3rd Kyu

Section 1 : Calculation Test

数学検定

PROFICIENCY TEST
IN
PRACTICAL MATHEMATICS

Test Time : 50 minutes

Test Instructions

1. Make sure that you have the correct level (Kyu) test.
2. Do not open the booklet until you are told to do so.
3. Write your examinee number and name on this page.
4. Write your name, examinee number and other necessary information on the answer sheet.
5. Write only answers on the answer sheets provided.
6. If your answer contains a fraction, write the fraction in simplest form by reducing it to lowest terms.
7. If your answer contains a radical, write your answer in simplest radical form. For example, $\sqrt{12}$ must be expressed as $2\sqrt{3}$.
8. You may not use a calculator, ruler or compass.
9. Turn off your cell phone and do not use it during the test.
10. Ask an examination supervisor if your problem sheets have inconsistent page numbering or missing pages.
11. It is prohibited to disclose the problems to the general public, such as on the Internet, without permission.

Examinee Number	–	Name	

※Your personal information will be handled appropriately according to the "Handling of Personal Information" agreement that was approved at the time of registration.

公益財団法人
日本数学検定協会
The Mathematics Certification Institute of Japan

[3rd Kyu] Section 1: Calculation Test

1 Simplify.

(1) $9-(-5)+(-8)$

(2) $24-16\div(-4)$

(3) $2^3+(-3)^2$

(4) $\dfrac{35}{36}\div\left(-\dfrac{2}{9}\right)\times\dfrac{4}{7}$

(5) $\sqrt{125}-\sqrt{45}+\sqrt{20}$

(6) $(\sqrt{3}+4)^2-\dfrac{24}{\sqrt{3}}$

(7) $3(3x+5)+4(2x-7)$

(8) $0.5(6x-1)-0.8(3x-4)$

(9) $7(4x-5y)-2(9x+y)$

(10) $\dfrac{3x-6y}{8}-\dfrac{2x-7y}{12}$

(11) $-5x^2y\times9x^2y^2$

(12) $\dfrac{13}{5}x^3y^2\div\left(-\dfrac{4}{5}x^2y\right)\times\left(-\dfrac{2}{13}xy^2\right)$

2 Expand and simplify the following expressions.

(13) $(2x-1)(x+6)$

(14) $(x-3)^2-(x+4)(x-4)$

3 Factorize the following expressions.

(15) $x^2+3x-28$

(16) $ax^2+12ax+36a$

4 Solve the following equations.

(17) $6x+7=8x-5$

(18) $\frac{1}{2}x+1=\frac{1}{6}x-\frac{1}{3}$

(19) $x^2-32=0$

(20) $2x^2-7x+4=0$

5 Solve the following systems of equations.

(21) $\begin{cases} y=3x+14 \\ y=-2x-1 \end{cases}$

(22) $\begin{cases} 4x-3y=11 \\ -0.6x+y=2.2 \end{cases}$

6 Answer the following.

(23) y is inversely proportional to x and $y=-12$ when $x=-3$. Express y in terms of x.

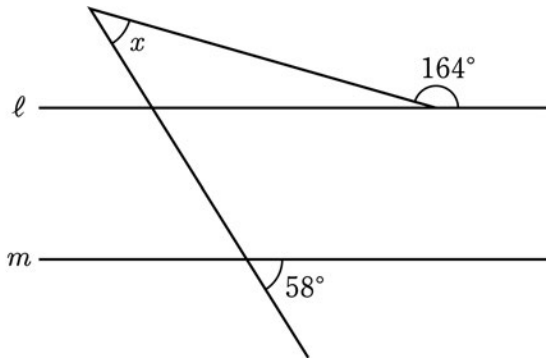
(24) Find the class width, in cm, of the frequency distribution table.

Students' height

Class Interval (cm)			Frequency
Greater than or equal to		less than	
155	-	160	5
160	-	165	7
165	-	170	11
170	-	175	9
175	-	180	3
Total			35

(25) Make b the subject of $a=\frac{1}{2}(b+c)$.

(26) In the figure, find $\angle x$ when $\ell \parallel m$.



(27) Find the measure of each interior angle of a regular nonagon. A nonagon is a 9-sided polygon.

(28) When three fair coins are tossed, find the probability that the three coins show tails.

(29) y is directly proportional to the square of x and $y = 18$ when $x = -6$. Find the value of y when $x = 8$.

(30) In the figure, three points A, B and C lie on the circumference of circle O. Find $\angle x$ when $\angle \mathrm{OCB} = 28°$.