

CUMULATIVE REVIEW
CHAPTERS 1-4

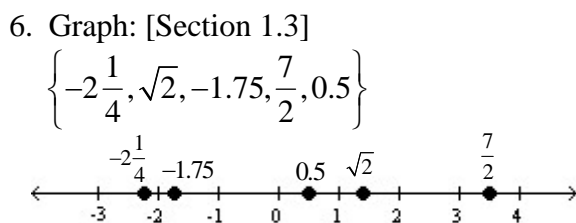
1. SPORTS CARS [Section 1.1]
 a. 1993
 b. 2005

2. Prime Factorization: [Section 1.2]
 $100 = 2 \cdot 50$
 $= 2 \cdot 2 \cdot 25$
 $= 2 \cdot 2 \cdot 5 \cdot 5$
 $= 2^2 \cdot 5^2$

3. Divide: [Section 1.2]
 $\frac{3}{4} \div \frac{6}{5} = \frac{3}{4} \cdot \frac{5}{6}$
 $= \frac{\cancel{3} \cdot 5}{4 \cdot \cancel{2} \cdot \cancel{3}}$
 $= \frac{5}{8}$

4. Subtract: [Section 1.2]
 LCD = $2 \cdot 5 \cdot 7 = 70$
 $\frac{7}{10} - \frac{1}{14} = \frac{7}{10} \cdot \left(\frac{7}{7}\right) - \frac{1}{14} \cdot \left(\frac{5}{5}\right)$
 $= \frac{49-5}{70}$
 $= \frac{44}{70}$
 $= \frac{\cancel{2} \cdot 2 \cdot 11}{\cancel{2} \cdot 5 \cdot 7}$
 $= \frac{22}{35}$

5. Rational or Irrational: [Section 1.3]
 π is irrational.



7. Write as a decimal: [Section 1.3]
 $\frac{2}{3} = 0.\overline{66}$

8. What property of real numbers is illustrated? [Section 1.6]
 $3(2x) = (3 \cdot 2)x$
 Associative property of multiplication

Evaluate each expression.

9. $-3^2 + |4^2 - 5^2|$ [Section 1.7]
 $-3^2 + |4^2 - 5^2| = -(3)(3) + |16 - 25|$
 $= -9 + |-9|$
 $= -9 + 9$
 $= 0$

10. $(4 - 5)^{20}$ [Section 1.7]
 $(4 - 5)^{20} = (-1)^{20}$
 $= 1$

11. $\frac{-3 - (-7)}{2^2 - 3}$ [Section 1.7]
 $\frac{-3 - (-7)}{2^2 - 3} = \frac{-3 + 7}{4 - 3}$
 $= \frac{4}{1}$
 $= 4$

12. $12 - 2[1 - (-8 + 2)]$ [Section 1.7]
 $12 - 2[1 - (-8 + 2)] = 12 - 2[1 - (-6)]$
 $= 12 - 2[1 + 6]$
 $= 12 - 2[7]$
 $= 12 - 14$
 $= -2$

13. RACING [Section 1.8]
 $250 - x$

14. Value of d dimes? [Section 1.8]
 $10d$ cents or $\$0.10d$

Simplify each expression.

15. $13r - 12r = r$ [Section 1.9]

16. $27\left(\frac{2}{3}x\right)$ [Section 1.9]

$$\begin{aligned} 27\left(\frac{2}{3}x\right) &= \frac{27 \cdot 2}{3}x \\ &= \frac{\cancel{27}^1 \cdot 9 \cdot 2}{\cancel{3}_1}x \\ &= 18x \end{aligned}$$

17. $4(d-3) - (d-1)$ [Section 1.9]

$$\begin{aligned} 4(d-3) - (d-1) &= 4d - 4(3) - d + 1 \\ &= 4d - 12 - d + 1 \\ &= 3d - 11 \end{aligned}$$

18. $(13c-3)(-6)$ [Section 1.9]

$$\begin{aligned} (13c-3)(-6) &= -6(13c) - 6(-3) \\ &= -78c + 18 \end{aligned}$$

Solve each equation. Check each result.

