

Note that the worked-out solutions do not restate the problems but rather show the subsequent steps.

Quiz 1

1. The first step is C.
2. $3 + 4 = 7$
3. $28 - 12 \div 3 = 28 - 4 = 24$
4. $5^2 - 4 \times (8 - 3) = 5^2 - 4 \times 5 = 25 - 20 = 5$
5. $(-3)^4 \div 9 \times (-1)^3 + 8 = 81 \div 9 \times (-1) + 8 = 9 \times (-1) + 8 = -9 + 8 = -1$

Quiz 2

1. $4(-2) + 7 = -1$
2. $5^2 - 4 \cdot 5 \cdot 4 + 4 \cdot 4^2 = 9$
3. $(2x - x) + (-3 + 5) = x + 2$
4. $5x + 5 - 8 + 2x = (5x + 2x) + (5 - 8) = 7x - 3$
5. $x - 3x^2 + 3x + 5x + x^2 = (-3x^2 + x^2) + (x + 3x + 5x) = -2x^2 + 9x$

Quiz 3

1. The first step is A.
2. Subtract 4 from both sides: $x = 6$
3. Divide both sides by -7 : $x = -9$
4. Subtract 4 from both sides: $5x = 15$
Divide both sides by 5: $x = 3$
5. Subtract 9 from both sides: $-3x = 15$
Divide both sides by -3 : $x = -5$

Quiz 4

1. Subtract $7x$ from both sides: $-5x + 1 = 3$
Subtract 1 from both sides: $-5x = 2$
Divide both sides by -5 : $x = -2/5$
2. Simplify each side: $2x + 2 = -2x + 8$
Add $2x$ to both sides: $4x + 2 = 8$
Subtract 2 from both sides: $4x = 6$
Divide both sides by 4: $x = 6/4$
Simplify: $x = 3/2$
3. Simplify each side: $8 = -4x + 15$
Switch sides: $-4x + 15 = 8$
Subtract 15 from both sides: $-4x = -7$
Divide both sides by -4 : $x = 7/4$
4. Simplify each side: $6x - 7 = 4x - 5$
Subtract $4x$ from both sides: $2x - 7 = -5$
Add 7 to both sides: $2x = 2$
Divide both sides by 2: $x = 1$

5. Simplify each side: $-x - 4 = 2x - 6$
Subtract $2x$ from both sides: $-3x - 4 = -6$
Add 4 to both sides: $-3x = -2$
Divide both sides by -3 : $x = 2/3$

Quiz 5

1. The least common denominator is 12.
2. Multiply both sides by 10: $3x - 12 = -5x + 4$
Add $5x$ to both sides: $8x - 12 = 4$
Add 12 to both sides: $8x = 16$
Divide both sides by 8: $x = 2$
3. Multiply both sides by 100: $2x + 25 = -3x - 50$
Add $3x$ to both sides: $5x + 25 = -50$
Subtract 25 from both sides: $5x = -75$
Divide both sides by 5: $x = -15$
4. Multiply both sides by 20: $15x + 4 = 10x + 8$
Subtract $10x$ from both sides: $5x + 4 = 8$
Subtract 4 from both sides: $5x = 4$
Divide both sides by 5: $x = 4/5$
5. Multiply both sides by 4: $2(3x + 1) = 8x + 3$
Simplify each side: $6x + 2 = 8x + 3$
Subtract $8x$ from both sides: $-2x + 2 = 3$
Subtract 2 from both sides: $-2x = 1$
Divide both sides by -2 : $x = -1/2$

Quiz 6

1. Write two equations: $3x = 21$ or $3x = -21$
Solve each equation: $x = 7$ or $x = -7$
2. Write two equations: $x - 7 = 5$ or $x - 7 = -5$
Solve each equation: $x = 12$ or $x = 2$
3. Isolate the bars. $|4x + 1| = 5$
Write two equations: $4x + 1 = 5$ or $4x + 1 = -5$
Solve each equation: $4x = 4$ or $4x = -6$
 $x = 1$ or $x = -3/2$
4. Isolate the bars: $-3|x - 2| = -5$
 $|x - 2| = 5/3$
Write two equations: $x - 2 = 5/3$ or $x - 2 = -5/3$
Solve each equation: $x = 11/3$ or $x = 1/3$
5. Isolate the bars: $5|2x + 3| = 15$
 $|2x + 3| = 3$
Write two equations: $2x + 3 = 3$ or $2x + 3 = -3$
Solve each equation: $2x = 0$ or $2x = -6$
 $x = 0$ or $x = -3$

Quiz 7

1. $2x = 6$
 $x = 3$
2. $8x - 1 = 5$
 $8x = 6$
 $x = 6/8 = 3/4$
3. $5x + 4 = -2x + 5$
 $7x + 4 = 5$
 $7x = 1$
 $x = 1/7$
4. $3x + 4 = 18x - 6$
 $-15x + 4 = -6$
 $-15x = -10$
 $x = (-10)/(-15)$
 $x = 2/3$
5. $-5|2x - 3| = -25$
 $|2x - 3| = 5$
 $2x - 3 = 5$ or $2x - 3 = -5$
 $2x = 8$ or $2x = -2$
 $x = 4$ or $x = -1$

Quiz 8

1. $0x + 3 = 5$
 $0x = 2$
No solution
2. $2x - 5 = x$
 $x - 5 = 0$
 $x = 5$
3. $11x + 8 = 11x + 8$
 $0x + 8 = 8$
 $0x = 0$
Infinitely many solutions
4. $|4x - 7| = -6$
No solution
5. $3|x + 4| = 15$
 $|x + 4| = 5$
 $x + 4 = 5$ or $x + 4 = -5$
 $x = 1$ or $x = -9$

