per gallon"
also 30 miles/gallon

"a" sometimes means "divided by"
as in "When I tanked up, I paid $3.90 for three gallons, so the gas was $1.30 a gallon, or $1.30/gallon

"less than"
If you need to translate "1.5 less than x", the temptation is to write "1.5 – x". **Don'**t! Put a "real world" situation in, and you'll see how this is wrong: "He makes $1.50 an hour less than me." You do NOT figure his wage by subtracting your wage from $1.50; instead, you subtract $1.50 from your wage.

"quotient/ratio of" constructions
If a problem says "the ratio of x and y", it means "**x divided by y**, or **x/y**, or **$x \div y$**.

"difference between/of" constructions
If the problem says "the difference of x and y", it means "**$x - y$**"

Examples:

<u>Wording</u>	<u>Math Expression</u>
What is the sum of 8 and y? ……………………………………………	$8 + y$
4 less than y ………………………………………………………….	$y - 4$
y multiplied by 13 ………………………………….……….…...	$13y$
the quotient of y and 3 ………………………………………….	$y/3$
the difference of 5 and y …………………………………………...	$5 - y$
the ratio of 9 more than y to y ………………………………….	$(y + 9)/y$
nine less than the total of a number (y) and two ……………………..	$(y + 2) - 9$ or $y - 7$
The length of a football field is 30 yards more than its width. Express the length of the field in terms of its width y ……………….	$y + 30$
Twenty gallons of crude oil were poured into two containers of different size. Express the amount of crude oil poured into the smaller container in terms of the amount y poured into the larger container. The expression they're looking for is found by this reasoning: There are twenty gallons total, and we've already poured y gallons of it. That means that there are x gallons left. ………………………………………………………	$20 - y$

$$1\tfrac{2}{3} = \tfrac{8}{12} \left.\right\} \begin{matrix}8\ \text{12ths}\\ \text{plus}\end{matrix}$$
$$7\tfrac{5}{6} = \tfrac{10}{12} \left.\right\} \begin{matrix}10\ \text{12ths}\\ \text{plus}\end{matrix}$$
$$+9\tfrac{3}{4} = \tfrac{9}{12} \left.\right\} \begin{matrix}9\ \text{12ths}\\ \text{equals}\end{matrix}$$
$$17\ \text{plus}\ \tfrac{27}{12} \quad 27\ \text{12ths} \quad 19\tfrac{1}{4}$$
$$12\overline{)27} = 2\tfrac{1}{4}$$
$$\tfrac{24}{3} \quad \tfrac{3}{12} = \tfrac{1}{4}$$

Math Review
(Questions 1 – 9 on first page)

Questions 1 – 2   *Write answers to nearest hundredth.*

1. $36,570 ÷ 52
   $703.27

2. $13,472 ÷ 13
   $1036.31

Questions 3 – 4 *Multiply*

3. $13 x 31
   $403

4. $314 x 5
   $1,570

Questions 5 – 6 *Find the given percent for each*

5. 20% of 45,123
   9024.6

6. 10% of $87,000
   $8,700

Student	A	B	C	D
Sarah	2	4	6	10
Jenny	6	12	3	1
Mark	5	13	9	2

A = 4 points,   B = 3 points,   C = 2 points, and D = 1 point

Questions 7 – 9 *Use the above chart to answer each question.*

7. How many total points did Mark earn?   **79**

8. How many points did Sarah earn from her A's and C's?   **20**

9. How many points did Jenny earn from her B's and D's?   **37**

Web Resources for Math Help

1.   WebMath.com
http://www.webmath.com/k8ipmult.html

2.   Wikipedia – The Free Encyclopedia
http://en.wikipedia.org/wiki/multiplcation_algorithm

3.   Math Forum: Ask Dr. Math
http://mathforum.org/library/drmath/sets/elem_large_numbers.html

4.   MathsisFun
http://www.mathisfun.com/long_division2.html

5.   Math World
http://mathworld.wolfram.com/longdivision.html

6.   Purplemath: Your Algebra Resource
http://www.purplemath.com/modules/percents.html

7.   Math Problems
www.studygs.net/mathproblems.html

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Grammar Rules and Some Exceptions
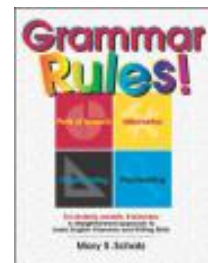
Plurals

Words ending in y preceded by a consonant are made plural by changing the y to i and adding es.
- Example: academy = academies

Words ending in y preceded by a vowel are made plural by adding s.
- Example: key = keys

Words ending in o preceded by a consonant are generally made plural by the addition of es.
- Example: tomato = tomatoes