19. $3(x-5) + 2 = 2x$ [Section 2.2]

$$\begin{aligned} 3(x-5) + 2 &= 2x \\ 3(x) - 3(5) + 2 &= 2x \\ 3x - 15 + 2 &= 2x \\ 3x - 13 &= 2x \\ 3x - 13 - 3x &= 2x - 3x \\ -13 &= -x \\ \frac{-13}{-1} &= \frac{-x}{-1} \\ 13 &= x \end{aligned}$$

Check: $x = 13$

$$\begin{aligned} 3(x-5) + 2 &= 2x \\ 3(\mathbf{13} - 5) + 2 &= 2(\mathbf{13}) \\ 3(8) + 2 &= 26 \\ 24 + 2 &= 26 \end{aligned}$$

$$26 = 26 \text{ True}$$

The solution is 13.

20. $\frac{x-5}{3} - 5 = 7$ [Section 2.2]

$$\begin{aligned} \frac{x-5}{3} - 5 &= 7 \\ 3\left(\frac{x-5}{3} - 5\right) &= 3(7) \\ 3\left(\frac{x-5}{3}\right) - 3(5) &= 3(7) \\ x - 5 - 15 &= 21 \\ x - 20 &= 21 \\ x - 20 + \mathbf{20} &= 21 + \mathbf{20} \\ x &= 41 \end{aligned}$$

Check: $x = 41$

$$\begin{aligned} \frac{x-5}{3} - 5 &= 7 \\ \frac{\mathbf{41} - 5}{3} - 5 &= 7 \\ \frac{36}{3} - 5 &= 7 \\ 12 - 5 &= 7 \\ 7 &= 7 \text{ True} \end{aligned}$$

The solution is 41.

$$21. \frac{2}{5}x + 1 = \frac{1}{3} + x \quad [\text{Section 2.2}]$$

$$\frac{2}{5}x + 1 = \frac{1}{3} + x$$

$$15\left(\frac{2}{5}x + 1\right) = 15\left(\frac{1}{3} + x\right)$$

$$15\left(\frac{2}{5}x\right) + 15(1) = 15\left(\frac{1}{3}\right) + 15(x)$$

$$6x + 15 = 5 + 15x$$

$$6x + 15 - 5 = 5 + 15x - 5$$

$$6x + 10 = 15x$$

$$6x + 10 - 6x = 15x - 6x$$

$$10 = 9x$$

$$\frac{10}{9} = \frac{9x}{9}$$

$$\frac{10}{9} = x$$

$$\text{Check: } x = \frac{10}{9}$$

$$\frac{2}{5}x + 1 = \frac{1}{3} + x$$

$$\frac{2}{5}\left(\frac{10}{9}\right) + 1 = \frac{1}{3} + \frac{10}{9}$$

$$\frac{2 \cdot 2 \cdot \cancel{5}^1}{\cancel{5}_1 \cdot 9} + 1 = \frac{1}{3} + \frac{10}{9}$$

$$\frac{4}{9} + \frac{9}{9} = \frac{1}{3} + \frac{10}{9}$$

$$\frac{13}{9} = \frac{13}{9} \quad \text{True}$$

The solution is $\frac{10}{9}$.

$$22. -\frac{5}{8}h = 15 \quad [\text{Section 2.2}]$$

$$-\frac{5}{8}h = 15$$

$$-\frac{8}{5}\left(-\frac{5}{8}h\right) = -\frac{8}{5}(15)$$

$$h = -24$$

Check: $h = -24$

$$-\frac{5}{8}h = 15$$

$$-\frac{5}{8}(-24) = 15$$

$$15 = 15 \quad \text{True}$$

The solution is 24.

23. GYMNASTICS [Section 2.3]

85% of what number is 119.

$$0.85 \square \quad x = 119$$

$$0.85x = 119$$

$$\frac{0.85x}{0.85} = \frac{119}{0.85}$$

$$x = 140$$

Check: $x = 140$

$$0.85x = 119$$

$$0.85(\mathbf{140}) = 119$$

$$119 = 119 \quad \text{True}$$

The maximum number of children is 140.

