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Solve each problem using a system of equations.

1. Emily has 180 M&Ms, some plain and some peanut. If there are 32 more plain M&Ms than peanut M&Ms, how many peanut M&Ms does she have?

plain (p)
peanut (n)

$p + n = 180$ (total)

$n + 32 = p$

$(n + 32) + n = 180$

$2n + 32 = 180$

$-32 \quad -32$

$\frac{2n}{2} = \frac{148}{2}$

$n = 74$

now plug it in!

$n + 32 = p$

$(74) + 32 = p$

$106 = p$

106 plain
74 peanut

2. The crib for Mrs. Matthew's baby is a rectangle. This rectangle has a perimeter of 126 inches. Its length is 5 in more than its width. Find the dimensions of the baby's crib.

length
width

Perimeter = $2L + 2W$

$2L + 2W = 126$

$L = w + 5$

$2(w+5) + 2w = 126$

$2w + 10 + 2w = 126$

$4w + 10 = 126$

$-10 \quad -10$

$\frac{4w}{4} = \frac{116}{4}$

$w = 29$

now plug it in!

$L = w + 5$

$L = (29) + 5$

$L = 34$

length = 34
width = 29

3. Chris and Paul sold tickets to the NCAA Regional Baseball Tournament. Chair back seats were \$5 each while seats in Aggie Alley cost \$2 each. If only 210 people attended and they paid a total of \$660 for tickets, how many people bought chair back seats?

Seats:
chair-back (c)
Aggie Alley (a)

$5c + 2a = 660$ (cost)

$c + a = 210$ (total)

$5c + 2a = 660$

$-2(c + a = 210)$

$5c + 2a = 660$

$-2c - 2a = -420$

$3c = 240$

$\frac{3c}{3} = \frac{240}{3}$

$c = 80$

$c + a = 210$

$80 + a = 210$

$-80 \quad -80$

$a = 130$

80 chair back seats

Solve the inequality and graph it on the number line.

4. $4(x + 1) - 2(x - 1) < 3 - x$

$4x + 4 - 2x + 2 < 3 - x$

$2x + 6 < 3 - x$

$+x \quad +x$

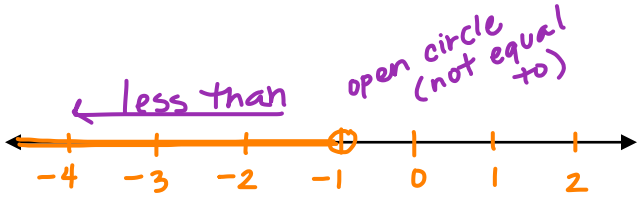
$3x + 6 < 3$

$3x + 6 < 3$

$-6 \quad -6$

$\frac{3x}{3} < \frac{-3}{3}$

$x < -1$



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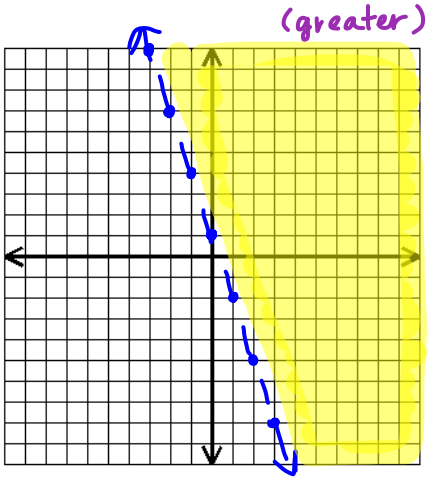
Graph the inequalities below and shade the solution.

