

Solve each of the following.

$$\begin{aligned}
 1. \quad & 2(7w+3) - 5 = 4(w-3) + 6w \\
 & 14w + 6 - 5 = 4w - 12 + 6w \\
 & 14w + 1 = 10w - 12 \\
 & 14w - 10w = -12 - 1 \\
 & \frac{4w}{4} = \frac{-13}{4} \rightarrow w = -3\frac{1}{4}
 \end{aligned}$$

1. $w = -3\frac{1}{4}$

$$\begin{aligned}
 2. \quad & 3 \left[\frac{r}{3} + 4 = -7 \right] \\
 & r + 12 = -21 \\
 & r = -21 - 12 \\
 & r = -33
 \end{aligned}$$

2. $r = -33$

$$\begin{aligned}
 3. \quad & 6m + 3(2m - 5) = 7m + 11 \\
 & 6m + 6m - 15 = 7m + 11 \\
 & 12m - 15 = 7m + 11 \\
 & 12m - 7m = 11 + 15 \\
 & \frac{5m}{5} = \frac{26}{5} \rightarrow m = 5\frac{1}{5}
 \end{aligned}$$

3. $m = 5\frac{1}{5}$

$$\begin{aligned}
 4. \quad & 8 \left[\frac{t+3}{8} = 4 \right] \\
 & t + 3 = 32 \\
 & t = 32 - 3 \\
 & t = 29
 \end{aligned}$$

4. $t = 29$

$$\begin{aligned}
 5. \quad & 3 \left[\frac{k+2}{3} = 7 \right] \\
 & k + 2 = 21 \\
 & k = 21 - 2 \\
 & k = 19
 \end{aligned}$$

5. $k = 19$

$$\begin{aligned}
 6. \quad & 7 \left[\frac{9-2h}{7} = -5 \right] \\
 & 9 - 2h = -35 \\
 & 9 + 35 = 2h \\
 & \frac{44}{2} = \frac{2h}{2} \\
 & 22 = h
 \end{aligned}$$

6. $22 = h$

$$7. \quad \frac{3}{4}(16g+12) - 3g = 25$$

$$12g + 9 - 3g = 25$$

$$9g + 9 = 25$$

$$9g = 25 - 9$$

$$9g = 16$$

$$g = \frac{16}{9}$$

$$g = 1\frac{7}{9}$$

$$7. \quad \underline{g = 1\frac{7}{9}}$$

$$8. \quad \left[\frac{2}{3}f + \frac{3}{4} = \frac{1}{2}f - \frac{1}{4} \right]$$

$$8F + 9 = 6F - 3$$

$$8F - 6F = -3 - 9$$

$$2F = -12$$

$$F = -6$$

$$8. \quad \underline{F = -6}$$

$$9. \quad \left[\frac{1}{2}w + \frac{3}{5} = \frac{3}{4}w - 2 \right]$$

$$10w + 12 = 15w - 40$$

$$12 + 40 = 15w - 10w$$

$$\frac{52}{5} = \frac{5w}{5}$$

$$10\frac{2}{5} = w$$

$$9. \quad \underline{10\frac{2}{5} = w}$$

$$10. \quad \left[\frac{2x+5}{3} = \frac{4}{5} \right]$$

$$5(2x+5) = 3(4)$$

$$10x + 25 = 12$$

$$10x = 12 - 25$$

$$\frac{10x}{10} = \frac{-13}{10}$$

$$x = -1\frac{3}{10}$$

$$10. \quad \underline{x = -1\frac{3}{10}}$$

$$11. \quad \left[\frac{11z}{2-5z} = \frac{4}{7} \right] \quad 7(2-5z)$$

$$(11z)7 = 4(2-5z)$$

$$77z = 8 - 20z$$

$$77z + 20z = 8$$

$$97z = 8$$

$$z = \frac{8}{97}$$

$$11. \quad \underline{z = \frac{8}{97}}$$

$$12. \quad \left[\frac{3t+1}{4} = \frac{5t-2}{2} + \frac{2t+3}{5} \right]$$

$$5(3t+1) = 10(5t-2) + 4(2t+3)$$

$$15t+5 = 50t-20 + 8t+12$$

$$15t+5 = 58t-8$$

$$5+8 = 58t-15t$$

$$13 = 43t$$

$$\frac{13}{43} = t$$

$$12. \quad \frac{13}{43} = t$$

Technology Problems: Do not work these out by hand, simply zero them out and use the calculator to solve them. Answer to **four decimal places** when appropriate.