24. Solve: $A = \frac{1}{2}h(b+B)$ for h . [Section 2.4]

$$A = \frac{1}{2}h(b+B)$$

$$2(A) = 2\left[\frac{1}{2}h(b+B)\right]$$

$$2A = h(b+B)$$

$$\frac{2A}{b+B} = \frac{h(b+B)}{b+B}$$

$$\frac{2A}{b+B} = h$$

$$h = \frac{2A}{b+B}$$

25. MIXING CANDY [Section 2.6]

Analyze the Problem

- Lemon gumdrops sell for \$4.40 per lb.
- Red licorice bits sell for \$3.80 per lb.
- The blend is to sell for \$4 per lb.
- A blend of 30 lb is needed.
- How many pounds of each is needed?

Form an Equation

Let x = the number of pounds lemon gumdrops

$30 - x$ = the number of pounds red licorice

	Number	Value	=	Total value
Lemon	x	4.40		$4.40x$
Licorice	$30 - x$	3.80		$3.80(30 - x)$
Blend	30	4.00		120

The value of the lemon gumdrops	plus	the value of the licorice	equals	the total value of the blend.
$4.40x$	+	$3.80(30 - x)$	=	120

Solve the Equation

$$4.40x + 3.80(30 - x) = 120$$

$$4.40x + 3.80(30) - 3.80(x) = 120$$

$$4.40x + 114 - 3.80x = 120$$

$$0.60x + 114 = 120$$

$$0.60x + 114 - 114 = 120 - 114$$

$$0.60x = 6$$

$$\frac{0.60x}{0.60} = \frac{6}{0.60}$$

$$x = 10$$

licorice

$$30 - x = 30 - 10$$

$$= 20$$

State the Conclusion

10 lb of the \$4.40/lb lemon drops will be needed.

20 lb of the \$3.80/lb licorice will be needed.

Check the Results

The value of the lemon drops is $10(\$4.40)$, or \$44.

The value of the licorice is $20(\$3.80)$, or \$76.

The value of the blend is $30(\$4)$, or \$120.

Since the total was $\$44 + \$76 = \$120$, the answers check.

26. Solve: $8(4+x) > 10(6+x)$ [Section 2.7]

$$8(4+x) > 10(6+x)$$

$$8(4) + 8(x) > 10(6) + 10(x)$$

$$32 + 8x > 60 + 10x$$

$$32 + 8x - 32 > 60 + 10x - 32$$

$$8x > 10x + 28$$

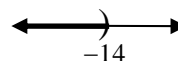
$$8x - 10x > 10x + 28 - 10x$$

$$-2x > 28$$

$$\frac{-2x}{-2} < \frac{28}{-2}$$

$$x < -14$$

$$(-\infty, -14)$$



27. In what quadrant does $(-3.5, 6)$ lie? [Section 3.1] **Quadrant II**

28. Is $(-2, 8)$ a solution of $y = -2x + 3$? [Section 3.2]

$$y = -2x + 3$$

?

$$8 = -2(-2) + 3$$

?

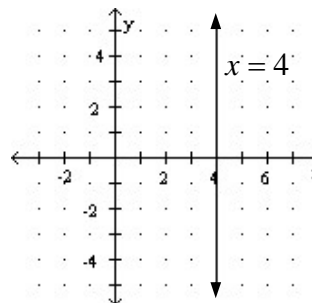
$$8 = 4 + 3$$

$$8 = 7 \text{ False}$$

$(-2, 8)$ is not a solution.

Graph each equation.

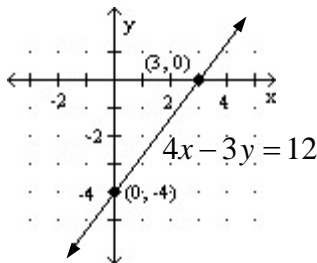
29. $x = 4$ [Section 3.2]



30. $4x - 3y = 12$ [Section 3.3]

y-intercept:	x-intercept:
If $x = 0$,	If $y = 0$
$4(0) - 3y = 12$	$4x - 3(0) = 12$
$-3y = 12$	$4x = 12$
$y = -4$	$x = 3$

The y-intercept is $(0, -4)$, and the x-intercept is $(3, 0)$.