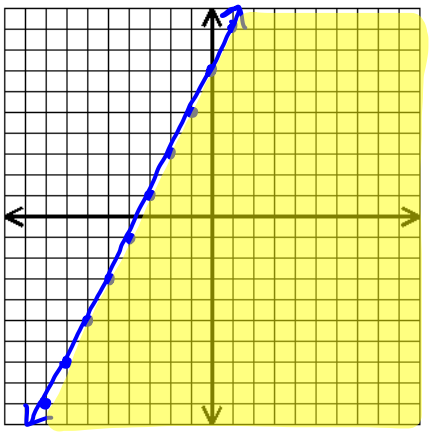
5. $y > -3x + 1$

dotted line (not equal to) shaded above (greater)



6. $y \leq 2x + 7$

solid line (equal to) shade below (less than)



7. Mr. Salgado needs to get his car repaired, but cannot spend more than $225 for repairs. His mechanic told him that he part needed to fix his car would cost $78 and the labor would be an additional $35 per hour. How many hours can the mechanic work and stay within Mr. Salgado's budget?

$78 + 35x \leq 225$

$-78 \quad -78$

$\frac{35x}{35} \leq \frac{147}{35}$

$x \leq 4.2$ hrs

Simplify the following polynomials:

8. $(x^2 + 6x - 5) + (-x^2 - 3x - 1) =$ $3x - 6$

$0x^2 + 3x - 6$

9. $(a^2 - 3a - 5) - (-a^2 - 7a + 4) =$ $2a^2 + 4a - 9$

$a^2 - 3a - 5 + a^2 + 7a - 4$

$2a^2 + 4a - 9$

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Simplify the following problems.

10. $(2x^4)(5x^3)$

$10x^7$

add exponents! $x^n x^m = x^{n+m}$

11. $(4x^7)(2x^4) - (6x^6)(5x^5)$

$8x^{11} - 30x^{11}$

$-22x^{11}$

add the exponents! $x^n x^m = x^{n+m}$

12. $(x + 2)(x - 3)$ FOIL or BOX!

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

$x^2 - 1x - 6$

13. $(3x - 2)(2x + 3)$

$6x^2 + 9x - 4x - 6$

$6x^2 + 5x - 6$

14. $4t(2t^2 - t - 5)$

$8t^3 - 4t^2 - 20t$

15. $\dfrac{32a^2bc^3}{20abc}$

$\dfrac{8ac^2}{5}$

subtract the exponents! $\dfrac{x^m}{x^n} = x^{m-n}$

16. $(-4c^3)^3$

$(-4)^3(c^3)^3$

multiply the exponents! $(x^n)^m = x^{nm}$

$-64c^9$

17. $(4x^2y)^2(-3xy^2)^3$

$(4)^2(x^2)^2(y)^2(-3)^3(x)^3(y^2)^3$

$(16x^4y^2)(-27x^3y^6)$

multiply exponents $(x^n)^m = x^{nm}$

add exponents $x^n x^m = x^{n+m}$

$-432x^7y^8$

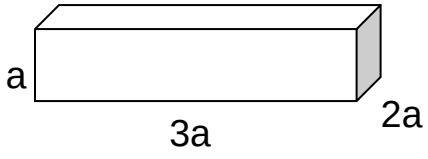
18. Find the volume of this solid.

Volume = LWH

$V = (a)(3a)(2a)$

$V = 6a^3$

add the exponents! $x^n x^m = x^{n+m}$



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FACTOR COMPLETELY. Find the solutions.

19. $18x - 12y + 36$

pull out a common factor!

$6(3x - 2y + 6)$

20. $64x^2 - 25$

perfect squares!

$(8x-5)(8x+5)$

$8x-5=0$ $+5\ +5$ $\frac{8x}{8}=\frac{5}{8}$ $x=\frac{5}{8}$

$8x+5=0$ $-5\ -5$ $\frac{8x}{8}=\frac{-5}{8}$ $x=-\frac{5}{8}$

21. $x^2 + 20x + 36$

| p = 36 | s = 20 |
|---|---|
| 1 + 36 | 37 |
| 2 + 18 | 20 |
| 3 + 12 | 15 |
| 4 + 9 | 13 |
| 6 + 6 | 12 |

$(x+18)(x+2)$

$x=-18 \quad x=-2$

22. $r^2 + 7r - 18$

| p = -18 | s = 7 |
|---|---|
| -1 + 18 | 17 |
| 1 + -18 | -17 |
| -2 + 9 | 7 |
| 2 + -9 | -7 |
| -3 + 6 | 3 |
| 3 + -6 | -3 |

