

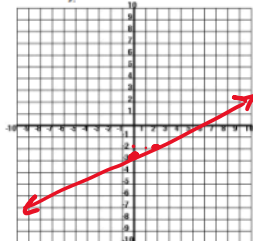
Semester 1 Final Review 2022

Wednesday, November 2, 2022 8:30 AM

Math 90 Semester 1 Final Review

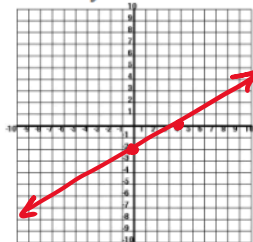
1. Graph. Label two points (as ordered pairs) on the graphs

a. $y = \frac{1}{2}x - 3$

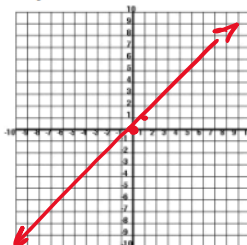


$2x = 8$
 $x = 4$
 $-4y = 8$
 $y = -2$

d. $2x - 4y = 8$

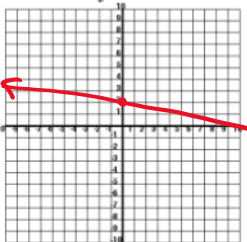


b. $y = x + 0$

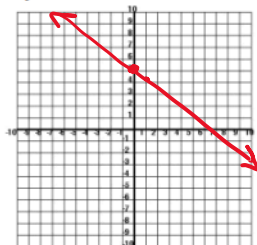


$-x = -12$
 $x = 12$
 $6y = 12$
 $y = 2$

e. $-x + 6y = -12$

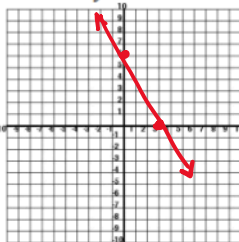


c. $y = -x + 5$



$5x = 15$
 $x = 3$
 $3y = 15$
 $y = 5$

f. $5x + 3y = 15$



$-\frac{1}{1}$

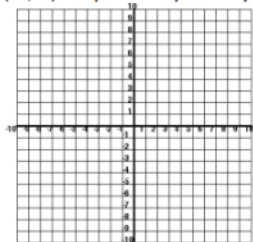
$y = mx + b$

$Ax + By = C$

$x\text{-int} : (x, 0)$

$y\text{-int} : (0, y)$

2. Is the line containing the points (4, 2) and (-6, 3) parallel to the line that contains the points (1, 1) and (-9, 2)? Explain why or why not.



$m = \frac{y_2 - y_1}{x_2 - x_1}$

$\frac{3 - 2}{-6 - 4} = -\frac{1}{10}$

$\frac{2 - 1}{-9 - 1} = -\frac{1}{10}$

Same slope = Parallel

3. Find the slope and y-intercept of each equation.

a. $y = 3x + 5$

$m = 3$
 $y\text{-int} : (0, 5)$

b. $2x + y = 8$

$y = -2x + 8$
 $m = -2$
 $y\text{-int} : (0, 8)$

c. $y = -5 - \frac{1}{2}x$

$y = -\frac{1}{2}x - 5$
 $m = -\frac{1}{2}$
 $y\text{-int} : (0, -5)$

4. Find the equation of a line that has a slope of $\frac{1}{4}$ and y-intercept (0, -6)

$y + 6 = \frac{1}{4}(x - 0)$

$y + 6 = \frac{1}{4}x - 0$

$y = \frac{1}{4}x - 6$

5. Find the equation of the line that passes through the point (2, 1) that has slope of -8.

$y - 1 = -8(x - 2)$

$y - 1 = -8x + 16$

$y = -8x + 17$

$y = mx + b$

$y - y_1 = m(x - x_1)$

$y = mx + b$

6. Write the equation for the line containing the point (1, 5) that has slope of 3.

$y - 5 = 3(x - 1)$

$y - 5 = 3x - 3$

$y = 3x + 2$

7. Write the equation for the line containing the point (12, 2) that has slope of $\frac{1}{2}$

$y - 2 = \frac{1}{2}(x - 12)$

$y - 2 = \frac{1}{2}x - 6$

$y = \frac{1}{2}x - 4$

8. What are the x- and y-intercepts: $3x + 4y = 24$

$3x = 24$ (8, 0)

$4y = 24$ (0, 6)

8. What are the x- and y-intercepts: $3x + 4y = 24$

$$3x = 24 \quad (8, 0)$$

$$4y = 24 \quad (0, 6)$$

$$y = \frac{1}{2}x - 4$$

9. Is $(-5, -1)$ a solution of the system?

No

$$\begin{cases} x + 5y = -11 \\ 2x + 5y = -12 \end{cases}$$

$$\begin{aligned} -x - 5y &= 11 \\ 2x + 5y &= -12 \\ \hline x &= -1 \end{aligned} \quad (-1,)$$

