

MTH 06, Test 1, V. 1, 03/01/22

Prof. Luis Fernández

NAME: _____ SOLUTION _____

There are 30 questions. Some are multiple choice and some are free response.
 Each question is worth 4 points, totalling 120 points.
 Any points over 100 and up to 110 will count as extra credit.
 For multiple-choice questions, just circle your answer.
 For free-response questions, SHOW ALL WORK to receive credit.

1. Evaluate the expression:

$$9 + 3 \cdot 7 - (8 + 3 \cdot 6) =$$

Solution:

$$9 + 3 \cdot 7 - (8 + 3 \cdot 6) = 9 + 21 - (8 + 18) = 30 - 26 = \boxed{4}$$

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

Circle the answer.

(a) -13

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

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

(d) 15

Solution:

$$\begin{aligned} 3(7x + 1) &= 4(5x + 1) + 14 \\ 21x + 3 &= 20x + 4 + 14 \quad (\text{distribute}) \\ 21x + 3 &= 20x + 18 \quad (\text{combine like terms}) \\ 21x &= 20x + 15 \quad (-3 \text{ from both sides}) \\ x &= \boxed{15} \quad (-20x \text{ from both sides}) \end{aligned}$$

3. Simplify: $\frac{4}{5} \cdot \frac{7}{16} =$

Solution: $\frac{4}{5} \cdot \frac{7}{16} = \frac{1}{5} \cdot \frac{7}{4} = \boxed{\frac{7}{20}}$

4. Simplify: $\frac{1}{8} + \frac{1}{12} - \frac{1}{16} =$

Solution: The common denominator is 48:

$$\frac{1}{8} + \frac{1}{12} - \frac{1}{16} = \frac{6}{48} + \frac{4}{48} - \frac{3}{48} = \boxed{\frac{7}{48}}$$

5. Use the formula $F = \frac{9}{5}C + 32$ for converting degrees Celsius into degrees Fahrenheit to find the Fahrenheit measure of the Celsius temperature $C = 25$. **Circle the answer.**

- (a) 37
 (b) 77
 (c) 257
 (d) 51.4

Solution: When $C = 25$,

$$F = \frac{9}{5} \cdot 25 + 32 = 9 \cdot 5 + 32 = 45 + 32 = \boxed{77}$$

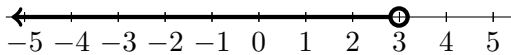
7. Solve the inequality and express the answer on the number line provided

$$6x - 14 + 2(x - 5) < 0.$$

Solution:

$$\begin{aligned} 6x - 14 + 2(x - 5) &< 0 \\ 6x - 14 + 2x - 10 &< 0 \quad (\text{distribute}) \\ 8x - 24 &< 0 \quad (\text{combine like terms}) \\ 8x &< 24 \quad (+24 \text{ to both sides}) \\ x &< 3 \quad (\div 8 \text{ on both sides}) \end{aligned}$$

The solution is therefore



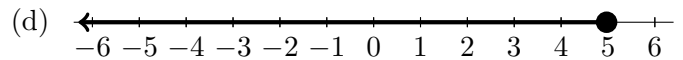
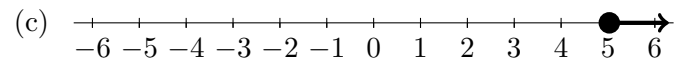
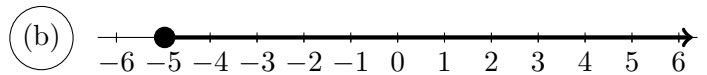
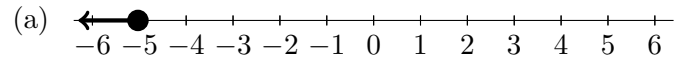
6. Solve the equation $8x - 7 = 2x - 3$.

Solution:

$$\begin{aligned} 8x - 7 &= 2x - 3 \\ 8x - 7 &= 2x - 3 \quad (+7 \text{ to both sides}) \\ 6x &= 4 \quad (-2x \text{ from both sides}) \\ x &= \frac{4}{6} \quad (\div 6 \text{ on both sides}) \\ x &= \boxed{\frac{2}{3}} \quad (\text{Simplify.}) \end{aligned}$$

8. **Circle** the graph of the solution to the inequality:

$$-1 - (-2 + x) \leq 3x + 21$$



Solution:

$$\begin{aligned} -1 - (-2 + x) &\leq 3x + 21 \\ -1 + 2 - x &\leq 3x + 21 \quad (\text{distribute}) \\ 1 - x &\leq 3x + 21 \quad (\text{combine like terms}) \\ -x &\leq 3x + 20 \quad (-1 \text{ from both sides}) \\ -4x &\leq 20 \quad (-3x \text{ from both sides}) \\ x &\geq -5 \quad (\div (-4) \text{ and swap inequality}) \end{aligned}$$

