MTH 05, Test 1, V. 3, 09/15/17 Prof. Luis Fernández

NAME: SOLUTION

There are twenty-two questions, each worth 5 points. For multiple-choice questions, circle your answer. For free-response questions, SHOW ALL WORK to receive full credit.

1. Evaluate $\dfrac{10-2xy}{x+y}$ when $x=8$ and $y=-5$.

(a) 30

(b) $-\dfrac{70}{3}$

(c) $\dfrac{90}{13}$

(d) $-\dfrac{70}{13}$

Solution:

$$\frac{10-2\cdot 8\cdot(-5)}{8+(-5)}=\frac{10-(-80)}{3}$$

$$=\frac{10+80}{3}=\frac{90}{3}=\boxed{30}$$

2. Evaluate $-2x^2+3x-2$ when $x=3$.

(a) 43

(b) -29

(c) 25

(d) -11

Solution:

$-2\cdot 3^2+3\cdot 3-2=-2\cdot 9+$
$9-2=-18+9-2=\boxed{-11}$

3. Evaluate: $|5-2\cdot 4|$

(a) -3

(b) 12

(c) -12

(d) 3

Solution:

$(12y+8)-(-3y^2+7y)=$
$12y+8+3y^2-7y=$
$\boxed{3y^2+5y+8}$

4. Compute: $-6^2-\dfrac{3}{5}\cdot 15=$

(a) 27

(b) -27

(c) -45

(d) 45

Solution:

$$-36-\frac{3}{5}\cdot\frac{15}{1}=-36-9=\boxed{-45}$$

5. Add: $\frac{7}{12} + \frac{3}{8} =$

(a) $\frac{1}{2}$

(b) $\frac{5}{6}$

(c) $\frac{23}{24}$

(d) $\frac{5}{12}$

Solution: LCD is 24.

$$\frac{7}{12} + \frac{3}{8} = \frac{14}{24} + \frac{9}{24} = \boxed{\frac{23}{24}}$$

6. Solve the equation $3(7 - n) = 5n - 11$.

(a) $n = -5$

(b) $n = -4$

(c) $n = 16$

(d) $n = 4$

Solution:

$$\begin{aligned} 21 - 3n &= 5n - 11 \\ -8n &= -32 \\ n &= \frac{-32}{-8} = \boxed{4} \end{aligned}$$

7. Evaluate $8 - 5(3 - 1)$

(a) -8

(b) 6

(c) 10

(d) -2

Solution:

$8 - 5(2) = 8 - 10 = \boxed{(-2)}$

8. Evaluate: $-\frac{14}{15} \div \frac{21}{25}$

(a) $-\frac{63}{70}$

(b) $\frac{7}{75}$

(c) $-\frac{10}{9}$

(d) $-\frac{98}{125}$

Solution:

$$-\frac{14}{15} \div \frac{21}{25} = -\frac{14}{15} \cdot \frac{25}{21}$$

$$= -\frac{2}{3} \cdot \frac{5}{3} = \boxed{-\frac{10}{9}}$$

9. Solve: $\dfrac{x-2}{3} = \dfrac{3}{4}$

(a) $x = 3$

(b) $x = \dfrac{11}{4}$

(c) $x = \dfrac{16}{3}$

(d) $x = \dfrac{17}{4}$

Solution: LCD is 12.

$$\frac{12}{1} \cdot \frac{x-2}{3} = \frac{12}{1} \cdot \frac{3}{4}$$

$$4(x-2) = 9$$

$$4x - 8 = 9$$

$$4x = 17 \quad \boxed{x = \frac{17}{4}}$$

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

(a) $\dfrac{15}{4}$

(b) $\dfrac{18}{125}$

(c) $-\dfrac{131}{60}$

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

Solution:

$$\left(-\frac{9}{10}\right)\left(-\frac{25}{6}\right)$$

$$= \left(-\frac{3}{2}\right)\left(-\frac{5}{2}\right) = \boxed{\frac{15}{4}}$$

11. Solve $3x = 2x - 18$

(a) $-\dfrac{18}{5}$

(b) -18

(c) 18

(d) no solution

Solution:

