

Grade 9 Academic Math Diagnostic Test
Question 1: NO CALCULATORS ALLOWED

Victim: Mr. Solutions

You will receive questions 2 to 10 once you hand in this sheet.

G = gain, L = loss
 > = greater than, < = less than

1. Evaluate each expression without using a calculator. You **do not** need to show your work. (15/15)

(a) $7(-3) = \underline{-21}$ ✓	(b) $7 + (-3) = \underline{4}$ ✓ 7-3 G > L	(c) $-7 + 3 = \underline{-4}$ ✓ L > G
(d) $-6 + 13 = \underline{7}$ ✓ G > L	(e) $-6 + (-13) = \underline{-19}$ ✓ -6-13 ← No gains, only losses	(f) $-6 - (-13) = \underline{7}$ ✓ -6+13
(g) $-4(-8) = \underline{32}$ ✓	(h) $-4 \cdot 8 = \underline{-32}$ ✓	(i) $-5(-4)(-3) = \underline{-60}$ ✓
(j) $-7 - 5 - 3 = \underline{-15}$ ✓	(k) $0 - 11 = \underline{-11}$ ✓	(l) $0(-11) = \underline{0}$ ✓
(m) $-11 \div 0 = \underline{\text{undefined}}$ ✓	(n) $(-7)^2 = \underline{49}$ ✓ (-7)(-7)	(o) $-7^2 = \underline{-49}$ ✓ -7(7)

Use this space for rough work

Nice job Mr. S!

Mr. Nolfi, Ms. Kugavaratharajah

Name: Mr. Solutions

Integers	Rational Numbers	Algebra	Measurement	Problem Solving
29/29	18/18	10/10	9/9	10/10

Part One – Integers

29/29

Total:

