

# MTH 05, Test 1, V. 2, 09/27/18 Luis Fernández

NAME: \_\_\_\_\_ SOLUTION \_\_\_\_\_

There are 20 questions. The 14 multiple choice are worth 5 points each; the 6 free response are worth 6 points each. For multiple-choice questions, circle your answer. For free-response questions, SHOW ALL WORK to receive full credit.

1. Add:  $\frac{7}{9} + \frac{5}{12} =$

(a)  $\frac{43}{36}$

(b)  $\frac{31}{12}$

(c)  $\frac{13}{3}$

(d)  $\frac{12}{21}$

**Solution:** LCD is 36.

$$\frac{7}{9} + \frac{5}{12} = \frac{28}{36} + \frac{15}{36} = \frac{43}{36}$$

2. Evaluate  $\frac{6 - 5xy}{2x + y}$  when  $x = 3$  and  $y = -4$ .

(a)  $-\frac{6}{5}$

(b) 30

(c) 33

(d) -33

**Solution:**

$$\frac{6 - 5 \cdot 3 \cdot (-4)}{2 \cdot 3 + (-4)} = \frac{6 - (-60)}{2}$$

$$= \frac{6 + 60}{2} = \frac{66}{2} = \boxed{33}$$

3. Solve:  $3(7x + 1) = 4(5x + 1) + 14$

(a)  $x = -13$

(b)  $x = \frac{9}{20}$

(c)  $x = \frac{21}{41}$

(d)  $x = 15$

**Solution:**

$$\begin{aligned} 3(7x + 1) &= 4(5x + 1) + 14 \\ \Rightarrow 21x + 3 &= 20x + 18 \\ \Rightarrow x + 3 &= 18 \\ \Rightarrow x &= \boxed{15} \end{aligned}$$

4. Find the value of:  $2(3^2 \cdot 5 - 4^2)$ .

(a) 122

(b) 58

(c) -35

(d) 28

**Solution:**

$$\begin{aligned} &2(3^2 \cdot 5 - 4^2) \\ &= 2 \cdot (9 \cdot 5 - 16) \\ &= 2 \cdot (45 - 16) \\ &= 2 \cdot (29) = \boxed{58} \end{aligned}$$

5. Evaluate:  $\left(-\frac{10}{9}\right)\left(-\frac{6}{25}\right)$

(a)  $-\frac{60}{131}$

(b)  $\frac{4}{15}$

(c)  $\frac{125}{18}$

(d)  $-\frac{4}{15}$

**Solution:**

$$\begin{aligned} &\left(-\frac{10}{9}\right)\left(-\frac{6}{25}\right) \\ &= \left(-\frac{2}{3}\right)\left(-\frac{2}{5}\right) = \boxed{\frac{4}{15}} \end{aligned}$$

6. Evaluate:  $-8^2 - \frac{3}{7} \cdot 14 =$

(a)  $-65$

(b)  $-70$

(c)  $58$

(d)  $70$

**Solution:**

$$\begin{aligned} -8^2 - \frac{3}{7} \cdot 14 &= -64 - \frac{3}{7} \cdot 14 \\ &= -64 - 6 \\ &= \boxed{-70} \end{aligned}$$

7. Solve the equation  $9x - 5 = 5x + 7$ .

(a)  $x = \frac{21}{2}$

(b)  $x = -5$

(c)  $x = 3$

(d)  $x = 4$

**Solution:**

$$\begin{aligned} 9x - 5 &= 5x + 7 \\ \Rightarrow 4x - 5 &= 7 \\ \Rightarrow 4x &= 12 \\ \Rightarrow x &= \frac{12}{4} = \boxed{3} \end{aligned}$$

8. Evaluate:  $-\frac{35}{6} \div \frac{14}{9}$

(a)  $-\frac{15}{4}$

(b)  $-\frac{13}{54}$

(c)  $-\frac{77}{18}$

(d)  $-\frac{245}{27}$

**Solution:**

$$\begin{aligned} -\frac{35}{6} \div \frac{14}{9} &= -\frac{35}{6} \cdot \frac{9}{14} \\ &= -\frac{5}{2} \cdot \frac{3}{2} \\ &= \boxed{-\frac{15}{4}} \end{aligned}$$

9. Write the following sentence in symbols:  
twice the sum of  $c$  and  $d$  is 5.

(a)  $2 + c + d = 5$

(b)  $2c + d = 5$

(c)  $2d + c = 5$

(d)  $2(c + d) = 5$

**Solution:**

The sum of  $c$  and  $d$ :  $(c + d)$ .  
Twice (= two times) the sum of  $c$  and  $d$ :  $2(c + d)$ . Therefore, the sentence can be written as  $2(c + d) = 5$