Quiz 9

1. Let x = the first even integer
 $x + 2$ = the second even integer
The sum is 54, so $x + (x + 2) = 54$.
Solve for x , and you get $x = 26$.
The numbers are 26 and 28.
2. Let x = the width of the rectangle
 $3x - 5$ = the length of the rectangle
Perimeter = $2(\text{length} + \text{width})$, so $2(x + 3x - 5) = 30$.
Solve for x , and you get $x = 5$.
The rectangle is 5 feet by 10 feet.
3. Let x = the number of nickels
 $x + 2$ = the number of quarters
Total value = x nickels at \$0.05 each + $(x + 2)$ quarters at \$0.25 each, so $0.05x + 0.25(x + 2) = 1.40$.
Solve for x , and you get $x = 3$.
Joey has 3 nickels and 5 quarters.

4. Let x = the cost before the tip
 $0.2x$ = the tip
The total cost = the cost before the tip + the tip,
so $x + 0.2x = 60$.
Solve for x , and you get $x = 50$.
The cost of the meal before the tip was \$50.
5. Let x = Emma's age
 $x + 4$ = Michael's age
 $x - 5$ = Emma's age 5 years ago
 $(x + 4) - 5$ = Michael's age 5 years ago
The sum was 20, so $x - 5 + (x + 4) - 5 = 20$.
Solve for x , and you get $x = 13$.
Emma is 13 years old. Michael is 17 years old.

Quiz 10

1. Let t = travel time in hours
 $D = rt$, so $195 = 65t$.
Solve for t , and you get $t = 3$.
It will take 3 hours.
2. Let t = travel time in hours
 $D = rt$, so $30 \times (20/60) = 40t$.
Solve for t , and you get $t = 1/4$.
It will take $1/4$ hour, or 15 minutes.
3. Let t = time it will take to meet each other
Total distance traveled in t hours = Eli's distance + Alex's distance = 12 miles, so $4t + 6t = 12$.
Solve for t , and you get $t = 1.2$.
It will take 1.2 hours, or 1 hour and 12 minutes.
4. Let t = time taken to walk the circle the first time
 $4.5 - t$ = time taken to walk the circle the second time
Distance walked the first time = distance walked the second time, so $4t = 5(4.5 - t)$.
Solve for t , and you get $t = 2.5$.
It took 2.5 hours to walk the circle at 4 mph, so the trail is $4 \times 2.5 = 10$ miles long.
5. Let t = time it will take Lucas to overtake Olivia
 $1 + t$ = time Olivia will travel until Lucas overtakes her
Lucas's distance in t hours =
Olivia's distance in $(1 + t)$ hours, so $14t = 10(1 + t)$.
Solve for t , and you get $t = 2.5$.
It will take 2.5 hours, or 2 hours and 30 minutes.

Quiz 11

- Amount of salt = 20% of 30 grams = $0.2 \times 30 = 6$
There are 6 grams of salt in the solution.
- Let w = amount of water to mix
Substance = salt = 10 g
Solution = salt + water = $10 + w$ g
Concentration = 25% = 0.25
Concentration \times solution = substance,
so $0.25(10 + w) = 10$.
Solve for w , and you get $w = 30$.
You need to mix 30 grams of water.
- Let x = ounces of 10% solution
 $x + 6$ = ounces of 12% solution
Acid in 10% solution + acid in 15% solution = acid in 12% solution, so $0.1x + 0.15 \times 6 = 0.12(x + 6)$.
Solve for x , and you get $x = 9$.
We need to add 9 ounces of 10% solution.
- Cost of nuts at \$4 per pound = $\$4 \times 2 = \8
Cost of nuts at \$6 per pound = $\$6 \times 3 = \18
Cost of the mixture = $\$8 + \$18 = \$26$
Amount of the mixture = $2 + 3 = 5$ pounds
Unit price = cost/quantity = $26/5 = 5.2$.
The mixture costs \$5.20 per pound.
- Let x = pounds of peanuts
 $x + 6$ = pounds of the mixture
Cost of peanuts + cost of cashews = cost of the mixture,
so $3x + 5 \times 6 = 4.5(x + 6)$.
Solve for x , and you get $x = 2$.
We need to mix 2 pounds of peanuts.

Quiz 12

- Switch sides: $x - y = 2x - 1$
Subtract x from both sides: $-y = x - 1$
Divide both sides by -1 : $y = -x + 1$
- Simplify each side: $3x + 3y = 4y + 5$
Subtract $4y$ from both sides: $3x - y = 5$
Subtract $3x$ from both sides: $-y = -3x + 5$
Divide both sides by -1 : $y = 3x - 5$
- Multiply both sides by 6: $2y + 5x = 6x - 4$
Subtract $5x$ from both sides: $2y = x - 4$
Divide both sides by 2: $y = \frac{1}{2}x - 2$
- Switch sides: $2l + 2w = P$
Subtract $2l$ from both sides: $2w = P - 2l$
Divide both sides by 2: $w = \frac{P - 2l}{2}$

- Switch sides: $\frac{9}{5}C + 32 = F$
Subtract 32 from both sides: $\frac{9}{5}C = F - 32$
Multiply both sides by $5/9$: $C = \frac{5}{9}(F - 32)$