$(x-2)(x+9)$

$x=2 \quad x=-9$

23. $3p^2 + 7p - 6$

| p = -18 | s = 7 |
|---|---|
| -1 + 18 | 17 |
| 1 + -18 | -17 |
| -2 + 9 | 7 |
| 2 + -9 | -7 |
| -3 + 6 | 3 |
| 3 + -6 | -3 |

$(x-\frac{2}{3})(x+\frac{9}{3})$

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

$x=\frac{2}{3} \quad x=-3$

24. $3p^2 + 7p - 6$

same question

oops!

Solve using the **Quadratic Formula**. Round your answers to the nearest tenth.

25. $6x^2 - 5x - 2 = 0$

$a=6$, $b=-5$, $c=-2$

$$\frac{-(-5)\pm\sqrt{(-5)^2-4(6)(-2)}}{2(6)}$$

$$\frac{5\pm\sqrt{25+48}}{12}$$

$$\frac{5\pm\sqrt{73}}{12} = \frac{5\pm 8.54}{12}$$

$\frac{5+8.54}{12} = 1.13$ $\quad \frac{5-8.54}{12} = -0.3$

26. $x^2 + 8x + 3 = 0$

$a=1$, $b=8$, $c=3$

$$\frac{-(8)\pm\sqrt{(8)^2-4(1)(3)}}{2(1)}$$

$$\frac{-8\pm\sqrt{64-12}}{2}$$

$$\frac{-8\pm\sqrt{52}}{2} = \frac{-8\pm 7.21}{2}$$

$\frac{-8+7.21}{2} = -0.4$ $\quad \frac{-8-7.21}{2} = -7.61$

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Write the equation for the parabola: $y = x^2$

27. Shifts up 4 units.

$y = x^2 + 4$ "shift up" means to add 4

28. Shifts down 2 units and is reflected.

$y = -x^2 - 2$ reflected is negative shift down "minus 2"

29. Tiger Woods hits a golf ball into the air The equation that describes the path of the ball is $h = 55t - 5t^2$. Answer the folowing questions using the information given.

A. How high is the ball after **2 seconds**? 90 feet

B. When will it **first** reach 140 meters? 4 sec.

C. When will it hit the **ground**? 11 sec. (when $y=0$)

30. The area of a rectangular room is given by the equation $w^2 - 7w = 18$ where **w** is the width of the room. Find the width of the room.

$w^2 - 7w - 18 = 0$

| p=-18 | s=-7 |
|---|---|
| 1 | -18 | -17 |
| -1 | 18 | 17 |
| 2 | -9 | -7 |
| -2 | 9 | 7 |
| 3 | -6 | -3 |
| -3 | 6 | 3 |

$(x-9)(x+2)$

$x = 9$ $x = -2$ ← can't be negative!

Width = 9

31. The area of a rectangular piece of cardboard is represented by the equation $L(3L - 7) = 20$ where **L** is the length of the room. Find the length of the room.

$L(3L-7) = 20$

$3L^2 - 7L - 20 = 0$

| p= -60 | s= -7 |
|---|---|
| 1 | -60 | -59 |
| -1 | 60 | 59 |
| 2 | -30 | -28 |
| -2 | 30 | 28 |
| 3 | -20 | -17 |
| -3 | 20 | 17 |
| 4 | -15 | -11 |
| -4 | 15 | 11 |
| 5 | -12 | -7 |
| -5 | 12 | 7 |

$(x + \frac{5}{3})(x - \frac{12}{3})$

$(3x+5)(x-4)$

no negative! $x = -\frac{5}{3}$ or $x = 4$

Length = 4

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32. At which points does the graph of $f(x) = x^2 + 2x - 48$ intersect the x-axis?

Hint! plug it in to the calculator and look for y=0 on the table!