Solve. Use any method you prefer

$$\begin{cases} y = 4x - 13 \\ y = -x - 3 \end{cases}$$

$$\begin{aligned} 4x - 13 &= -x - 3 \\ 5x &= 10 \\ x &= 2 \end{aligned} \quad (2, -5)$$

$$\begin{cases} 2x - 3y = 23 \\ x = 4 - y \end{cases}$$

$$\begin{aligned} 2(4 - y) - 3y &= 23 \\ 8 - 2y - 3y &= 23 \\ -5y &= 15 \\ y &= -3 \end{aligned} \quad (7, -3)$$

$$\begin{cases} 10x + y = 1 \\ y = 2x - 5 \end{cases}$$

$$\begin{aligned} 10x + 2x - 5 &= 1 \\ 12x &= 6 \\ x &= \frac{1}{2} \end{aligned} \quad (\frac{1}{2}, -4)$$

$$\begin{cases} x + y = 15 \\ x - y = -1 \end{cases}$$

$$\begin{aligned} 2x &= 14 \\ x &= 7 \end{aligned} \quad (7, 8)$$

$$\begin{cases} 2x + 4y = -14 \\ 3x - 4y = 9 \end{cases}$$

$$\begin{aligned} 5x &= -5 \\ x &= -1 \end{aligned} \quad (-1, -3)$$

$$\begin{cases} 3x - 2y = 6 \\ 6x + 5y = 12 \end{cases}$$

$$\begin{aligned} 3x - 2y &= 6 \\ 3x + 5y &= 12 \\ \hline -7y &= -6 \\ y &= \frac{6}{7} \end{aligned} \quad (2, 0)$$

$$\begin{cases} 4x + 5y = -11 \\ 6x - 10y = 36 \end{cases}$$

$$\begin{aligned} 8x + 10y &= -22 \\ 6x - 10y &= 36 \\ \hline 14x &= 14 \\ x &= 1 \end{aligned} \quad (1, 3)$$

$$\begin{cases} 4x + 3y = 23 \\ 7x - 2y = 4 \end{cases}$$

$$\begin{aligned} 8x + 6y &= 46 \\ 21x - 6y &= 12 \\ \hline 29x &= 58 \\ x &= 2 \end{aligned} \quad (2, 5)$$

$$\begin{cases} 8x + 2y = 12 \\ 3x + 3y = 21 \end{cases}$$

$$\begin{aligned} -24x - 6y &= -36 \\ 6x + 9y &= 42 \\ \hline -18x &= 6 \\ x &= -\frac{1}{3} \end{aligned} \quad (-\frac{1}{3}, \frac{20}{3})$$

19. Find the equation of a line that passes through the points whose coordinates are $(-1, 1)$ and $(2, 7)$.

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

$$y = mx + b$$

$$y - y_1 = m(x - x_1)$$

$$m = \frac{7 - 1}{2 - (-1)} = \frac{6}{3} = 2$$

$$\begin{aligned} y - 1 &= 2x + 2 \\ y &= 2x + 3 \end{aligned}$$

20. Find the equation of a line that passes through the point whose coordinates are $(6, 3)$ and is parallel to the line with the equation $y = -2x + 3$.

$$\begin{aligned} y - 3 &= -2(x - 6) \\ y - 3 &= -2x + 12 \\ y &= -2x + 15 \end{aligned}$$