Find the slope of the line with the given properties.

31. Passing through $(-2, 4)$ and $(6, 8)$
[Section 3.4]

$(-2, 4)$ and $(6, 8)$
 (x_1, y_1) and (x_2, y_2)

$$\begin{aligned}
 m &= \frac{y_2 - y_1}{x_2 - x_1} \\
 &= \frac{8 - 4}{6 - (-2)} \\
 &= \frac{4}{6 + 2} \\
 &= \frac{4}{8} \\
 &= \frac{1}{2}
 \end{aligned}$$

32. A line that is horizontal [Section 3.4]

$$m = 0$$

33. An equation of $2x - 3y = 12$ [Section 3.5]

$$\begin{aligned}
 2x - 3y &= 12 \\
 2x - 3y - 2x &= 12 - 2x \\
 -3y &= -2x + 12 \\
 \frac{-3y}{-3} &= \frac{-2x}{-3} + \frac{12}{-3} \\
 y &= \frac{2}{3}x - 4
 \end{aligned}$$

The slope is $\frac{2}{3}$.

34. Are the graphs of the lines parallel or perpendicular? [Section 3.5]

$y = -\frac{3}{4}x + \frac{15}{4}$	$4x - 3y = 25$
$m = -\frac{3}{4}$	$4x - 3y - 4x = 25 - 4x$
	$-3y = -4x + 25$
	$\frac{-3y}{-3} = \frac{-4x}{-3} + \frac{25}{-3}$
	$y = \frac{4}{3}x - \frac{25}{3}$
	$m = \frac{4}{3}$

The slopes are negative reciprocals.
The lines are perpendicular.

Find an equation of the line with the following properties. Write the equation in slope - intercept form.

35. Slope $= \frac{2}{3}$, y-intercept $= (0, 5)$

[Section 3.5]
 $y = mx + b$
 $y = \frac{2}{3}x + 5$

36. Passing through $(-2, 4)$ and $(6, 10)$

[Section 3.6]

Step 1: $(-2, 4)$ and $(6, 10)$

(x_1, y_1) and (x_2, y_2)

$$\begin{aligned} m &= \frac{y_2 - y_1}{x_2 - x_1} \\ &= \frac{10 - 4}{6 - (-2)} \\ &= \frac{6}{6 + 2} \\ &= \frac{6}{8} \\ &= \frac{3}{4} \end{aligned}$$

Step 2: $y - y_1 = m(x - x_1)$

$$y - 10 = \frac{3}{4}(x - 6)$$

$$y - 10 = \frac{3}{4}x - \frac{3}{4}(6)$$

$$y - 10 = \frac{3}{4}x - \frac{9}{2}$$

$$y - 10 + 10 = \frac{3}{4}x - \frac{9}{2} + \frac{20}{2}$$

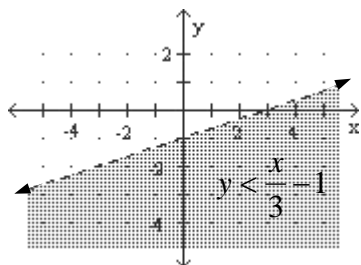
$$y = \frac{3}{4}x + \frac{11}{2}$$

37. A horizontal line passing through $(2, 4)$

[Section 3.6]

$$y = 4$$

38. Graph: $y < \frac{x}{3} - 1$ [Section 3.7]



39. If $f(x) = -2x^2 - 3x^3$, find $f(-1)$.

[Section 3.8]

$$f(x) = -2x^2 - 3x^3$$

$$f(-1) = -2(-1)^2 - 3(-1)^3$$

$$f(-1) = -2(1) - 3(-1)$$

$$f(-1) = -2 + 3$$

$$f(-1) = 1$$

40. Is this a graph of a function?

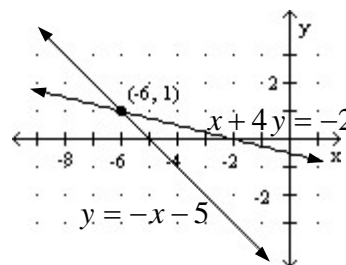
[Section 3.8]