$3x - 2x = -18$

$x = \boxed{-18}$

12. Evaluate exactly $-b + \sqrt{b^2 - 4ac}$ when $a = 2$, $b = 7$, $c = 3$.

(a) $2 + \sqrt{45}$

(b) 2

(c) 12

(d) -2

Solution:

$$-7 + \sqrt{7^2 - 4 \cdot 2 \cdot 3}$$

$$= -7 + \sqrt{49 - 24}$$

$$= -7 + \sqrt{25} = -7 + 5 = \boxed{-2}$$

13. Solve $-9x + 2 = 38 - 3x$

Solution:
If $-9x + 2 = 38 - 3x$,
then $-9x + 3x = 38 - 2$,
and then $-6x = 36$,
which gives $x = \dfrac{36}{-6}$,
and therefore $\boxed{x = -6}$

14. Solve the equation: $5x-2(x+1) = 4+2(x-3)$

Solution:
Expand: $5x - 2x - 2 = 4 + 2x - 6$.
Combine like terms: $3x - 2 = -2 + 2x$.
Subtract $2x$ from both sides: $x - 2 = -2$.
Add 2 to both sides: $x = 0$.
Therefore the solution is $\boxed{x = 0}$.

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

Solution:

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

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

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

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

16. Solve $x + 2(3x - 1) = -5(x - 2) + 12$

Solution:
If $x + 2(3x - 1) = -5(x - 2) + 12$,
then $x + 6x - 2 = -5x + 10 + 12$,
and then $7x - 2 = -5x + 22$,
which implies $7x + 5x = 22 + 2$,
and then $12x = 24$,

and therefore $x = \frac{24}{12}$,

which gives $\boxed{x = 2}$.

17. Solve $7(x - 4) = 5x + 9$

Solution:
If $7(x - 4) = 5x + 9$,
then $7x - 28 = 5x + 9$,
which implies $7x - 5x = 9 + 28$,
and then $2x = 37$
which gives $\boxed{x = \frac{37}{2}}$

18. Solve: $\frac{3x}{4} = \frac{15}{8}$

(a) $x = \frac{5}{2}$

(b) $x = \frac{9}{8}$

(c) $x = -\frac{7}{2}$

(d) $x = \frac{4}{3}$

Solution:

$\frac{8}{1} \cdot \frac{3x}{4} = \frac{8}{1} \cdot \frac{15}{8} \rightarrow 6x = 15$

$\rightarrow x = \frac{15}{6} \rightarrow \boxed{x = \frac{5}{2}}$

19. If $g = 3x^2 - 4x + 2$,
find the value of g when $x = 3$.

(a) -17

(b) 0

(c) 17

(d) 37

20. If $y = 2x^2 + x + 5$,
find y when $x = -2$.

(a) -5

(b) -1

(c) 11

(d) 5

21. Solve the equation: $\dfrac{2(x-3)}{5} + \dfrac{7}{6} = \dfrac{2x}{3} - 2$

Solution:
LCD is 30. Multiply all by 30.

$$\begin{aligned}
\frac{2(x-3)}{5} + \frac{7}{6} &= \frac{2x}{3} - 2 \\
\frac{30}{1} \cdot \frac{2(x-3)}{5} + \frac{30}{1} \cdot \frac{7}{6} &= \frac{30}{1} \cdot \frac{2x}{3} - 30 \cdot 2 \\
12(x-3) + 35 &= 20x - 60 \\
12x - 36 + 35 &= 20x - 60 \\
12x - 1 &= 20x - 60 \\
-8x &= -59 \\
x &= \frac{-59}{-8} = \boxed{\frac{59}{8}}
\end{aligned}$$

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

Solution:

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