Quiz 13

- $6 + (3 \times 8 - 16 \div 4) \div 5 = 6 + (24 - 4) \div 5$
 $= 6 + 20 \div 5 = 6 + 4 = 10$
- $6x = 15$
 $x = 15/6$
 $x = 5/2$
- $6x - 12 = 3x - 8$
 $3x - 12 = -8$
 $3x = 4$
 $x = 4/3$
- $3|2x + 5| = 15$
 $|2x + 5| = 5$
 $2x + 5 = 5$ or $2x + 5 = -5$
 $2x = 0$ or $2x = -10$
 $x = 0$ or $x = -5$
- Let t = time it will take to be 920 miles apart
Train 1's distance + train 2's distance = 920,
so $110t + 120t = 920$.
Solve for t , and you get $t = 4$.
It will take 4 hours.

Quiz 14

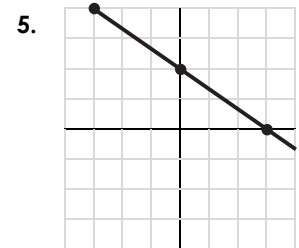
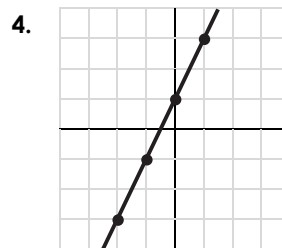
- The statement **C** is true.

2.

x	-2	0	2	4	6
y	-7	-3	1	5	9

3.

x	-4	-2	0	2	4
y	8	5	2	-1	-4

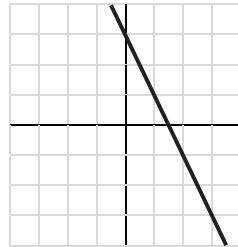
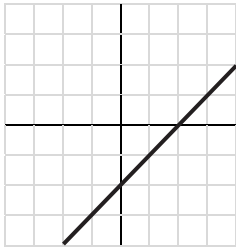


Quiz 15

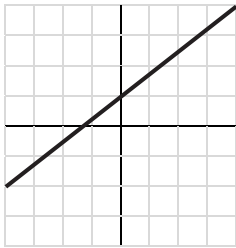
- You can pick any two points.
Rise = 3 and run = -1, so slope = $3/(-1) = -3$.
(Or rise = -3 and run = 1, so slope = $-3/1 = -3$.)
- $\frac{8-2}{1-(-2)} = \frac{6}{3} = 2$
- $\frac{-2-10}{6-3} = \frac{-12}{3} = -4$
- $\frac{0-4}{-8-2} = \frac{-4}{-10} = \frac{2}{5}$
- $\frac{5-9}{-4-4} = \frac{-4}{-8} = \frac{1}{2}$

Quiz 16

- $m = -1, y\text{-int} = 5$
- $m = 1/4, y\text{-int} = -3$
- $m = 1, y\text{-int} = -2$
- $m = -2, y\text{-int} = 3$

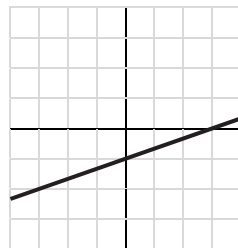
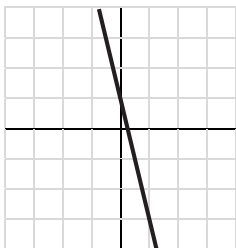


- $m = 3/4, y\text{-int} = 1$

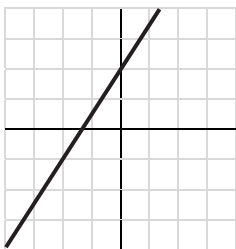


Quiz 17

- $y = x - 5$
 $m = 1, y\text{-int} = -5$
- $y = -\frac{1}{2}x + 4$
 $m = -1/2, y\text{-int} = 4$
- $m = -4, y\text{-int} = 1$
- $m = 1/3, y\text{-int} = -1$

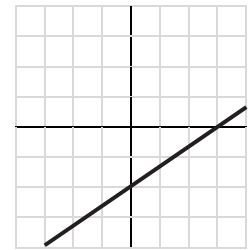
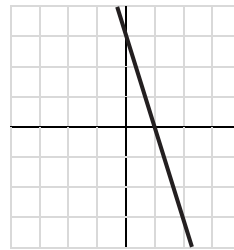


- $m = 3/2, y\text{-int} = 2$

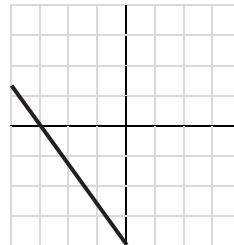


Quiz 18

- When $y = 0, x = 6$.
When $x = 0, y = -3$.
 $x\text{-int} = 6, y\text{-int} = -3$
- When $y = 0, x = 3$.
When $x = 0, y = 5$.
 $x\text{-int} = 3, y\text{-int} = 5$
- $x\text{-int} = 1, y\text{-int} = 3$
- $x\text{-int} = 3, y\text{-int} = -2$



- $x\text{-int} = -3, y\text{-int} = -4$

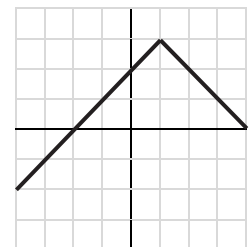
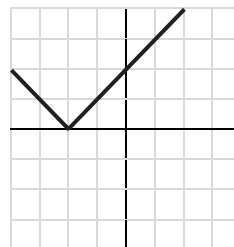


Quiz 19

- $x = 3$
- $y = -2$
- 1st line: $m = 5$
2nd line: $m = -1/5$
Perpendicular
- 1st line: $m = -2/3$
2nd line: $m = -2/3$
Parallel
- 1st line: $m = -3/4$
2nd line: $m = -3$
Neither

Quiz 20

- $x = -2$ makes $|x + 2| = 0$.
 $y = 0$ when $x = -2$.
The vertex is $(-2, 0)$.
- $x = 1$ makes $|x - 1| = 0$.
 $y = 3$ when $x = 1$.
The vertex is $(1, 3)$.