A. $3.523(4.16x - 6) = 11.233x + 4$

A. $x = 7.3445$

$$y = 3.523(4.16x - 6) - 11.233x - 4$$

B. $2t^2 - 5t = 9$

B. $x = \{-1.2122, 3.7122\}$

C. $2p^3 - 3p = 5p^2 - 2$

C. $x = \{-.8195, .4210, 2.8985\}$

Solve each inequality. Put answers in set building notation and graph.

13. $2j + 11 > 5j - 3$

$$11 + 3 > 5j - 2j$$

$$\frac{14}{3} > \frac{3j}{3}$$

$$4\frac{2}{3} > j$$

13. $\{j \mid j < 4\frac{2}{3}\}$



14. $\left[\frac{2p+9}{3} \leq -4\right]^3$

$$2p + 9 \leq -12$$

$$2p \leq -12 - 9$$

$$\frac{2p}{2} \leq \frac{-21}{2}$$

$$p \leq -10\frac{1}{2}$$

14. $\{p \mid p \leq -10\frac{1}{2}\}$



15. $5w > 2(2w - 4)$ and $2(w - 4) + 2 < 12$

$$5w > 4w - 8$$

$$5w - 4w > -8$$

$$w > -8$$

$$2w - 8 + 2 < 12$$

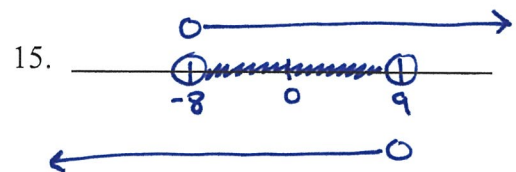
$$2w - 6 < 12$$

$$2w < 12 + 6$$

$$\frac{2w}{2} < \frac{18}{2}$$

$$w < 9$$

15. $\{w \mid w > -8\}$ and $\{w \mid w < 9\}$



16. $5t - 8 > 7t + 12$ or $5t - 14 \geq 2t - 4$

$$-8 - 12 > 5t + 7t$$

$$-20 > 2t$$

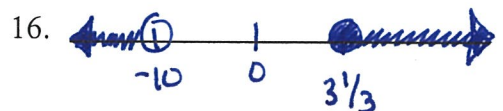
$$-10 > t$$

$$5t - 2t \geq -4 + 14$$

$$3t \geq 10$$

$$t \geq 3\frac{1}{3}$$

16. $\{t \mid t < -10\}$ or $\{t \mid t \geq 3\frac{1}{3}\}$

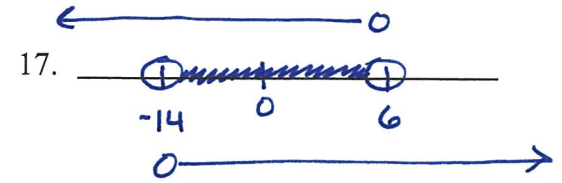


27. $|x+4| < 10$

$x+4 < 10$ AND $x+4 > -10$

$x < 6$ AND $x > -10-4$
 $x > -14$

17. $\{x|x < 6\}$ AND $\{x|x > -14\}$



18. $|2z+5| \geq -13$

$2z+5 \geq -13$ or $2z+5 \leq 13$

$2z \geq -18$ $2z \leq 8$
 $z \geq -9$ $z \leq 4$

18. $\{z|z \geq -9\}$ OR $\{z|z \leq 4\}$



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Age Problems

Ben is 10 years older than Alice and 20 years younger than Carl. Twenty years ago, Ben's age was the same as the combined ages of Alice and Carl. What is the present age of each today?