9. Solve for x .

$$\frac{10}{3}x + \frac{1}{6} = \frac{7}{3}x + \frac{37}{6}$$

Solution:

$$\begin{aligned}\frac{10}{3}x + \frac{1}{6} &= \frac{7}{3}x + \frac{37}{6} \\ \frac{20}{6}x + \frac{1}{6} &= \frac{14}{6}x + \frac{37}{6} \quad (\text{common denominator}) \\ 20x + 1 &= 14x + 37 \quad (\text{remove denominators}) \\ 20x &= 14x + 36 \quad (-1 \text{ both sides}) \\ 6x &= 36 \quad (-14x \text{ both sides}) \\ x &= 6 \quad (\div 6x \text{ both sides})\end{aligned}$$

Solution: $x = 6$

10. Solve for y and circle the answer:

$$z = 4x + 9y.$$

(a) $y = \frac{z + 4x}{9}$

(b) $y = \frac{z}{9} - 4x$

(c) $y = 9(z - 4x)$

(d) $y = \frac{z - 4x}{9}$

Solution:

$$\begin{aligned}z &= 4x + 9y \\ z - 4x &= 9y \quad (-4x \text{ both sides}) \\ \frac{z - 4x}{9} &= y \quad (\div 9 \text{ both sides})\end{aligned}$$

11. Find

$$38 - (-30) + (-15) - 63.$$

Solution:

$$\begin{aligned}38 - (-30) + (-15) - 63 \\ &= 38 + 30 + (-15) - 63 \\ &= 68 + (-15) - 63 \\ &= 53 - 63 \\ &= -10.\end{aligned}$$

12. Divide or state that the division is undefined:
(Note: Your answer must be a fraction.)

$$-\frac{3}{2} \div \left(-\frac{9}{4}\right) = \frac{2}{3}$$

$$15 \div \left(-\frac{3}{2}\right) = -10$$

Solution:

(a) $-\frac{3}{2} \div \left(-\frac{9}{4}\right) = \frac{3}{2} \cdot \frac{4}{9} = \frac{2}{3}$

(b) $15 \div \left(-\frac{3}{2}\right) = -15 \cdot \frac{2}{3} = -10$

13. Find the x and y intercepts of the graph of the equation $y = x + 6$.

Solution:

The x intercept is: $\boxed{-6}$

The y intercept is: $\boxed{6}$

14. Given the function $f(x) = 3x^2 + 5x - 2$, calculate the following values:

Solution:

• $f(0) = \boxed{-2}$

• $f(2) = \boxed{20}$

• $f(-2) = \boxed{0}$

• $f(x + 1) = \boxed{3(x + 1)^2 + 5(x + 1) - 2}$

• $f(-x) = \boxed{3x^2 - 5x - 2}$

15. Subtract: $(6x^2 + 4x - 4) - (-7x^2 - 4x - 5)$

Solution: $\boxed{13x^2 + 8x + 1}$.

16. Add: $(7x^3 - 4x^2 + 4x - 2) + (5x^3 - 7x^2 + x - 6)$

Solution: $\boxed{12x^3 - 11x^2 + 5x - 8}$

17. For the polynomial $x^2 + x^5 - 3x - 5$,
a) Determine the coefficient and the degree of each term.

Solution:

Term	Coefficient	Degree
x^2	1	2
x^5	1	5
$-3x$	-3	1
-5	-5	0

b)

The degree of the polynomial is $\boxed{5}$,

The leading term is $\boxed{x^5}$,

The leading coefficient is $\boxed{1}$.

19. Simplify the expression $\left(\frac{10x^4y^3}{5x^6y^{-3}}\right)^4$

Solution:

$$\boxed{16x^{-8}y^{24}} \quad \text{or} \quad \boxed{\frac{16y^{24}}{x^8}}$$

18. Simplify the numerical expression

$$\left(\frac{10}{11}\right)^0.$$

Solution: $\boxed{1}$.