- Vertex: $(0, -5)$
The graph opens up.
- Vertex: $(-3, 0)$
The graph opens down.
- Vertex: $(4, 2)$
The graph opens up.

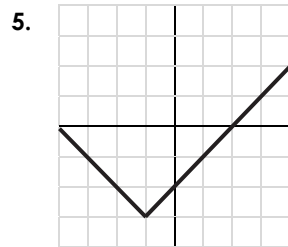
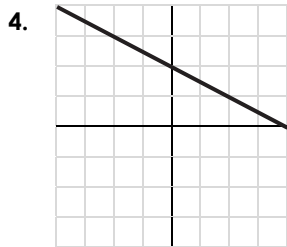
Quiz 21

1. $m = \frac{4-7}{-2-3} = \frac{3}{5}$

2. $m = \frac{3-5}{-2-4} = \frac{1}{3}$

Given $m = 1/3$
Perpendicular $m = -3$

3. The line vertical.
 $x = 4$



Quiz 22

1. $m = -1, y\text{-int} = 2$
 $y = -x + 2$

2. $m = 4, y\text{-int} = 0$
 $y = 4x$

3. $m = 2, y\text{-int} = -1$
 $y = 2x - 1$

4. $m = 1/3, y\text{-int} = 1$
 $y = \frac{1}{3}x + 1$

5. $m = -3, y\text{-int} = 3$
 $y = -3x + 3$

Quiz 23

1. $y = -x + b$ $m = -1$
 $-3 = -8 + b$ Use $(8, -3)$ to find b .
 $b = 5$
 $y = -x + 5$ Write $y = mx + b$.

2. $m = \frac{9 - (-6)}{1 - (-2)} = 5$
 $y = 5x + b$
 $9 = 5(1) + b$
 $b = 4$
 $y = 5x + 4$

3. $m = \frac{3-3}{10 - (-5)} = 0$
 $y = 0x + b$
 $3 = 0(-5) + b$
 $b = 3$
 $y = 3$

4. Given $m = -2$
Parallel $m = -2$
 $y = -2x + b$
 $-7 = -2(6) + b$
 $b = 5$
 $y = -2x + 5$

5. Given $m = 4/3$
Perpendicular $m = -3/4$
 $y = -\frac{3}{4}x + b$
 $-4 = -\frac{3}{4}(8) + b$
 $b = 2$
 $y = -\frac{3}{4}x + 2$

Quiz 24

1. $y - 7 = 4(x - 2)$

2. $m = \frac{4 - (-1)}{-4 - (-3)} = -5$
 $y + 1 = -5(x + 3)$

3. $m = \frac{0 - 8}{3 - (-5)} = -1$
 $y - 8 = -(x + 5)$

4. Given $m = 1/2$
Parallel $m = 1/2$
 $y + 4 = \frac{1}{2}(x - 6)$

5. Given $m = -1/3$
Perpendicular $m = 3$
 $y + 8 = 3(x + 5)$

Quiz 25

1. $y - 5 = -3(x + 1)$
 $y = -3x + 2$
 $3x + y = 2$

2. $m = \frac{-1 - 3}{4 - (-6)} = -\frac{2}{5}$
 $y - 3 = -\frac{2}{5}(x + 6)$
 $y = -\frac{2}{5}x + \frac{3}{5}$
 $2x + 5y = 3$

3. $m = \frac{-2 - 0}{-5 - 7} = \frac{1}{6}$
 $y - 0 = \frac{1}{6}(x - 7)$
 $y = \frac{1}{6}x - \frac{7}{6}$
 $x - 6y = 7$

4. Given $m = \text{undefined}$
Parallel $m = \text{undefined}$
The line is vertical and passes through $(3, -4)$.
 $x = 3$

5. Given $m = -3/2$
Perpendicular $m = 2/3$
 $y - 5 = \frac{2}{3}(x - 5)$
 $y = \frac{2}{3}x + \frac{5}{3}$
 $2x - 3y = -5$

Quiz 26

- a. $m = 8$ and $b = 10$, so $y = 8x + 10$.
b. When $x = 4$, $y = 42$. It will cost \$42.
- a. $m = 42$ and $b = 30$, so $y = 42x + 30$.
b. When $x = 3$, $y = 156$. It will cost \$156.
- a. $m = 7$ and $b = 0$, so $y = 7x$.
b. When $x = 15$, $y = 105$. There will be 105 gallons.
- a. $m = 24 + 6 = 30$ and $b = 50$, so $y = 30x + 50$.
b. When $x = 6$, $y = 230$. It will cost \$230.
- a. $m = -60$ and $b = 1500$, so $y = -60x + 1500$.
b. When $y = 0$, $x = 25$. It will take 25 minutes.