No

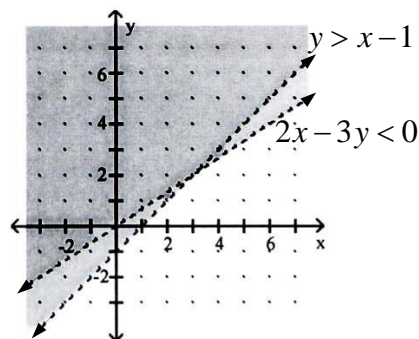
Solve each system by graphing.

$$41. \begin{cases} x + 4y = -2 \\ y = -x - 5 \end{cases} \quad \text{[Section 4.1]}$$

The solution is $(-6, 1)$.



$$42. \begin{cases} 2x - 3y < 0 \\ y > x - 1 \end{cases} \quad \text{[Section 4.5]}$$



43. Solve $\begin{cases} x - 2y = 2 \\ 2x + 3y = 11 \end{cases}$ by substitution

[Section 4.2]

$$\begin{cases} x - 2y = 2 \\ 2x + 3y = 11 \end{cases}$$

Solve the 1st equation for x .

$$\begin{cases} x = 2y + 2 \\ 2x + 3y = 11 \end{cases}$$

$$2x + 3y = 11 \quad \begin{array}{l} \text{The 2}^{\text{nd}} \text{ equation.} \\ \text{Substitute for } x. \end{array}$$

$$2(2y + 2) + 3y = 11$$

$$4y + 4 + 3y = 11$$

$$7y + 4 = 11$$

$$7y + 4 - 4 = 11 - 4$$

$$7y = 7$$

$$\frac{7y}{7} = \frac{7}{7}$$

$$y = 1$$

$$x = 2y + 2 \quad \text{The 1}^{\text{st}} \text{ equation}$$

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

$$x = 4$$

The solution is (4,1).

44. NUTRITION [Section 4.4]

Analyze the Problem

- Protein in 1 serving of egg noodles: 5 g
- Protein in 1 serving of rice pilaf: 4 g
- Wants to consume only 22 g of protein.
- Fat in 1 serving of egg noodles: 3 g
- Fat in 1 serving of rice pilaf: 5 g
- Wants to consume only 21 g of fat.

Form the System

Let x = # of servings of egg noodles

y = # of servings of rice pilaf

	Grams •	Servings =	Total Protein
Noodles	5	x	5x
Rice	4	y	4y
		Total	22

The grams of protein in egg noodles	plus	the grams of protein in rice pilaf	is	22 grams.
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$$5x + 4y = 22$$

Grams • Servings = Total Fat

	Grams •	Servings =	Total Fat
Noodles	3	x	3x
Rice	5	y	5y
		Total	21

The grams of fat in egg noodles	plus	the grams of fat in rice pilaf	is	21 grams.
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$$3x + 5y = 21$$

Solve the System

$$\begin{cases} 5x + 4y = 22 \\ 3x + 5y = 21 \end{cases}$$

Eliminate x .

Multiply both sides of the 1st equation by -3 .

Multiply both sides of the 2nd equation by 5.

$$-15x - 12y = -66$$

$$15x + 25y = 105$$

$$13y = 39$$

$$13y = 39$$

$$\mathbf{13} = \mathbf{13}$$

$$y = 3$$

$$5x + 4y = 22 \quad \text{The 1}^{\text{st}} \text{ equation}$$

$$5x + 4(\mathbf{3}) = 22$$

$$5x + 12 - \mathbf{12} = 22 - \mathbf{12}$$

$$\frac{5x}{5} = \frac{10}{5}$$

$$\mathbf{5} = \mathbf{5}$$

$$x = 2$$

State the Conclusion

2 servings of egg noodles.

3 servings of rice pilaf.

Check the Results

The results check.