20. Simplify the expression $(3x^6y^3)(7x^{15}y^{11})$

Solution:

$$\boxed{21x^{21}y^{14}}$$

21. Simplify the expression $\frac{30x^{14}y^{17}z^{17}}{6x^9y^{12}z^{14}}$

Solution:

$$\boxed{5x^5y^5z^3}$$

22. Write in decimal notation

Solution:

$$5.4 \times 10^{-4} = \boxed{0.00054}$$

23. Write in scientific notation:

$$63400000$$

Solution:

$$\boxed{6.34 \times 10^7}$$

24. Write in scientific notation.

$$0.0039$$

Solution:

$$\boxed{3.9 \times 10^{-3}}$$

25. Multiply: $(6x - 6)(x^2 + 2x + 3)$

Circle the answer

Solution:

(a) $6x^3 + 18x^2 + 18x - 18$

(b) $6x^3 + 6x^2 + 6x - 18$

(c) $6x^3 + 6x^2 + 18x - 18$

(d) $6x^3 + 18x^2 + 6x - 18$

26. Square the binomial: $(x - 5)^2$.

Solution: $x^2 - 10x + 25$.

27. Multiply the polynomials: $(x - 1)(x + 3)$

Solution: $x^2 + 2x - 3$

28. Divide and write in scientific notation:

$$\frac{1.2 \times 10^3}{4.8 \times 10^7}$$

Circle the answer

Solution:

(a) 0.25×10^{-4}

(b) 2.5×10^{-5}

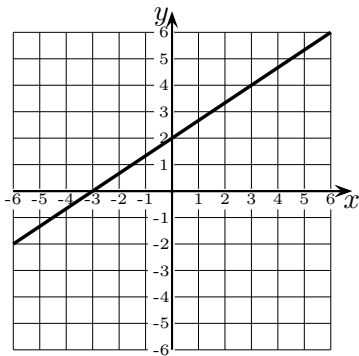
(c) 4×10^{-5}

(d) 4×10^{10}

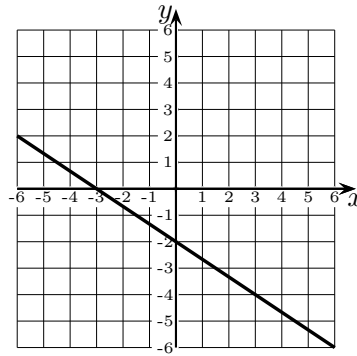
29. Which of the following is the graph of the equation $2x - 3y = -6$? (Circle the answer).

Solution:

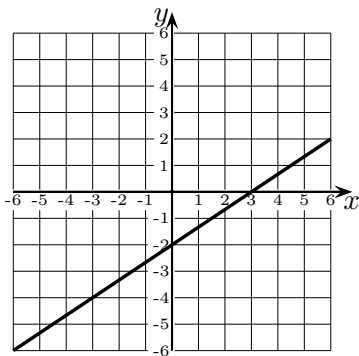
(a)



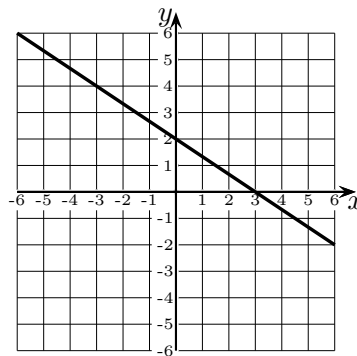
(c)



(b)



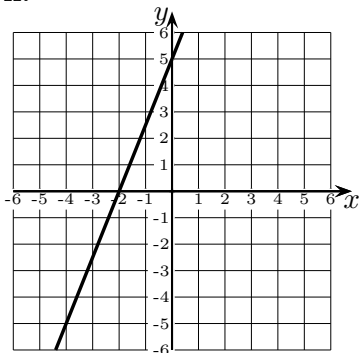
(d)



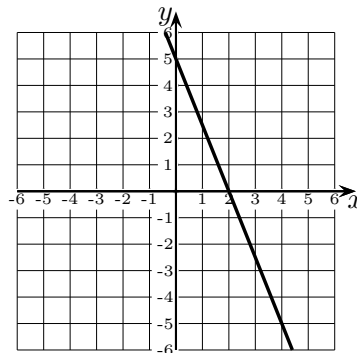
30. Which of the following is the graph of the equation $10x - 4y = 20$? (Circle the answer).

Solution:

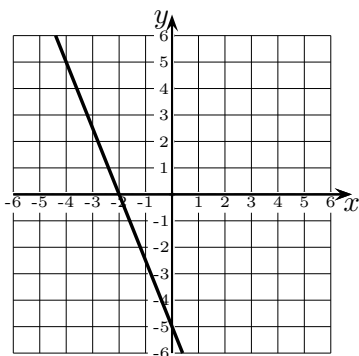
(a)



(c)



(b)



(d)