Quiz 27

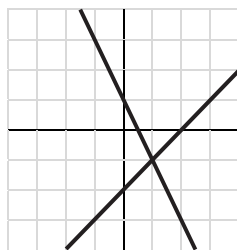
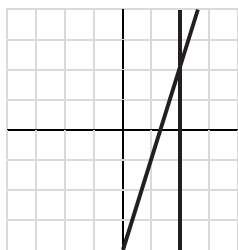
1. a. $5x =$ amount from fives
 $y =$ amount from ones
 Total amount = 64, so $5x + y = 64$.
 b. When $y = 9, x = 11$. She has 11 fives.
2. a. $6x =$ cost of watermelons
 $2y =$ cost of mangos
 Total cost = 30, so $6x + 2y = 30$.
 b. When $x = 3, y = 6$. She can buy 6 mangos.
3. a. $4x =$ points from 4-point questions
 $8y =$ points from 8-point questions
 Total points = 100, so $4x + 8y = 100$.
 b. When $x = 11, y = 7$. There are 7 8-point questions.
4. a. $12x =$ cost of adult tickets
 $10y =$ cost of child tickets
 Total cost = 98, so $12x + 10y = 98$.
 b. When $x = 4, y = 5$. They bought 5 child tickets.
5. a. $2x =$ number of seats from 2-seat tables
 $6y =$ number of seats from 6-seat tables
 Total number of seats = 78, so $2x + 6y = 78$.
 b. When $x = 15, y = 8$. There are 8 6-seat tables.

Quiz 28

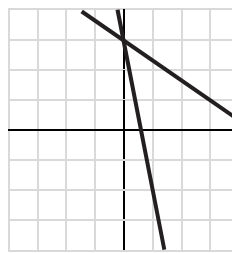
1. $m = 1/4, y\text{-int} = 1$
 $y = \frac{1}{4}x + 1$
 $x - 4y = -4$
2. $y + 7 = -3(x - 5)$
 $y = -3x + 8$
 $3x + y = 8$
3. $m = \frac{-1 - 3}{4 - (-2)} = -\frac{2}{3}$
 $y - 3 = -\frac{2}{3}(x + 2)$
 $y = -\frac{2}{3}x + \frac{5}{3}$
 $2x + 3y = 5$
4. Given $m = 1/2$
 Perpendicular $m = -2$
 $y - 5 = -2(x + 6)$
 $y = -2x - 7$
 $2x + y = -7$
5. a. $m = -500$ and $b = 7000$, so $y = -500x + 7000$.
 b. When $y = 2500, x = 9$. It will take 9 minutes.

Quiz 29

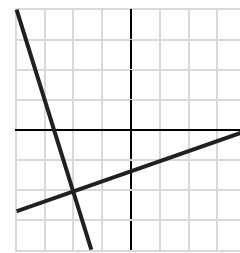
1. The ordered pair **C** makes all the equations true.
2. Solution: (2, 2)
3. Solution: (1, -1)



4. Solution: (0, 3)



5. Solution: (-2, -2)



Quiz 30

1. $y = 3x + 2$
 $x + 6(3x + 2) = 12$
 $19x + 12 = 12$
 $x = 0$
 $y = 3(0) + 2 = 2$
 Solution: (0, 2)
2. $y = 4x - 1$
 $5x - 4(4x - 1) = -7$
 $-11x + 4 = -7$
 $x = 1$
 $y = 4(1) - 1 = 3$
 Solution: (1, 3)
3. $x = -3y - 9$
 $3(-3y - 9) - 2y = -5$
 $-11y - 27 = -5$
 $y = -2$
 $x = -3(-2) - 9 = -3$
 Solution: (-3, -2)
4. $x = 2y + 13$
 $(2y + 13) + 5y = -15$
 $7y + 13 = -15$
 $y = -4$
 $x = 2(-4) + 13 = 5$
 Solution: (5, -4)
5. $y = -3x + 2$
 $2x - 3(-3x + 2) = 27$
 $11x - 6 = 27$
 $x = 3$

→ $y = -3(3) + 2 = -7$
 Solution: (3, -7)

Quiz 31

1. eq1 - eq2
 $10y = 20$
 $y = 2$
 $x + 8(2) = 13$
 $x = -3$
 Solution: (-3, 2)
2. eq1 \times 2 + eq2
 $11x = 22$
 $x = 2$
 $3(2) - y = 15$
 $y = -9$
 Solution: (2, -9)
3. eq1 - eq2 \times 3
 $-7x = 42$
 $x = -6$
 $2(-6) + 6y = 0$
 $y = 2$
 Solution: (-6, 2)
4. eq1 \times 3 + eq2 \times 4
 $25x = 25$
 $x = 1$
 $3(1) + 4y = -9$
 $y = -3$
 Solution: (1, -3)
5. eq1 \times 2 + eq2
 $7x = -35$
 $x = -5$

→ $2(-5) - 5y = -30$
 $y = 4$
 Solution: (-5, 4)

Quiz 32

- | | |
|---|---|
| <p>1. $y = -x + 8$
 $x - 9(-x + 8) = 8$
 $10x - 72 = 8$
 $x = 8$
 $y = -8 + 8 = 0$
 Solution: (8, 0)</p> | <p>2. eq1 + eq2
 $8x = 32$
 $x = 4$
 $3(4) + 2y = 14$
 $y = 1$
 Solution: (4, 1)</p> |
| <p>3. eq1 - eq2 $\times 2$
 $-9y = 36$
 $y = -4$
 $4x + 5(-4) = 8$
 $x = 7$
 Solution: (7, -4)</p> | <p>4. $y = 3x - 12$
 $6x + 5(3x - 12) = 3$
 $21x - 60 = 3$
 $x = 3$
 $y = 3(3) - 12 = -3$
 Solution: (3, -3)</p> |
| <p>5. eq1 $\times 2$ - eq2
 $20y = 20$
 $y = 1$</p> | <p>$\begin{array}{l} \rightarrow \\ \vdots \\ \rightarrow \end{array}$ $2x + 7(1) = 25$
 $x = 9$
 Solution: (9, 1)</p> |

