

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

- (a) 30
- (b) $-\frac{70}{13}$
- (c) $-\frac{70}{3}$
- (d) $\frac{90}{13}$

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) -11
- (c) -29
- (d) 25

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) 3
- (c) 12
- (d) -12

Solution:

$$(12y + 8) - (-3y^2 + 7y) =$$

$$12y + 8 + 3y^2 - 7y =$$

$$\boxed{3y^2 + 5y + 8}$$

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

- (a) 27
- (b) 45
- (c) -27
- (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) $\frac{5}{12}$

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

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

Solution: LCD is 24.

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

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

(a) $n = -5$

(b) $n = 4$

(c) $n = -4$

(d) $n = 16$

Solution:

$$21 - 3n = 5n - 11$$

$$-8n = -32$$

$$n = \frac{-32}{-8} = 4$$

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

(a) -8

(b) -2

(c) 6

(d) 10

Solution:

$$8 - 5(2) = 8 - 10 = (-2)$$

8. Solve: $\frac{x - 2}{3} = \frac{3}{4}$

(a) $x = 3$

(b) $x = \frac{17}{4}$

(c) $x = \frac{11}{4}$

(d) $x = \frac{16}{3}$

Solution: LCD is 12.

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

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

$$4x - 8 = 9$$

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

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

- (a) $\frac{15}{4}$
- (b) $-\frac{15}{4}$
- (c) $\frac{18}{125}$
- (d) $-\frac{131}{60}$

Solution:

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

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

- (a) $-\frac{18}{5}$
- (b) no solution
- (c) -18
- (d) 18

Solution:

$$\begin{aligned} 3x - 2x &= -18 \\ x &= \boxed{-18} \end{aligned}$$

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

- (a) $-\frac{63}{70}$
- (b) $-\frac{98}{125}$
- (c) $\frac{7}{75}$
- (d) $-\frac{10}{9}$

Solution:

$$\begin{aligned} -\frac{14}{15} \div \frac{21}{25} &= -\frac{14}{15} \cdot \frac{25}{21} \\ &= -\frac{2}{3} \cdot \frac{5}{3} = \boxed{-\frac{10}{9}} \end{aligned}$$

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

- (a) $2 + \sqrt{45}$
- (b) -2
- (c) 2
- (d) 12

Solution:

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

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

(a) -5

(b) 5

(c) -1

(d) 11

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

(a) -17

(b) 37

(c) 0

(d) 17

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

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

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

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

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

Solution:

$$\frac{8}{1} \cdot \frac{3x}{4} = \frac{8}{1} \cdot \frac{15}{8} \rightarrow 6x = 15$$
$$\rightarrow x = \frac{15}{6} \rightarrow x = \frac{5}{2}$$

16. 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 $x = \frac{37}{2}$

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

Solution:

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

18. 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 $x = 2$.

19. 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 $x = 0$.

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

Solution:

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

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

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

Solution:

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

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

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