Names	Ages	-20
Ben	B	B-20
Alice	B-10	B-30
Carl	B+20	B

BEN = ALICE + CARL

$B-20 = B-30 + B$

$B-20 = 2B-30$

$-20+30 = 2B-13$

$10 = B$

<p>BEN = 10 YRS ALICE = 0 YRS CARL = 30 YRS</p>

Integer Problems

Find four consecutive integers such that when the difference of the greatest and least is combined with the sum of the middle two integers the result is 46.

FIRST: $x+1$
SECOND: $x+2$
THIRD: $x+3$
FOURTH: $x+4$

$$(\text{FOURTH} - \text{FIRST}) + (\text{SECOND} + \text{THIRD}) = 46$$

$$x+4 - (x+1) + x+2 + x+3 = 46$$

$$\underline{x+4} - \underline{x-1} + \underline{x+2} + \underline{x+3} = 46$$

$$2x + 8 = 46$$

$$2x = 46 - 8$$

$$\frac{2x}{2} = \frac{38}{2}$$

$$x = 19$$

FIRST: 20
SECOND: 21
THIRD: 22
FOURTH: 23

Number Problems

The sum of two numbers is 30. Twice the smaller increased by the larger is 40. Find the two numbers.

ONE: R
OTHER: $30-R$

$$2[\text{ONE}] + [\text{OTHER}] = 40$$

$$2R + 30 - R = 40$$

$$R + 30 = 40$$

$$R = 40 - 30$$

$$R = 10$$

ONE: 10
OTHER: 20

Mixture Problems

Some 12¢ balloons and some 18¢ balloons are mixed to make a package of 20 balloons. How many balloons of each kind are needed to make a package worth \$3.06?

Type	Amount	Price ¢	Total
Ballon A	B	12	$12B$
Ballon B	$20-B$	18	$360-18B$
Mixture	20		306

$$T_A + T_B = T_M$$

$$12B + 360 - 18B = 306$$

$$360 - 6B = 306$$

$$360 - 306 = 6B$$

$$\frac{54}{6} = \frac{6B}{6}$$

$$9 = B$$

BALLOON A = 9
BALLOON B = 11

Translate Each of The Following (DO NOT SOLVE THESE)

20. **Five** times a number, increased by **seven**, is equal to **four** times the number, decreased by **three**. (Use "n" to represent the number)

20. $5n + 7 = 4n - 3$

21. **Three** times the difference of a **nine** times a number and **seven**, is the same as, **six** times the number, increased by **fourteen**. (Use "n" to represent the number)

21. $3(9n - 7) = 6n + 14$

Linear Forms

Write the equation in the indicated form.

22. $+3 \left\langle \begin{matrix} (9, 5) \\ (12, 4) \end{matrix} \right\rangle -1$

$$\begin{aligned} y &= -\frac{1}{3}x + c \\ 5 &= -\frac{1}{3}[9] + c \\ 5 &= -3 + c \\ 8 &= c \end{aligned}$$

$$y = -\frac{1}{3}x + 8$$

Slope Int $y = -\frac{1}{3}x + 8$

23. $(4, -3)$
 $m = \frac{-3}{4}$

$$\begin{aligned} y &= -\frac{3}{4}x + c \\ -3 &= -\frac{3}{4}[4] + c \\ -3 &= -3 + c \\ 0 &= c \end{aligned}$$

$$\begin{aligned} y &= -\frac{3}{4}x \\ \frac{3}{4}x + y &= 0 \\ 3x + 4y &= 0 \end{aligned}$$

Standard $3x + 4y = 0$

Write each equation in standard form

24. $y = \frac{2}{3}x - 5$ $-3 \left[-\frac{2}{3}x + y = -5 \right]$
 $2x - 3y = 15$

Standard $2x - 3y = 15$

25. $y = \frac{-4}{7}x + \frac{6}{7}$ $7 \left[\frac{4}{7}x + y = \frac{6}{7} \right]$
 $4x + 7y = 6$

Standard $4x + 7y = 6$

Write each equation in slope intercept form

26. $3x + 4y = 12$

$$\frac{4y}{4} = \frac{-3x + 12}{4}$$

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

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

27. $5x + 8y = 16$

$$\frac{8y}{8} = \frac{-5x + 16}{8}$$

$$y = -\frac{5}{8}x + 2$$

Slope Int $y = -\frac{5}{8}x + 2$

Write the slope, y intercept as an ordered pair, and x intercept as an ordered pair