10. Solve  $\frac{x}{3} + 5 = 7$

(a)  $x = \frac{2}{3}$

(b)  $-4$

(c)  $x = 6$

(d) No solution

**Solution:**

$$\frac{x}{3} + 5 = 7$$

$$\Rightarrow \frac{x}{3} = 2$$

Times 3 both sides:

$$\Rightarrow x = 6$$

11. Solve:  $\frac{x - 4}{3} = \frac{4}{5}$

(a)  $x = -\frac{11}{4}$

(b)  $x = 4$

(c)  $x = \frac{32}{5}$

(d)  $x = \frac{16}{5}$

**Solution:** LCD is 15.

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

Common denominator:

$$\Rightarrow \frac{5(x - 4)}{15} = \frac{12}{15}$$

Remove denominators:

$$\Rightarrow 5(x - 4) = 12$$

$$\Rightarrow 5x - 20 = 12$$

$$\Rightarrow 5x = 32$$

$$\Rightarrow x = \frac{32}{5}$$

12. Evaluate  $g(2)$  for the function

$$g(x) = 3x^2 - 4x + 2$$

(a) 6

(b)  $-4$

(c) 30

(d) 2

**Solution:**

$$g(2) = 3 \cdot 2^2 - 4 \cdot 2 + 2$$

$$= 3 \cdot 2^2 - 4 \cdot 2 + 2$$

$$= 3 \cdot 4 - 4 \cdot 2 + 2$$

$$= 12 - 8 + 2$$

$$= 6$$

13. Evaluate exactly  $-b + \sqrt{b^2 - 4ac}$   
when  $a = 3$ ,  $b = 5$ ,  $c = (-2)$ .

(a)  $-4$

(b)  $-5 + \sqrt{30}$

(c)  $-2$

(d)  $2$

**Solution:**

$$\begin{aligned} & -5 + \sqrt{5^2 - 4 \cdot 3 \cdot (-2)} \\ &= -5 + \sqrt{25 - (-24)} \\ &= -5 + \sqrt{25 + 24} \\ &= -5 + \sqrt{49} \\ &= -5 + 7 = \boxed{2} \end{aligned}$$

14. Ten more than twice a number is 46.  
What is the number?

(a)  $18$

(b)  $29$

(c)  $34$

(d)  $5$

**Solution:**

Let us say that the number we want is called " $x$ ".

Then "twice the number" is  $2 \cdot x$ .

"Ten more than twice the number" is  $2 \cdot x + 10$ .

Thus, we get the equation:

$$2 \cdot x + 10 = 46$$

$$\Rightarrow 2 \cdot x = 36$$

$$\Rightarrow x = 18$$

Therefore the number is  $18$

Free response questions start here. SHOW ALL WORK!!!

15. Twice a number minus 7 is equal to the same number plus 3. What is the number?

**Solution:**

Suppose that the number is ' $x$ '. Then 'twice the number' is  $2x$ , and 'twice the number minus 7' is  $2x - 7$ .

On the other hand, 'the number plus 3' is  $x + 3$ .

Therefore, 'Twice a number minus 7 is equal to the same number plus 3' translates to  $2x - 7 = x + 3$ .

Solve the equation:  $2x - x = 3 + 7 \rightarrow x = 10$ .

Therefore,  $\boxed{\text{the number is } 10}$

16. Solve  $5(x + 2) = 2x - 7$

**Solution:**

$$\text{If } 5(x + 2) = 2x - 7$$

$$\Rightarrow 5x + 10 = 2x - 7$$

$$\Rightarrow 3x + 10 = -7$$

$$\Rightarrow 3x = -17$$

$$\Rightarrow x = -\frac{17}{3}$$

17. Evaluate:  $\frac{4}{5} - \frac{2}{7} \div \frac{5}{14} = \boxed{0}$

**Solution:**

$$\begin{aligned}\frac{4}{5} - \frac{2}{7} \div \frac{5}{14} &= \frac{4}{5} - \frac{2}{7} \cdot \frac{14}{5} \\ &= \frac{4}{5} - \frac{2}{1} \cdot \frac{2}{5} = \frac{4}{5} - \frac{4}{5} = \boxed{0}.\end{aligned}$$

18. Solve the equation:  $\frac{2x}{5} + \frac{7}{6} = \frac{x}{3} - 2$

**Solution:**

The LCD is 30. Write all fractions with denominator 30 (note  $2 = \frac{2}{1}$ ):

$$\begin{aligned}\frac{2x}{5} + \frac{7}{6} &= \frac{x}{3} - \frac{2}{1} \\ \Rightarrow \frac{12x}{30} + \frac{35}{30} &= \frac{10x}{30} - \frac{60}{30}\end{aligned}$$

Remove denominators:

$$\Rightarrow 12x + 35 = 10x - 60$$

Subtract 10x and 35 from both sides:

$$\Rightarrow 2x = -95$$

$$\Rightarrow x = \boxed{-\frac{95}{2}}$$

19. Solve  $-5x + 1 = 17 - x$

**Solution:**

If  $-5x + 1 = 17 - x$ ,

adding  $x$  to both sides we get

$$-4x + 1 = 17.$$

Subtract 1 from both sides to get,

$$-4x = 16,$$

and divide both sides by  $(-4)$  to get

$$\boxed{x = -4}$$

20. Evaluate:  $\sqrt{36} + (-4)^2 = \boxed{22}$

**Solution:**

$$\sqrt{36} = 6 \text{ (because } 6^2 = 36\text{)}.$$

$$(-4)^2 = (-4) \cdot (-4) = 16.$$

$$\sqrt{36} + (-4)^2 = 6 + 16 = \boxed{22}$$