76
76

1. This question is given on a separate sheet. (15/15)

2. Evaluate each expression. You *must* show your work. (14/14)

(a) $-9 - 2(3 - 11)$

$$= -9 - 2(-8) \checkmark$$

$$= -9 - (-16) \checkmark$$

$$= -9 + 16$$

$$= 7 \checkmark$$

(b) $-8(3) - 2[-2 + 18 \div (-3)]^2$

$$= -24 - 2[-2 + (-6)]^2 \checkmark$$

$$= -24 - 2(-8)^2 \checkmark$$

$$= -24 - 2(64) \checkmark$$

$$= -24 - 128$$

$$= -152 \checkmark$$

(c) $-21 - 24 \div (-6) - 5(-6)$

$$= -21 - (-4) - (-30) \checkmark$$

$$= -21 + 4 + 30 \checkmark$$

$$= -17 + 30$$

$$= 13 \checkmark$$

(d) $\frac{-14 - (13 + 9) \div 11}{(7 - 9)(-3 - 1)}$

$$= \frac{-14 - 22 \div 11}{(-2)(-4)} \checkmark$$

$$= \frac{-14 - 2}{8} \checkmark$$

$$= \frac{-16}{8} \checkmark$$

$$= -2 \checkmark$$

Part Two – Rational Numbers

18/18

1. Evaluate each expression. You *must* show your work. (11/11)

(a) $\frac{-4}{5} + \left(\frac{-3}{5}\right)$

$$= \frac{-4}{5} - \frac{3}{5} \checkmark$$

$$= \frac{-7}{5} \checkmark$$

(b) $\frac{-4}{5} \left(\frac{-3}{5}\right)$

$$= \frac{12}{25} \checkmark$$

(c) $-\frac{11}{4} \left(\frac{-8}{33}\right)$

$$= \frac{88 \div 44}{132 \div 44} \checkmark$$

$$= \frac{2}{3} \checkmark$$

OR

$$= \frac{-11}{4} \left(\frac{-8}{33}\right) \checkmark$$

$$= \frac{2}{3} \checkmark$$

(d) $\frac{7}{15} \div \frac{14}{3}$

$$= \frac{7}{15} \times \frac{3}{14} \checkmark$$

$$= \frac{21 \div 21}{210 \div 21} \checkmark$$

$$= \frac{1}{10} \checkmark$$

(e) $\frac{1}{6} + \frac{3}{4}$

6 and 4
BOTH
divide
into 12

$$= \frac{2}{12} + \frac{9}{12} \checkmark$$

$$= \frac{11}{12} \checkmark$$

(f) $\frac{-3}{8} - \left(\frac{-1}{10}\right)$

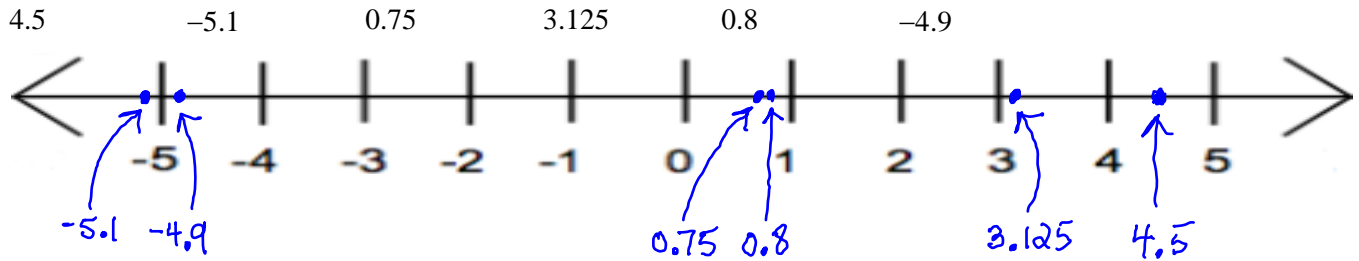
$$= \frac{-3 \times 5}{8 \times 5} + \frac{1 \times 4}{10 \times 4} \checkmark$$

$$= \frac{-15}{40} + \frac{4}{40} \checkmark$$

$$= \frac{-11}{40} \checkmark$$

2. This question deals with number sense. (7 /7)

(a) Place each of the given numbers on the number line. 3 marks



(b) Arrange the given numbers from **largest** to **smallest**. 4 marks

$\frac{1}{4}$ 0.31 0.1 -0.98 -1.08 -1.9 0.04 $\frac{1}{3}$
 $\frac{1}{3}$ 0.31 $\frac{1}{4}$ 0.1 0.04 -0.98 -1.08 -1.9

Part Three – Algebra 10 /10

Show all work for the questions in this section.

3. Substitute and evaluate. (4 /4)

$$\begin{aligned} & -8s^3 + 20 \quad (s = -4) \\ & = -8(-4)^3 + 20 \quad \checkmark \\ & = -8(-64) + 20 \quad \checkmark \\ & = 512 + 20 \quad \checkmark \\ & = 532 \quad \checkmark \end{aligned}$$

4. Solve the following equation. (2 /2)

$$\begin{aligned} & w + 7 = -51 \\ & \therefore w + 7 - 7 = -51 - 7 \quad \checkmark \\ & \therefore w = -58 \quad \checkmark \end{aligned}$$

5. Write an algebraic expression that means “the quotient of a number and 5.” (2 /2)

$$\frac{x}{5} \quad \checkmark \checkmark$$

6. Translate the algebraic expression $12 - x$ into words. (2 /2)

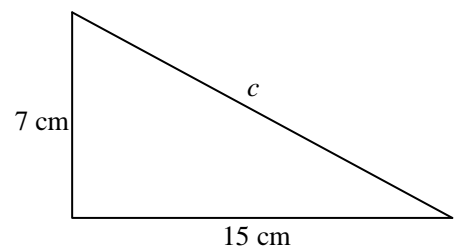
Twelve decreased by a number
 $\checkmark \checkmark$

Part Four – Measurement 9 /9

7. Determine the value of c that would make the given triangle a **right** triangle. (4 /4)

If this is a right triangle, then

$$\begin{aligned} & c^2 = 7^2 + 15^2 \quad \checkmark \\ & \therefore c^2 = 49 + 225 \quad \checkmark \\ & \therefore c^2 = 274 \quad \checkmark \\ & \therefore c = \sqrt{274} \quad \checkmark \\ & \therefore c \approx 16.6 \quad \checkmark \end{aligned}$$