28. $3x - 4y = 24$

$m = \frac{3}{4}$ y - int = $(0, -6)$ x - int = $(8, 0)$

$$y = \frac{3}{4}x - 6$$

29. $2x + 3y = 20$

$m = -\frac{2}{3}$ y - int = $(0, \frac{20}{3})$ x - int = $(10, 0)$

$$y = -\frac{2}{3}x + \frac{20}{3}$$

30. $y = \frac{-3}{5}x - 4$

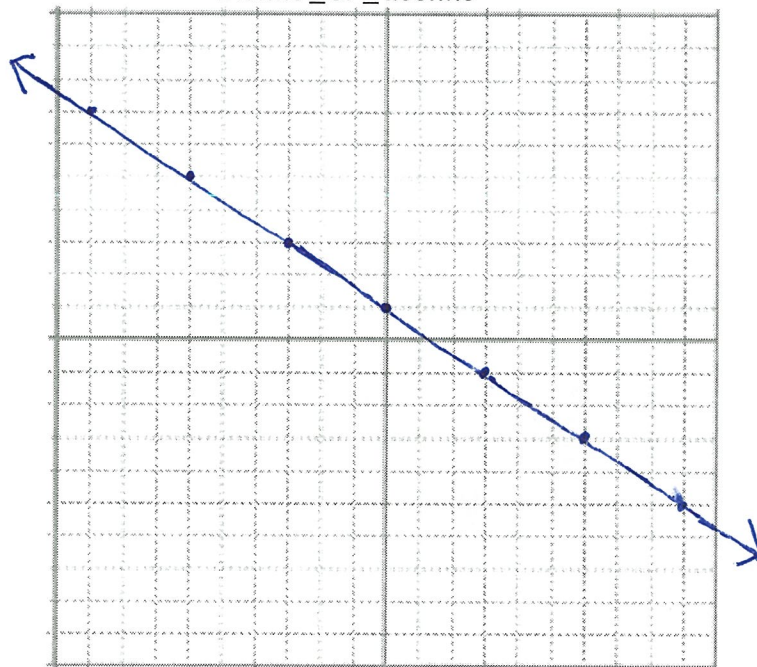
$m = -\frac{3}{5}$ y - int = $(0, -4)$ x - int = $(-\frac{16}{3}, 0)$

$$3x + 5y = -20$$

Graph Each of the following

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

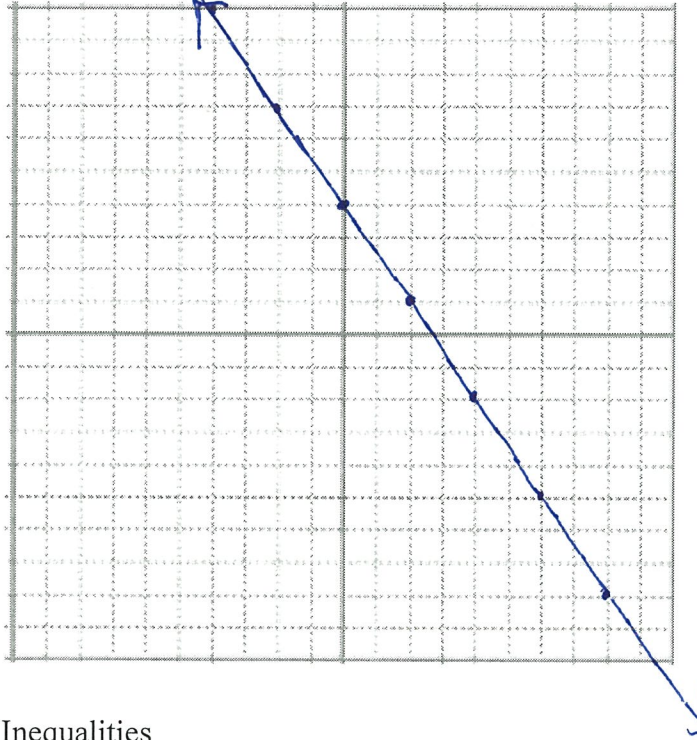
$m = -\frac{2}{3}$ steep_or_shallow SHALLOW incline_or_decline DECLINE y - int = $(0, 1)$



