

MATH 0310 Free Response

1.
106113

1. Solve $2.25x + 10.25 = 2.20x + 30.75$

13. Find the slope and y-intercept.
 $-8x + 2y = 10$

2. Solve $4x + 2 = 6x + 22$

14. Parallel, perpendicular, or neither?

$$y = \frac{1}{3}x + 1$$

$$y + 3x = -7$$

3. Solve $6x + 5 = 4x + 5$

4. Solve $2(x + 1) = 2x + 10$

15. Graph $y = -\frac{1}{2}x + 1$

5. Solve $4(x + 2) = x + 3x + 8$

16. Graph $2x + 3y = 12$

6. Solve $-\frac{1}{5}x + 2 = \frac{2x}{5} - \frac{x}{10}$

17. Write the equation of the line that passes through $(-4, 60)$ with slope $m = -2$.

7. Solve for A if $A = P + Prt$ and
 $r = 24\%$, $P = 1000$, $t = \frac{6}{12}$

18. Solve the system
 $2x + 3y = 5$
 $4x + 5y = 9$

8. Solve for y . $4x + 3y = 11$

19. Solve the system
 $2x + 3y = 5$
 $4x + 6y = 8$

9. Solve for x . $2x + 8y = 20$

20. Solve the system
 $2x - 3y = 6$
 $4x - 6y = 12$

10. Is $(0, -2)$ a solution of $3x - 5y = 10$?

11. Is $(1, 2)$ a solution of $5x - 2y = 8$?

21. Simplify $\frac{40a^4b^{-9}}{35a^{-2}b^{-2}}$

12. Solve $-2x + 8 < 2x - 12$

1.1

22. Simplify $\left(\frac{5a^3b^2}{15c}\right)^3$

23. Simplify $(-2x^3y^4)(4x^3y^8)$

24. $(4x^2 - 8x - 1) - (2x^2 - 10x - 11)$

25. $(3x - 5)(2x + 3)$

26. $(4x + 3)(4x - 3)$

27. $(4x - 3)^2$

28. $(2x + 3)(x^2 - 8x - 5)$

29. $\frac{2x^2 + 12x + 12}{x + 2}$

$$\textcircled{1} \quad 2.25x + 10.25 = 2.20x + 30.75$$

$$2.25x + \cancel{10.25} - \cancel{10.25} = 2.20x + 30.75 - 10.25$$

$$2.25x = 2.20x + 20.50$$

$$2.25x - 2.20x = \cancel{2.20x} + 20.50 - \cancel{2.20x}$$

$$.05x = 20.50$$

$$\frac{.05x}{.05} = \frac{20.50}{.05}$$

$$x = 410$$

$$\textcircled{2} \quad 4x + 2 = 6x + 22$$

$$4x + \cancel{2} - \cancel{2} = 6x + 22 - 2$$

$$4x = 6x + 20$$

$$4x - 6x = 6x + 20 - 6x$$

$$-2x = 20$$

$$\frac{-2x}{-2} = \frac{20}{-2}$$

$$x = -10$$

$$\textcircled{3} \quad 6x + 5 = 4x + 5$$

$$6x + \cancel{5} - \cancel{5} = 4x + \cancel{5} - \cancel{5}$$

$$6x = 4x$$

$$6x - 4x = 4x - 4x$$

$$2x = 0$$

$$\frac{2x}{2} = \frac{0}{2}$$

$$x = 0$$

$$\begin{aligned} \textcircled{4} \quad 2(x+1) &= 2x+10 \\ 2x+2 &= 2x+10 \\ 2x+\cancel{x}-\cancel{x} &= 2x+10-2 \\ 2x &= 2x+8 \end{aligned}$$

$$2x - 2x = 2x + 8 - 2x$$

$$0 \neq 8$$

NO solution

\emptyset

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$$\textcircled{5} \quad 4(x+2) = x+3x+8$$

$$4x+8 = 4x+8$$

$$4x+\cancel{8}-\cancel{8} = 4x+\cancel{8}-\cancel{8}$$

$$4x = 4x$$

$$4x - 4x = 4x - 4x$$

$$0 = 0$$

all REAL numbers

$$\textcircled{6} \quad -\frac{1}{5}x + 2 = \frac{2x}{5} - \frac{x}{10} \quad \text{LCD} = 10$$

