

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

- (a) 45
- (b) -45
- (c) -27
- (d) 27

Solution:

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

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

- (a) $\frac{5}{12}$
- (b) $\frac{23}{24}$
- (c) $\frac{5}{6}$
- (d) $\frac{1}{2}$

Solution: LCD is 24.

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

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

- (a) $n = 4$
- (b) $n = 16$
- (c) $n = -4$
- (d) $n = -5$

Solution:

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

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

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

Solution:

$$\begin{aligned} \frac{10 - 2 \cdot 8 \cdot (-5)}{8 + (-5)} &= \frac{10 - (-80)}{3} \\ &= \frac{10 + 80}{3} = \frac{90}{3} = \boxed{30} \end{aligned}$$

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

(a) -11

(b) 25

(c) -29

(d) 43

Solution:
 $-2 \cdot 3^2 + 3 \cdot 3 - 2 = -2 \cdot 9 + 9 - 2 = -18 + 9 - 2 = -11$

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

(a) 3

(b) -12

(c) 12

(d) -3

Solution:
 $(12y + 8) - (-3y^2 + 7y) = 12y + 8 + 3y^2 - 7y = 3y^2 + 5y + 8$

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

(a) -2

(b) 10

(c) 6

(d) -8

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

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

(a) no solution

(b) 18

(c) -18

(d) $-\frac{18}{5}$

Solution:
 $3x - 2x = -18$
 $x = -18$

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

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

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

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

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

Solution:

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

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

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

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

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

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

(d) $x = 3$

Solution: LCD is 12.

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

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

$$4x - 8 = 9$$

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

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

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

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

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

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

Solution:

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

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

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

(a) -2

(b) 12

(c) 2

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

Solution:

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

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

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

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

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

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

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

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

Solution:

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

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

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

(a) 37

(b) 17

(c) 0

(d) -17

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

(a) 5

(b) 11

(c) -1

(d) -5

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 $x = 2$.

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

18. 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 $x = -6$.

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

Solution:

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

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

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

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

Solution:

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