

Algebra Review: Leave all answers reduced. Do not use a calculator.

Pre-Algebra:

Evaluate:

Example 1: $\frac{4}{5} \div \left(2\frac{2}{3}\right)$ $\frac{4}{5} \div \frac{8}{3} = \frac{4}{5} \times \frac{3}{8} = \frac{12}{40} = \frac{3}{10}$

Example 2: $\left(1\frac{1}{3}\right) - \frac{3}{4}$ $\frac{4}{3} - \frac{3}{4} = \frac{16}{12} - \frac{9}{12} = \frac{7}{12}$

1. $-\frac{1}{2} \cdot \frac{4}{9}$

2. $\left(3\frac{1}{2}\right) \cdot \left(1\frac{3}{7}\right)$

3. $\frac{7}{6} \div \frac{5}{2}$

4. $\left(-2\frac{2}{3}\right) \div \frac{1}{9}$

5. $\frac{5}{4} - \frac{7}{6}$

6. $-2\frac{3}{5} + \frac{3}{10}$

7. $\left(\frac{1}{2} - \frac{3}{5}\right)^2$

8. $\left(\frac{2}{3}\right)^2 + \left(\frac{1}{2}\right)^2$

Solve each equation:

9. $x - \frac{1}{4} = \frac{5}{3}$

10. $-\frac{c}{4} = 2$

11. $-\frac{5}{6}k = \frac{2}{3}$

12. $\frac{4y-3}{2} = -1$

13. $7x - (-3 + 3x) = 15$

14. $-\frac{2}{3}p + 2 = \frac{1}{6}p - \frac{1}{2}$

Solve each system. You may use any method.

Example:
$$\begin{cases} x + y = -2 \\ -8x + 2y = -14 \end{cases}$$

Substitution method:

$$\begin{aligned} x &= -2 - y \\ -8(-2 - y) + 2y &= -14 \\ 16 + 8y + 2y &= -14 \\ 10y &= -30 \\ y &= -3 \\ x &= -2 - (-3) \\ x &= 1 \\ \mathbf{(1, -3)} \end{aligned}$$

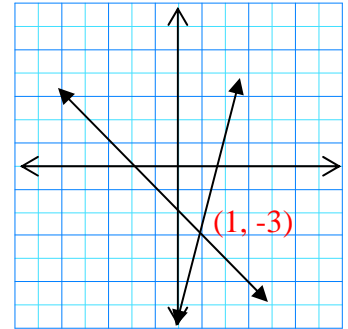
Elimination method:

$$\begin{aligned} -2(x + y) &= -2(-2) \\ -8x + 2y &= -14 \\ \hline -2x - 2y &= 4 \\ -8x + 2y &= -14 \\ \hline -10x &= -10 \\ x &= 1 \\ 1 + y &= -2 \\ y &= -3 \\ \mathbf{(1, -3)} \end{aligned}$$

Graphing method:

Put both equations in slope-intercept form.

$$\begin{aligned} y &= -x - 2 \\ 2y &= 8x - 14 \\ y &= 4x - 7 \end{aligned}$$



15.
$$\begin{cases} y = x + 3 \\ -2x + y = -4 \end{cases}$$

16.
$$\begin{cases} 4x + y = 10 \\ -2x - y = 4 \end{cases}$$

17.
$$\begin{cases} 2x + y = 8 \\ 3x + 5y = 5 \end{cases}$$

Lines Example: Find the equation of a line that contains the points (7, -5) and (1, -1).

$$\begin{aligned} \frac{\Delta y}{\Delta x} &= \frac{-1 - (-5)}{1 - 7} = \frac{4}{-6} = -\frac{2}{3} \\ y - (-1) &= -\frac{2}{3}(x - 1) \\ y + 1 &= -\frac{2}{3}x + \frac{2}{3} \\ y &= -\frac{2}{3}x - \frac{1}{3} \end{aligned}$$

Find the slope between the points.

18. (4, -6) and (-2, 1)

19. (4, 9) and (4, -4)

For #20, 21 leave your answer in slope-intercept form.

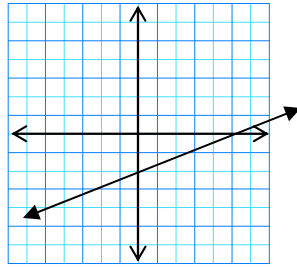
20. Find the equation of a line that has a slope of $-\frac{3}{4}$ and contains the point (2, -3).

21. Find the equation of a line that contains the points (-9, 2) and (-1, 8).

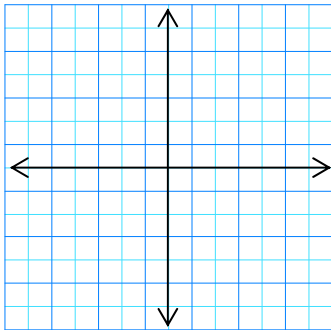
Graph each line.