(-8,0) (6,0)

33. For the function $y = 4x^2 + 3x - 1$, what is the value of y when x = -3?

$y = 4(-3)^2 + 3(-3) - 1$ ...or plug it in and look at the table!

$y = 26$

34. What is the vertex of $y = 4x^2 + 3x - 1$?

Remember the vertex is the center point!

(-0.375, -1.5)

Linear Transformations.

35. Given the equation y = 5x - 3 , what would be the **slope** of a parallel line?'

slope = 5

ex: $y = 5x$

a parallel line has the same slope!

36. Write the equation of the **line y = 2x - 3** that has been **shifted:**

A. Up 3 $y = 2x$ → $y = 2x - 3$ (+3) $y = 2x + 0$

B. Down 1 $y = 2x - 4$ ↘ $y = 2x - 3$ (-1) $y = 2x - 4$

37. Describe the change in the graph y = -5x when the equation is changed to y = -5x - 4.

shifts down 4

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Write the equation of a line given the following information.

38. The slope is 4 and crosses through the point ( -2,11 )

point-slope: $y - y_1 = m(x - x_1)$

$y - 11 = 4(x + 2)$

$y - 11 = 4x + 8$

$+11 \quad +11$

$y = 4x + 19$

39. 2 points ( 3,-1 ) and ( -2,9 ).

slope: $\frac{y_2 - y_1}{x_2 - x_1}$ $\frac{9+1}{-2-3} = \frac{10}{-5} = -2$

$y + 1 = -2(x - 3)$

$y + 1 = -2x + 6$

$-1 \quad -1$

$y = -2x + 5$

40. In a random survey of 40 algebra 1 students at A & M consolidated HS, 30 said they loved their math class. Using this information, what is the best prediction of the number of students who love their Algebra 1 class out of 340 students?

use a proportion!

$\frac{30 \text{ like}}{40 \text{ students}} = \frac{x}{340}$

$30(340) = 40x$

$10200 = 40x$

$225 = x$

225 students

41. Two lines have the equations $2x - y = 1$

$3x = y - 6$

At what point do they intersect?

Hint: you could plug it in to the calculator and look for the same point in the table!

$2x - y = 1$

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

$y = 2x - 1$

$3x = y - 6$

$3x + 6 = y$

solution $(-7, -15)$

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42. SOLVE: $2(x+3)+3(x-5)=8(x-6)$

$2x+6+3x-15=8x-14$

$5x-9=8x-14$

$-5x \quad -5x$

$-9=3x-14$

$+14 \quad +14$

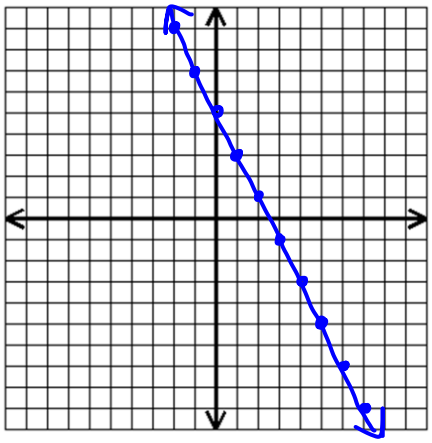
$5=3x$

$\frac{5}{3}=\frac{3x}{3}$

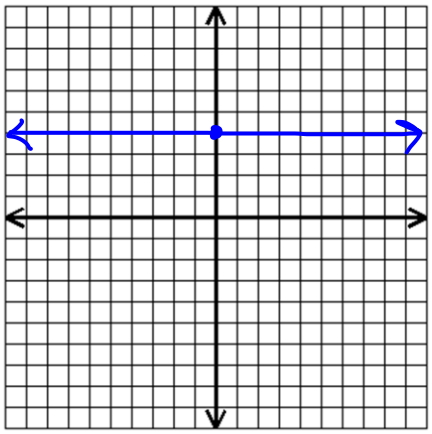
$x=\frac{5}{3}$

Graph each of the linear equations.

43. $y=-2x+5$



44. $y=4$ horizontal line



45. $x=6$ vertical line