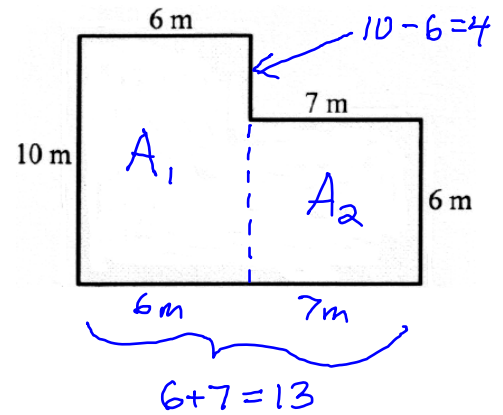
The hypotenuse must have a length of about 16.6 cm to make the given triangle a right triangle.

8. Calculate the **perimeter** and **area** of the given shape. (5 / 5)

$$P = 6 + 10 + 13 + 6 + 7 + 4 = 46 \text{ m}$$

$$A = A_1 + A_2 = 10(6) + 7(6) = 60 + 42 = 102 \text{ m}^2$$

The perimeter is 46 m and the area is 102 m².



Part Five – Problem Solving

10 / 10

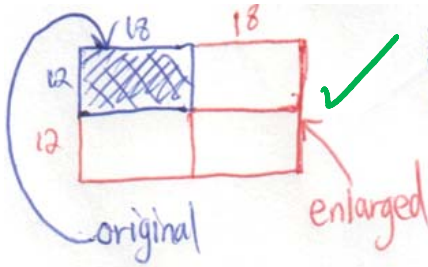
9. A picture that measures 12 cm by 18 cm is enlarged to four times its original area. What are the **new dimensions** of the picture? (4 / 4)

$$\text{Original area} = 12(18) = 216 \text{ cm}^2$$

$$\text{Area of enlarged picture} = 4(216) = 864 \text{ cm}^2$$



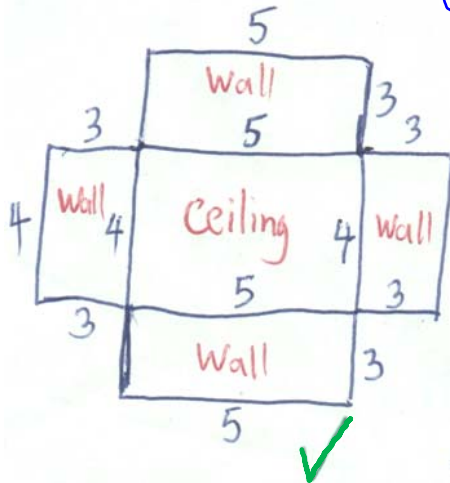
Opie from "Family Guy"



From this diagram we can see that the enlarged picture should have dimensions 24 cm x 36 cm.

Since $24(36) = 864$, the dimensions of the enlarged picture are 24 cm by 36 cm.

10. You need to paint the walls and the ceiling of a rectangular room whose dimensions are 5 m (length) by 4 m (width) by 3 m (height). The brand of paint to be used has a **coverage** of 8 m² (square metres) per litre. If each can contains 3.79 L of paint, how many cans would you need to buy to apply **one coat** of paint to the walls and ceiling? (/ 6)



① Total Area

$$\begin{aligned} &= \text{area of ceiling} + \text{area of walls} \\ &= 5(4) + 2(4)(3) + 2(5)(3) \\ &= 20 + 24 + 30 \\ &= 74 \text{ m}^2 \end{aligned}$$

$$\begin{aligned} \text{② Litres of paint for one coat} &= 74 \text{ m}^2 \div 8 \text{ m}^2/\text{L} \\ &= 9.25 \end{aligned}$$

③ # of cans

$$\begin{aligned} &= \frac{9.25 \text{ L}}{3.79 \text{ L/can}} \\ &\approx 2.4 \end{aligned}$$

One would need to buy 3 cans of paint.

Answer must be a whole # because one can only buy a whole # of cans!