Example: $2x - 5y = 10$

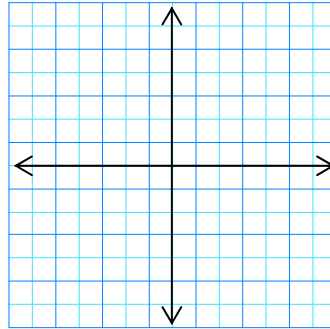
$-5y = -2x + 10$
 $y = \frac{2}{5}x - 2$
slope = $\frac{2}{5}$ *y-int* = $(0, -2)$



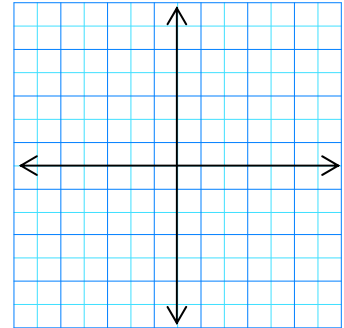
22. $y = -x$



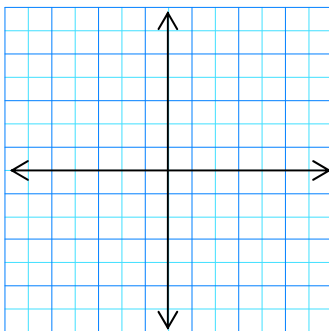
23. $y = \frac{2}{3}x + 3$



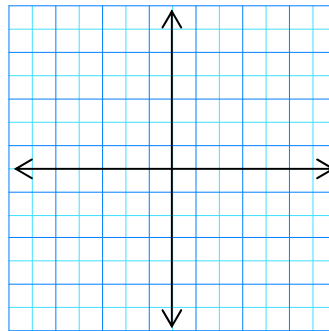
24. $x = 4$



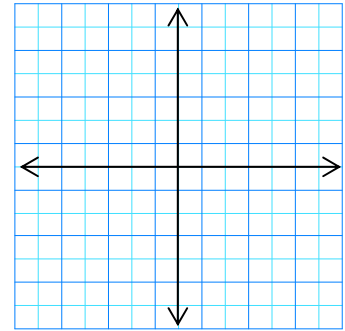
25. $3x - y = 2$



26. $y = -3$



27. $5x = 2y - 4$

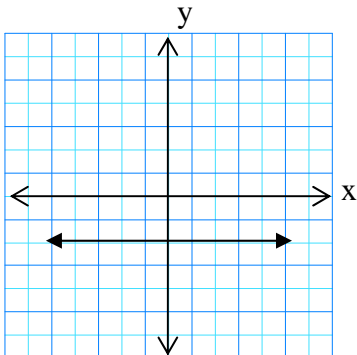


28. List 3 points that are on the line $2x - y = 1$.

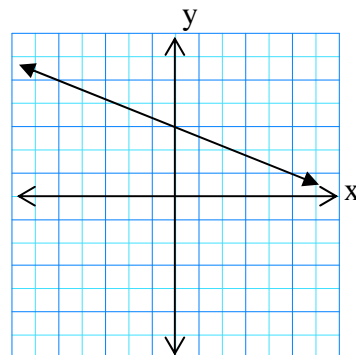
29. Is the point $(-2, -1)$ on the line $4y - 2 = 3x$?

Write the equation of each graph.

30.



31.



Multiply out each expression:

Example: $(3x-1)(x+2)$

$$3x^2 + 6x - x - 2 = 3x^2 + 5x - 2$$

32. $(x+3)(x-6)$

33. $(2x-5)(-x+4)$

34. $(x-5)^2$

35. $(4x-1)(4x+1)$

Factor each expression:

Example: $3x^2 + 10x - 8$

$$(3x-2)(x+4)$$

36. $x^2 - 9x + 14$

37. $x^2 + 3x - 40$

38. $x^2 + 5x - 6$

39. $x^2 - 25$

40. $x^2 + 15x + 36$

41. $4x^2 + 21x - 18$

42. $4x^2 - 9$

43. $2x^2 + 3x - 5$

Solve each equation by factoring:

Example: $6x^2 - 29x + 20 = 0$

$$\begin{aligned} (6x-5)(x-4) &= 0 \\ 6x-5 &= 0 & x-4 &= 0 \\ 6x &= 5 & x &= 4 \\ x &= \frac{5}{6} \end{aligned}$$

44. $x^2 - 5x + 4 = 0$

45. $4a^2 + a = 3$

46. $16x^2 - 9 = 0$

47. $-22x^2 + 8x = -5x^3$

Solve using the quadratic formula: Leave your answers in simplified radical form.