32. $3x + 2y = 8$

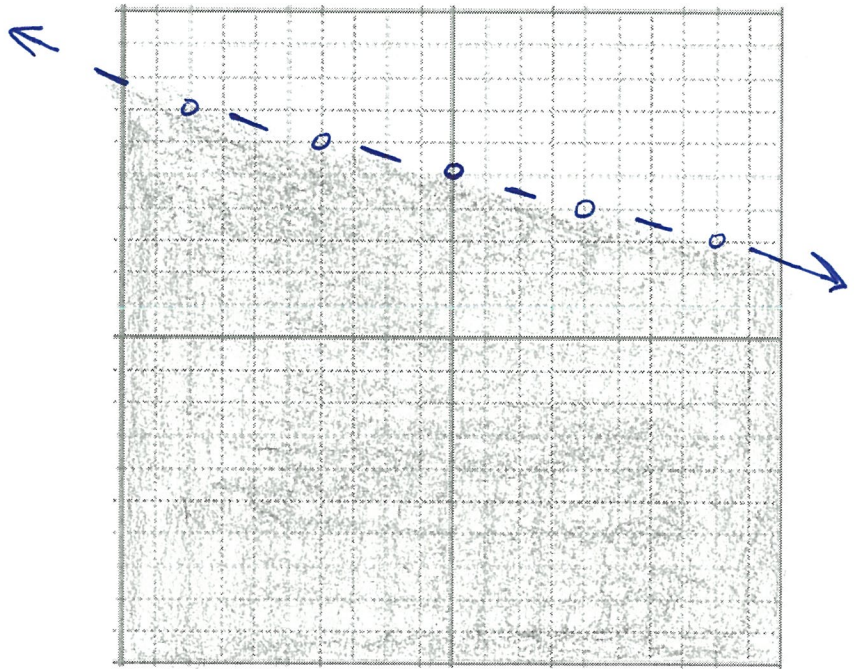
$m = \frac{-3/2}{\text{steep_or_shallow}} \frac{\text{incline_or_decline}}{\text{DECLINE}}$ y - int = 0,4

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

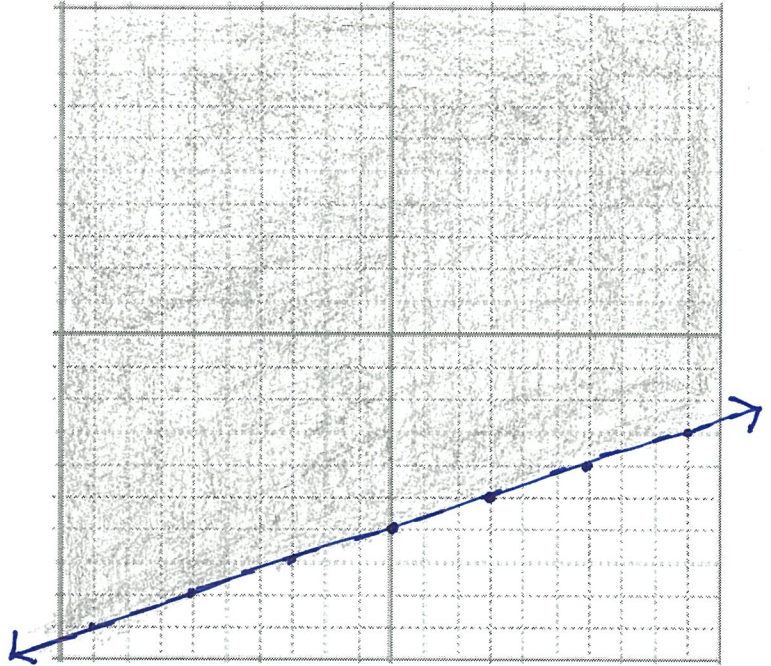


Graph The System of Inequalities

#33. $y < \frac{-1}{4}x + 5$



#34. $y \geq \frac{1}{3}x - 6$



#35. $y \geq \frac{4}{3}x - 2$