Quiz 33

- | | |
|---|---|
| <p>1. C has no solution.</p> | <p>2. B ($m = 2$, y-int = -5)</p> |
| <p>3. $y = 2x - 9$
 $x + 5(2x - 9) = -1$
 $11x - 45 = -1$
 $x = 4$
 $y = 2(4) - 9 = -1$
 Solution: (4, -1)</p> | <p>4. eq1 $\times 2$ + eq2
 $19x = 0$
 $x = 0$
 $5(0) - y = -7$
 $y = 7$
 Solution: (0, 7)</p> |
| <p>5. eq $\times 2$ + eq2 $\times 3$
 $17x = 85$
 $x = 5$</p> | <p>$\begin{array}{l} \rightarrow \\ \vdots \\ \rightarrow \end{array}$ $4(5) + 3y = 11$
 $y = -3$
 Solution: (5, -3)</p> |

Quiz 34

- x = tens place digit, y = ones place digit
 $x + y = 10$ and $(10x + y) + 18 = 10y + x$
 Solve the system, and you get $x = 4$ and $y = 6$.
 The number is 46.
- x = number of quarters, y = number of dimes
 $y = x + 8$ and $0.25x + 0.1y = 3.60$
 Solve the system, and you get $x = 8$ and $y = 16$.
 Leah has 8 quarters and 16 dimes.
- x = Max's age, y = Kate's age
 $x + y = 32$ and $x - 7 = 2(y - 7)$
 Solve the system, and you get $x = 19$ and $y = 13$.
 Max is 19 years old. Kate is 13 years old.
- x = # of 4-seat tables, y = # of 6-seat tables
 $x + y = 20$ and $4x + 6y = 92$
 Solve the system, and you get $x = 14$ and $y = 6$.
 14 tables seat 4 people and 6 tables seat 6 people.

- x = price of a muffin, y = price of a cookie
 $6x + 3y = 10.20$ and $3x + 12y = 11.40$
 Solve the system, and you get $x = 1.4$ and $y = 0.6$.
 Muffins cost \$1.40 each and cookies cost \$0.60 each.

Quiz 35

- x = time spent in bus 1
 y = time spent in bus 2
 Total travel time = 5 hours, so $x + y = 5$.
 Distance traveled in bus 1 + distance traveled in bus 2 = 332, so $64x + 70y = 332$.
 Solve the system, and you get $x = 3$ and $y = 2$.
 Lynn spent 3 hours in the first bus and 2 hours in the second bus.
- x = speed of the plane in still air
 y = speed of the wind
 $x + y$ = speed of the plane flying with the wind
 $x - y$ = speed of the plane flying against the wind
 Distance with the wind = 2700, so $9(x + y) = 2700$.
 Distance against the wind = 2700, $10(x - y) = 2700$.
 Solve the system, and you get $x = 285$ and $y = 15$.
 The speed of the airplane in still air would be 285 mph, and the speed of the wind was 15 mph.
- x = speed of the boat in still water
 y = speed of the current
 $x + y$ = speed of the boat going downstream
 $x - y$ = speed of the boat going upstream
 Distance = 120, so $3(x + y) = 120$ and $4(x - y) = 120$.
 Solve the system, and you get $x = 35$ and $y = 5$.
 The speed of the boat in still water would be 35 km/h, and the speed of the current was 5 km/h.
- x = speed of train 1, y = speed of train 2
 One is 20 mph faster than the other, so $y = x + 20$.
 Distance train 1 travels in 3 hours + distance train 2 travels in 3 hours = 810, so $3x + 3y = 810$.
 Solve the system, and you get $x = 125$ and $y = 145$.
 One travels at 125 mph and the other at 145 mph.
- x = speed of plane 1, y = speed of plane 2
 One is 40 mph faster than the other, so $y = x + 40$.
 Distance plan 1 travels in 2.5 hours + distance plan 2 travels in 2.5 hours = 1600, so $2.5x + 2.5y = 1600$.
 Solve the system, and you get $x = 300$ and $y = 340$.
 One travels at 300 mph and the other at 340 mph.