Example: $x^2 - 6x - 3 = 0$

$a = 1, b = -6, c = -3 \quad \text{quadratic formula: } \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$
$x = \frac{6 \pm \sqrt{36 - 4(1)(-3)}}{2} \longrightarrow x = \frac{6 \pm \sqrt{48}}{2} \longrightarrow x = \frac{6 \pm 4\sqrt{3}}{2}$
$x = 3 \pm 2\sqrt{3}$

48. $0 = 2x^2 + x - 5$

49. $x^2 - 4x = -2$

Simplify each rational expression:

Example: $\frac{m^2 - 2m - 3}{8m - 24}$

$\frac{(m-3)(m+1)}{8(m-3)} = \frac{m+1}{8}$

50. $\frac{3(x+2)(x+4)}{6(x+2)^2}$

51. $\frac{x-4}{x^2 - 2x - 8}$

52. $\frac{x^2 - 1}{x^2 - 11x + 10}$

Simplify each radical expression:

Example: $\sqrt{54}$

$\sqrt{9}\sqrt{6} = 3\sqrt{6} \quad \text{OR}$
$\sqrt{9}\sqrt{6} = \sqrt{3}\sqrt{3}\sqrt{2}\sqrt{3} = 3\sqrt{6}$

53. $\sqrt{32}$

54. $\sqrt{108}$

55. $\sqrt{225}$

Simplify each expression:

Example: $\frac{(3x^2)^3}{6x^5}$

$\frac{27x^6}{6x^5} = \frac{9x}{2}$

56. $(-3m^9)(4m^{15})$

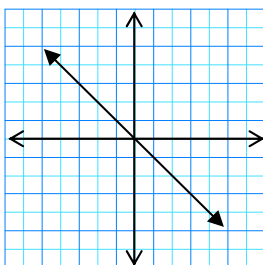
57. $\frac{pn^4}{p^3n}$

58. $\frac{(2m^4b^5)^3}{(m^2b^2)^2}$

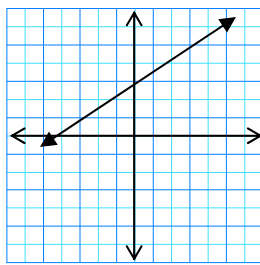
Answers:

1) $-\frac{2}{9}$	2) 5	3) $\frac{7}{15}$	4) -24	5) $\frac{1}{12}$
6) $\frac{29}{10}$	7) $\frac{1}{100}$	8) $\frac{25}{36}$	9) $x = \frac{23}{12}$	10) $c = -8$
11) $k = -\frac{4}{5}$	12) $y = \frac{1}{4}$	13) $x = 3$	14) $p = 3$	15) (7, 10)
16) (7, -18)	17) (5, -2)	18) $-\frac{7}{6}$	19) undefined	20) $y = -\frac{3}{4}x - \frac{3}{2}$
21) $y = \frac{3}{4}x + \frac{35}{4}$	22-27) see graphs below	28) answers vary (0, -1) (1,1) (2,3)	29) yes	30) $y = -2$
31) $y = -\frac{2}{5}x + 3$	32) $x^2 - 3x - 18$	33) $-2x^2 + 13x - 20$	34) $x^2 - 10x + 25$	35) $16x^2 - 1$
36) $(x-2)(x-7)$	37) $(x+8)(x-5)$	38) $(x+6)(x-1)$	39) $(x-5)(x+5)$	40) $(x+12)(x+3)$
41) $(4x-3)(x+6)$	42) $(2x-3)(2x+3)$	43) $(2x+5)(x-1)$	44) $x = 1, x = 4$	45) $a = \frac{3}{4}, a = -1$
46) $x = \frac{3}{4}, x = -\frac{3}{4}$	47) $x = 0, x = \frac{2}{5}, x = 4$	48) $x = \frac{-1 \pm \sqrt{41}}{4}$	49) $x = 2 \pm \sqrt{2}$	50) $\frac{x+4}{2x+4}$
51) $\frac{1}{x+2}$	52) $\frac{x+1}{x-10}$	53) $4\sqrt{2}$	54) $6\sqrt{3}$	55) 15
56) $-12m^{24}$	57) $\frac{n^3}{p^2}$	58) $8m^8b^{11}$		

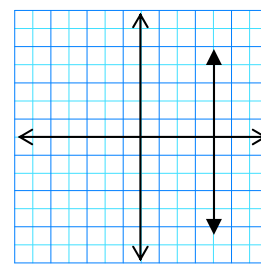
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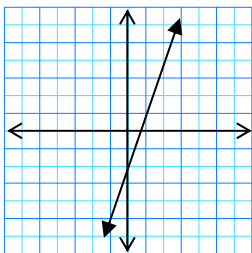
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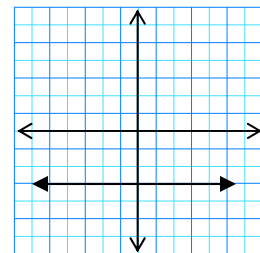
24)



25)



26)



27)