$$-\frac{1}{5}x(10) + \frac{2}{1}(10) = \frac{2x}{5}(10) - \frac{x}{10}(10)$$

$$-1x(2) + 2(10) = 2x(2) - x(1)$$

$$-2x + 20 = 4x - 1x$$

$$-2x + 20 = 3x$$

$$-2x + \cancel{20} - \cancel{20} = 3x - 20$$

$$-2x = 3x - 20$$

$$-2x - 3x = 3x - 20 - \cancel{3x}$$

$$-5x = -20$$

$$\frac{-5x}{-5} = \frac{-20}{-5}$$

$$x = 4$$

$$\textcircled{7} \quad A = P + Prt \quad r = 24\% = .24$$

$$P = 1000$$

$$t = \frac{6}{12}$$

$$A = 1000 + 1000 (.24) \left(\frac{6}{12}\right)$$

$$A = 1000 + 1000 (.24) \left(\frac{1}{2}\right)$$

$$A = 1000 + 1000 (.12)$$

$$A = 1000 + 120$$

$$A = 1120$$

$$\textcircled{8} \quad 4x + 3y = 11 \quad \text{Solve for } y$$

$$4x + 3y - 4x = 11 - 4x$$

$$3y = 11 - 4x$$

$$\frac{3y}{3} = \frac{11 - 4x}{3}$$

$$y = \frac{11 - 4x}{3}$$

$$\textcircled{9} \quad 2x + 8y = 20 \quad \text{Solve for } x$$

$$2x + 8y - 8y = 20 - 8y$$

$$2x = 20 - 8y$$

$$\frac{2x}{2} = \frac{20}{2} - \frac{8y}{2}$$

$$x = 10 - 4y$$

$$\textcircled{10} \quad 3x - 5y = 10 \quad \text{Is } (0, -2) \text{ a solution?}$$

$$3(0) - 5(-2) = 10$$

$$0 + 10 = 10$$

$$10 = 10$$

YES a solution

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11) $5x - 2y = 8$ Is $(1, 2)$ a solution?
x y

5

$$5(1) - 2(2) = 8$$

$$5 - 4 = 8$$

$$1 \neq 8$$

NO

NOT a solution

12) $-2x + 8 < 2x - 12$

$$-2x + 8 - 8 < 2x - 12 - 8$$

$$-2x < 2x - 20$$

$$-2x - 2x < 2x - 20 - 2x$$

$$-4x < -20$$

$$\frac{-4x}{-4} > \frac{-20}{-4}$$

$$x > 5$$



$(5, +\infty)$

13) $-8x + 2y = 10$ Find slope and y-intercept

$$y = mx + b$$

$$-8x + 2y + 8x = 10 + 8x$$

$$2y = 10 + 8x$$

$$\frac{2y}{2} = \frac{10}{2} + \frac{8x}{2}$$

$$y = 5 + 4x$$

$$y = 4x + 5$$

$m = \text{slope} = 4$ and y-intercept $= b = 5$

OR $(0, 5)$

$$(14) \quad y = \frac{1}{3}x + 1$$

$$y + 3x = -1$$

↓
solve for y

$$y + 3x - 3x = -1 - 3x$$

$$y = -1 - 3x$$

$$y = -3x - 1$$

$$m_1 = \frac{1}{3}$$

$$m_2 = -3$$

$$m_1 \cdot m_2 = \left(\frac{1}{3}\right)(-3) = \frac{-3}{3} = -1$$

Lines are perpendicular

$$(15) \quad y = -\frac{1}{2}x + 1 \quad \text{graph}$$

$$y = -\frac{1}{2}(0) + 1$$

$$y = 0 + 1$$

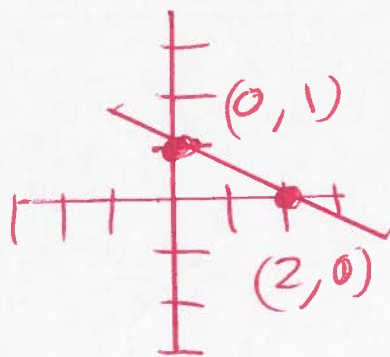
$$y = 1$$

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

$$y = -1 + 1$$

$$y = 0$$

x	y
0	1
2	0



16) $2x + 3y = 12$ Graph

$$2x + 3y - 2x = 12 - 2x$$

$$3y = 12 - 2x$$

$$\frac{3y}{3} = \frac{12}{3} - \frac{2x}{3}$$

$$y = 4 - \frac{2}{3}x$$

$$y = -\frac{2}{3}x + 4$$

$$y = -\frac{2}{3}(0) + 4$$

$$y = 0 + 4$$

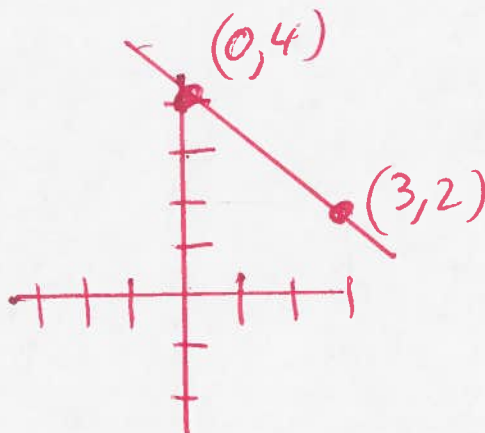
$$y = 4$$

$$y = -\frac{2}{3}(3) + 4$$

$$y = -2 + 4$$

$$y = 2$$

X	Y
0	4
3	2



17) Equation of a line with point

$(-4, 60)$ and slope $= m = -2$
 $x_1 \quad y_1$

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

$$y - (60) = -2(x - (-4))$$

$$y - 60 = -2(x + 4)$$

$$y - 60 = -2x - 8$$

$$y - 60 + 60 = -2x - 8 + 60$$

$$y = -2x + 52$$

$$(18) \begin{cases} 2x + 3y = 5 \\ 4x + 5y = 9 \end{cases} \begin{pmatrix} -5 \\ 3 \end{pmatrix}$$