Quiz 36

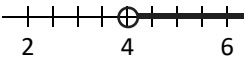
- Let x = liters of water
 $x + 180$ = liters of 18% solution
 Salt in 25% solution = salt in 18% solution,
 so $0.25 \times 180 = 0.18(x + 180)$.
 Solve for x , and you get $x = 70$.
 We need to add 70 liters of water.
- x = gallons of 20% solution
 y = gallons of 50% solution
 Amount of the mixture = 15, so $x + y = 15$.
 Alcohol in 20% solution + alcohol in 50% solution
 = alcohol in the mixture, so $0.2x + 0.5y = 0.4 \times 15$.
 Solve the system, and you get $x = 5$ and $y = 10$.
 Five gallons of the 20% solution and 10 gallons of the
 50% solution should be mixed.
- x = ounces of 15% solution
 y = ounces of 30% solution
 Amount of the mixture = 30, so $x + y = 30$.
 Acid in 15% solution + acid in 30% solution
 = acid in the mixture, so $0.15x + 0.3y = 0.24 \times 30$.
 Solve the system, and you get $x = 12$ and $y = 18$.
 12 ounces of the 15% solution and 18 ounces of the
 30% solution should be mixed.
- x = pounds of coffee A
 y = pounds of coffee B
 Amount of the mixture = 18, so $x + y = 18$.
 Cost of coffee A + cost of coffee B
 = cost of the mixture, so $15x + 12y = 13 \times 18$.
 Solve the system, and you get $x = 6$ and $y = 12$.
 Six pounds of coffee A and 12 pounds of coffee B
 should be mixed.
- x = pounds of walnuts, y = pounds of almonds
 Amount of the mixture = 25, so $x + y = 25$.
 Cost of walnuts + cost of almonds
 = cost of the mixture, so $4.5x + 6y = 5.1 \times 25$.
 Solve the system, and you get $x = 15$ and $y = 10$.
 15 pounds of walnuts and 10 pounds of almonds
 should be used.

Quiz 37

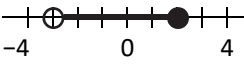
- | | |
|---|---|
| 1. $x = -4$
$4(-4) + 7y = 5$
$y = 3$
Solution: $(-4, 3)$ | 2. $x = -3y - 1$
$3(-3y - 1) - 2y = 19$
$y = -2$
$x = -3(-2) - 1 = 5$
Solution: $(5, -2)$ |
|---|---|

- x = number of adults, y = number of children
 A total of 9 tickets, so $x + y = 9$.
 Total cost = 98, so $12x + 10y = 98$.
 Solve the system, and you get $x = 4$ and $y = 5$.
 There were 4 adults and 5 children in the group.
- x = speed of the boat in still water
 y = speed of the current
 $x + y$ = speed of the boat going downstream
 $x - y$ = speed of the boat going upstream
 Distance = 16, so $2(x + y) = 16$ and $4(x - y) = 16$.
 Solve the system, and you get $x = 6$ and $y = 2$.
 The speed of the boat in still water would be 6 mph,
 and the speed of the current was 2 mph.
- x = ounces of 12% juice, y = ounces of 20% juice
 Amount of the mixture = 16, so $x + y = 16$.
 Pure juice in 12% juice + pure juice in 20% juice
 = pure juice in the mixture, so $0.12x + 0.2y = 0.18 \times 16$.
 Solve the system, and you get $x = 4$ and $y = 12$.
 Four ounces of the 12% juice and 12 ounces of the 20%
 juice should be mixed.

Quiz 38

- 
- Add 1 to both sides: $7x \leq -21$
 Divide both sides by 7: $x \leq -3$
- Simplify each side: $-8x + 10 > 8$
 Subtract 10 from each side: $-8x > -2$
 Divide both sides by -8
 and flip the inequality sign: $x < \frac{1}{4}$
- Multiply both sides by 4: $2x + 3 < 4x - 2$
 Subtract $4x$ from both sides: $-2x + 3 < -2$
 Subtract 3 from both sides: $-2x < -5$
 Divide both sides by -2
 and flip the inequality sign: $x > \frac{5}{2}$
- x = the greater integer $\rightarrow 2x \leq 36$
 $(x - 1) + x \leq 35$ $x \leq 18$
 $2x - 1 \leq 35$ \leftarrow The answer is 18.

Quiz 39

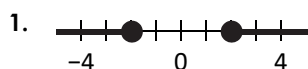
- 
- Subtract 3 from all sides: $-10 \leq 2x < 8$
 Divide all sides by 2: $-5 \leq x < 4$

3. 1st inequality: $x \leq -4$
 2nd inequality: $3x < 15$
 $x < 5$
 1st inequality AND 2nd inequality: $x \leq -4$

4. 1st inequality: $-4x - 10 > 6$
 $-4x > 16$
 $x < -4$
 2nd inequality: $2 + 6x < 8$
 $6x < 6$
 $x < 1$
 1st inequality OR 2nd inequality: $x < 1$

5. Multiply all sides by 10: $3 \leq 5 - 6x < 8$
 Subtract 5 from all sides: $-2 \leq -6x < 3$
 Divide all sides by -6 and flip the sign: $-\frac{1}{2} < x \leq \frac{1}{3}$

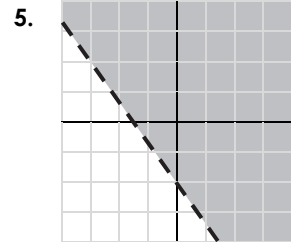
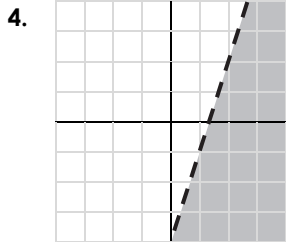
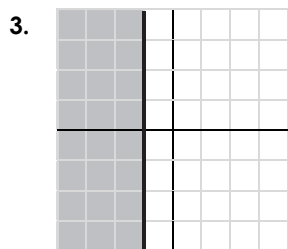
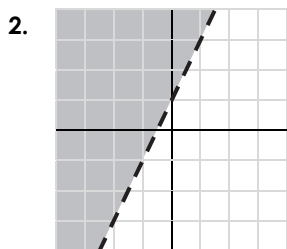
Quiz 40