21. Simplify

$$a) x^9 \cdot x^5 = x^{14}$$

$$b) (-3b^4a^5)^2 = 9b^8a^{10}$$

$$c) (5x^{-3})(-2x^{-4}) = -10x^{-7} = -\frac{10}{x^7}$$

$$d) (2x^5y^3)(3x^3y^6) = 6x^8y^9$$

22. Write the following expression involving radicals in exponential notation.

$$a) \sqrt{x^3} = x^{\frac{3}{2}}$$

$$b) \sqrt[3]{5^2} = 5^{\frac{2}{3}}$$

$$c) \sqrt[4]{6} = 6^{\frac{1}{4}}$$

$$d) \sqrt[5]{(cd)^5} = (cd)^{\frac{5}{5}} = (cd)^1$$

23. Find three consecutive numbers such that the sum of the three numbers is -15 .

$$-6, -5, -4$$

24. Find three consecutive even integers the sum of which is 66.

$$20, 22, 24$$

25. Write .35% as a decimal?

$$.35\% = .0035$$

26. What is 2.4 as percent?

$$2.4 = 240\%$$

27. What is 40.5% as a decimal?

$$40.5\% = .405$$

Simplify

$$28. 12 \div 4 \cdot 2 + 1^5$$

$$29. 10 + 4^2 - (7 + 4 \cdot 2)$$

$$30. 2(5x + 9) - 3(8x + 5)$$

27. What is 40.5% as a decimal? $40.5\% = .405$

Simplify

28. $12 \div 4 \cdot 2 + 1^5$
 $3 \cdot 2 + 1$
 7

29. $10 + 4^2 - (7 + 4 \cdot 2)$
 $10 + 16 - 15$
 11

30. $2(5x + 9) - 3(8x + 5)$
 $10x + 18 - 24x - 15$
 $-14x + 3$

31. $10x^2 + 3x - 1 + 3x^2 + 4x$
 $13x^2 + 7x - 1$

32. $-4^2 + 5 \cdot 2 + 3(1 - 6)$
 $-16 + 10 - 15$
 -21

33. $-7(2x - 5)$
 $-14x + 35$

Solve

34. $4x + 3(x - 2) = 14 - 3x$
 $4x + 3x - 6 = 14 - 3x$
 $10x = 20$
 $x = 2$

35. $-1 + \frac{2}{5}x = 7$ $x = 20$
 $\frac{2}{5}x = 8$
 $2x = 40$

36. $\frac{3}{5}x + 8 = 2$
 $\frac{3}{5}x = -6$
 $3x = -30$ $x = -10$

37. $7(x - 2) - 2(x - 7) = 15$
 $7x - 14 - 2x + 14 = 15$
 $5x = 15$
 $x = 3$

38. $-5 = 2x - 3$
 $2x = -2$
 $x = -1$

39. $\frac{2}{3}x + 1 = 3$
 $\frac{2}{3}x = 2$ $x = 3$
 $2x = 6$

40. $-5(x - 6) = x - 12$
 $-5x + 30 = x - 12$
 $-6x = -42$
 $x = 7$

41. $4 - 18x = 13$
 $-18x = 9$
 $x = -\frac{1}{2}$

42. $3x - 5 = 8 - x$
 $4x = 13$
 $x = \frac{13}{4}$

43. Solve

a) $\left(\frac{x}{9^{\frac{5}{6}}}\right)\left(\frac{x}{9^{\frac{1}{6}}}\right) = 9^4$ $x = \frac{120}{11}$
 $\frac{x}{9} + \frac{x}{9} = 4$
 $6x + 5x = 120$
 $11x = 120$
 $x = \frac{120}{11}$

b) $\left(6^{-\frac{x}{3}}\right)\left(6^{-\frac{x}{2}}\right) = 6^{-2}$
 $-\frac{x}{3} - \frac{x}{2} = -2$
 $-2x - 3x = -12$
 $-5x = -12$
 $x = \frac{12}{5}$

c) $(3^{2x})(3^{4x}) = 3^9$
 $2x + 4x = 9$
 $6x = 9$
 $x = \frac{3}{2}$

$A = P(1 + r)^t$
 $A = P(1 - r)^t$

44. Suppose \$6,500 is invested in an account that earns interest at a rate of 2% per year for 10 years. What will the value be.

$6500(1 + .02)^{10} = 7923.46$

45. Initial Value: 20000
 Growth rate: 15%
 After 6 years, what will the value be?

$20000(1.15)^6 = 46261.22$

46. Suppose a car's value is 45000 and decreases in value by 15% each year. What will the value of the car be after 10 years?

$45000(1 - .15)^{10} = 8859.35$

47. Initial population: 120000
 Decay rate: 2.5%
 Population after 12 years

$120000(1 - .025)^{12} = 88559.80$

48. Determine which sequences are arithmetic or geometric and the common difference or ratio

a. 44, 40, 36, 32, Arithmetic/geometric? Arithmetic d or r = -4

b. 2, 6, 18, 54, 162, Arithmetic/geometric? Geometric d or r = 3

c. 4, -8, 16, -32, 64, Arithmetic/geometric? Arithmetic d or r = -2

d. -5, 0, 5, 10, 15, Arithmetic/geometric? Arithmetic d or r = 5

d. -5, 0, 5, 10, 15, Arithmetic/geometric? _____ d or r = 5

49. Given 3, 9, 15, 21, 27, Find

a. the recursive formula

$$a_n = a_{n-1} + 6$$
$$a_1 = 3$$

b. the explicit formula

$$a_n = 6n - 3$$

c. a_{75}

$$a_{(75)} = 6(75) - 3$$

$$a_{75} = 447$$

50. Given 3, 12, 48, 192, Find

a. the recursive formula

$$a_n = a_{n-1} \cdot 4$$
$$a_1 = 3$$

b. the explicit formula

$$a_n = 3(4)^{n-1}$$

c. a_{19}

$$a_n = 3(4)^{19-1}$$

$$a_n = 3(4)^{18}$$

$$a_n = 204,158,138,208$$