Words ending in s, x, z, ch, or sh are made plural by adding es.
- Example: business - businesses

Words ending in fe are made plural by changing the f to v and adding s.
- Example: knife = knives

Spelling

I before E except after C
- Example: receive

Except when it sounds like an "a"
- Example: neighbor, weigh

Exceptions:
- seize, either, weird, height, foreign, leisure, conscience, counterfeit, forfeit, leisure, neither, science, species, sufficient

i before e: relief, believe, niece, chief, sieve, frieze, field, yield

e before i: receive, deceive, ceiling, conceit, vein, sleigh, freight, eight

Ceed/Cede Rule

Only three verbs that end in ceed:
- Succeed, proceed, exceed.

All other verbs end in cede:
- Example: secede, concede, precede

Ful Rule

At the end of a word that sounds like full, it is spelled with only one l.
- Example: careful, graceful

Contractions

Contractions are used to combine two words into one word by using an apostrophe.

Rule: The apostrophe always falls in the 2nd word and replaces one or more vowels or consonants
- Examples: They did = They'd
                I am = I'm
                Do not = Don't
                You are = You're

Who or Whom

If you can fill in the blank with I/he/she/they, who is correct.

If you can fill in the blank with me/him/her/their, whom is correct

  o   Example: Captain Jones is the captain whom Officer Smith will meet.

Step: mentally change the sentence to Officer Smith will meet him. Since you used him, the correct word is whom.

Who's or Whose

Who's is a contraction and stands for who is or who has.

  o   Example: Who's going to the academy?

Whose is a possessive pronoun.

  o   Example: Whose car is that?

There or Their

There indicates a place, there is possessive - belongs to them.

  o   Example: There were three dogs that had their own doghouses.

To, Too, Two

To indicates action (I.e. to do), too means also, and two = 2.

  o   Example: I have two cats. They like to ride in the car. My bird likes to ride in the car too.

Punctuation

. Period

A period is the most commonly used punctuation mark. Use it after a complete sentence, after a command, after most abbreviations (I.e. Dr. vs FBI), inside a quotation mark at the end of a sentence, after a roman numeral, letter and between decimals to separate dollars from cents.

, Comma

Use a comma after an introductory clause, to set off expressions, to set off words that directly address a person, after the greeting and closing of a letter, before a conjunction (and, but, for, or, nor, yet) provided the conjunction joins two clauses that otherwise could be two complete sentences, between addresses, numbers, month and day, and to prevent misreading:

  o   Example of misreading:

Without comma: To get through a tunnel must be dug.

With comma: To get through, a tunnel must be dug.

; Semicolon

Use a semicolon between closely related independent clauses, between main clauses when the coordinating conjunction has been left out, to join independent clauses when one or both clauses contain a comma, and between main clauses connected by adverbs such as however, nevertheless, moreover, for example, and consequently.

: Colon

Use a colon before a list, before a long quotation, before part of a sentence that explains what has just been stated, to distinguish hours from minutes, and titles from subtitles.

' Apostrophes

Apostrophes are used to show possession, plural forms and where a letter or number has been omitted.

Common Words in Law Enforcement

A
anonymous
appearance
/appears/appeared
arrest/arrests/arrested
arson/arsonist
article/articles
assault/assaults/assaulted

B
believe
burglar/burglars
burglarize/burglarizes/burglarized
burglary/burglaries

C
captain
cause/causes/caused
chief
citizen/citizens
civilian/civilians
coincidence/coincidental
conscious
consent
consider/considers/considered
contraband
convict/convicts/convicted
conviction
crime/crimes
criminal/criminals

D
describe/describes/described
description
department
degree/degrees
deputy   enforcement

E
economic/economical
elude/eludes/eluded
elusive
enforce/enforces/enforced

F
felony/felonies
forensics

G
gregarious
grievance
grieve/grieves/grieved

H
hallucinate
height

I
injure/injures/injured
injury/injuries
inmate

J
judge/judges/judged
judicial
judgment

K
knowledge
knowledgeable

L
laboratory/laboratories
larceny/larcenies
lieutenant

M
material
method/methodical
missing

N

O
offend/offends/offended
offense/offenses
offensive

P
particular
permission
possess/possesses/possessed
possession
prescription
procedure/procedures
pursuit

Q

R
radio
receipt
receive/receives/received
respond/responds/responded
response
rifle
robbery/robberies
rule/rules

S
safety
sergeant
suspect

T
technical
technique/techniques
technology
thief
thorough

U

V
value
victim/victims
victimize

W
weapon
weight
witness/witnesses/witnessed

XYZ