$$\begin{array}{r} -10x - 15y = -25 \\ 12x + 15y = 27 \\ \hline \end{array}$$

$$2x = 2$$

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

$$x = 1$$

$$(x, y) = (1, 1)$$

→ Subst

$$2x + 3y = 5$$

$$2(1) + 3y = 5$$

$$2 + 3y = 5$$

$$2 + 3y - 2 = 5 - 2$$

$$3y = 3$$

$$\frac{3y}{3} = \frac{3}{3}$$

$$y = 1$$

(8)

$$(19) \begin{cases} 2x + 3y = 5 \\ 4x + 6y = 8 \end{cases} \begin{pmatrix} -6 \\ 3 \end{pmatrix}$$

$$\begin{array}{r} -12x - 18y = -30 \\ 12x + 18y = 24 \\ \hline \end{array}$$

$$0 + 0 = -6$$

$$0 \neq -6$$

No Solution

$$(20) \begin{cases} 2x - 3y = 6 \\ 4x - 6y = 12 \end{cases} \begin{pmatrix} -6 \\ 3 \end{pmatrix}$$

$$\begin{array}{r} -12x + 18y = -36 \\ 12x - 18y = 36 \\ \hline \end{array}$$

$$0 + 0 = 0$$

$$0 = 0$$

Infinite # of Solutions

$$\begin{aligned} (21) \quad & \frac{40 a^4 b^{-9}}{35 a^{-2} b^{-2}} = \\ & \frac{40 \cdot a^4 a^2 b^2}{35 \cdot b^9} = \\ & \frac{40 a^6 b^2}{35 b^9} = \\ & \frac{(\cancel{5})(8) a^6}{(\cancel{5})(7) b^{9-2}} = \end{aligned}$$

9

$$\frac{8 a^6}{7 b^7} =$$

$$\begin{aligned} (22) \quad & \left(\frac{5 a^3 b^2}{15 c} \right)^3 = \\ & \left(\frac{\cancel{5} a^3 b^2}{(\cancel{5})(3) c} \right)^3 = \end{aligned}$$

$$\left(\frac{a^3 b^2}{3 c} \right)^3 =$$

$$\frac{a^9 b^6}{3^3 c^3} =$$

$$\frac{a^9 b^6}{(3)(3)(3) c^3} =$$

$$\frac{a^9 b^6}{27 c^3} =$$

$$\textcircled{23} \quad (-2x^3y^4)(4x^3y^8) =$$
$$\textcircled{-8x^6y^{12} =}$$

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$$\textcircled{24} \quad (4x^2 - 8x - 1) - (2x^2 - 10x - 11) =$$
$$4x^2 - 8x - 1 - 2x^2 + 10x + 11 =$$
$$\textcircled{2x^2 + 2x + 10 =}$$

$$\textcircled{25} \quad (3x - 5)(2x + 3) =$$
$$6x^2 + 9x - 10x - 15 =$$
$$6x^2 - 1x - 15 =$$
$$\textcircled{6x^2 - x - 15 =}$$

$$\textcircled{26} \quad (4x + 3)(4x - 3) =$$
$$16x^2 - 12x + 12x - 9 =$$
$$\textcircled{16x^2 - 9 =}$$

$$\textcircled{27} \quad (4x - 3)^2 =$$
$$(4x - 3)(4x - 3) =$$
$$16x^2 - 12x - 12x + 9 =$$
$$\textcircled{16x^2 - 24x + 9 =}$$

$$(28) \quad (2x+3)(x^2-8x-5) =$$

$$2x^3 - 16x^2 - 10x + 3x^2 - 24x - 15 =$$

$$2x^3 - 13x^2 - 34x - 15 =$$



$$(29.) \quad \begin{array}{r} 2x^2 + 12x + 12 \\ \hline x + 2 \end{array}$$

$$\begin{array}{r} x+2 \overline{) 2x^2 + 12x + 12} \\ \underline{-(2x^2 + 4x)} \\ 8x + 12 \\ \underline{-(8x + 16)} \\ -4 \end{array}$$

Long Division

OR

$$\begin{array}{r} 2x^2 + 12x + 12 \\ \hline x + 2 \end{array}$$

-4 rem

Synthetic division

$$\begin{array}{r|rrr} -2 & 2 & 12 & 12 \\ & & -4 & -16 \\ \hline & 2 & 8 & -4 \end{array}$$

-4 Rem

$$2x + 8 + \frac{-4}{x+2}$$