2. Rewrite using AND: $-3 \leq x + 5 \leq 3$
 Solve for x: $-8 \leq x \leq -2$
3. Rewrite using OR: $2x - 5 < -7$ or $2x - 5 > 7$
 Solve for x: $2x < -2$ or $2x > 12$
 $x < -1$ or $x > 6$
4. Isolate the bars: $|1 - 2x| \geq 1$
 Rewrite using OR: $1 - 2x \leq -1$ or $1 - 2x \geq 1$
 Solve for x: $-2x \leq -2$ or $-2x \geq 0$
 $x \geq 1$ or $x \leq 0$
 $x \leq 0$ or $x \geq 1$
5. Isolate the bars: $2|4 - x| < 12$
 $|4 - x| < 6$
 Rewrite using AND: $-6 < 4 - x < 6$
 Solve for x: $-10 < -x < 2$
 $-2 < x < 10$

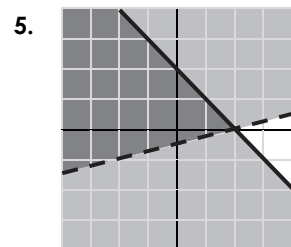
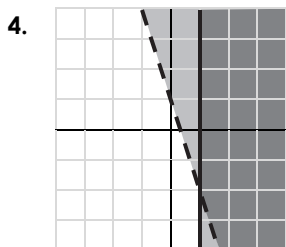
Quiz 41

1. The ordered pair **D** does not satisfy the inequality.



Quiz 42

- The system **B** has no overlapping region when graphed, so it has no solution.
- The solution set to $y \geq -x$ is P and S.
 The solution set to $y < 2x - 3$ is S and R.
 The solution set to the system is region **S**.
- The solution set to $x + 2y < 4$ is Q and R.
 The solution set to $x + 2y > -4$ is P and Q.
 The solution set to the system is region **Q**.



Quiz 43

- $2x + 6 > x + 4$
 $x + 6 > 4$
 $x > -2$
- $-2 \leq 1 - 3x < 10$
 $-3 \leq -3x < 9$
 $-3 < x \leq 1$
- $|5 - 2x| > 5$
 $5 - 2x < -5$ or $5 - 2x > 5$
 $-2x < -10$ or $-2x > 0$
 $x > 5$ or $x < 0$
 $x < 0$ or $x > 5$
- The line is $y = -2x$, so the answer is C or D.
 (1, 0) is a solution, so the answer is **D**.
- The solid line $y = -1$, so the answer is C or D.
 (0, 0) is a solution, so the answer is **C**.

Quiz 48

- Function because each input has exactly one output.
- Function because each input has exactly one output.
- Not a function because input 1 has two outputs.
- Not a function because input 3 has two outputs.
- Function because it passes the vertical line test.

Quiz 49

- The sum, S , is the dependent variable.
The number of sides, n , is the independent variable.
- Domain: $\{1, 2, 3\}$
Range: $\{-2, -1, 0, 1, 2\}$
Not a function
- Domain: $\{0, 1, 2, 3, 4\}$
Range: $\{3\}$
Function
- Domain: $-5 < x < -1$
Range: $-1 < y < 2$
Function
- Domain: $-3 \leq x \leq 1$
Range: $-2 \leq y < 2$
Not a function

Quiz 50

- $f(-4) = (-4)^2 - 7$
 $f(-4) = 9$
 $n = 9$
- $g(n) = 3n + 5 = -10$
 $3n = -15$
 $n = -5$
- $h(n) = |n| - 4 = 8$
 $|n| = 12$
 $n = 12$ or $n = -12$
- $p(4) = 0, p(1) = 1$
 $p(4) - p(1) = -1$
 $n = -1$
- $p(2) = 0, P(4) = 0$
 $n = 2, n = 4$

Quiz 51

- B** is linear because it can be written in slope-intercept form. Note that $x = 5$ is a vertical line which is not a function.
- Nonlinear
The graph is not a straight line.
- Linear
 $y = \frac{1}{2}x + 1$
- Linear
 $y = x + 4$
- Nonlinear
The rate of change is not constant.

Quiz 52

- A** is exponential. **C** is quadratic. **D** is linear.
- Exponential
- Quadratic
- Linear because the first differences are constant.
- Exponential because the ratios are constant.

Quiz 53

- $\frac{f(2) - f(-1)}{2 - (-1)} = \frac{7 - 1}{2 - (-1)} = 2$
- $\frac{f(4) - f(0)}{4 - 0} = \frac{0 - 0}{4 - 0} = 0$
- $\frac{f(6) - f(-3)}{6 - (-3)} = \frac{31 - (-5)}{6 - (-3)} = 4$

$$4. \frac{f(6) - f(2)}{6 - 2} = \frac{64 - 4}{6 - 2} = 15$$

$$5. \frac{h(5) - h(0)}{5 - 0} = \frac{400 - 0}{5 - 0} = 80 \text{ feet per second}$$

Quiz 54

- $f(n) = 1$
 $n = 1$
- $f(n) = -1$
 $n = 3$
- Set y equal to $f(x)$:
Switch x and y :
Solve for y :
Write in function notation:
 $y = x - 1$
 $x = y - 1$
 $y = x + 1$
 $f^{-1}(x) = x + 1$
- $y = -x + 7$
 $x = -y + 7$
 $y = -x + 7$
 $f^{-1}(x) = -x + 7$
- $y = \frac{1}{2}x + \frac{3}{2}$
 $x = \frac{1}{2}y + \frac{3}{2}$
 $2x = y + 3$
 $y = 2x - 3$
 $f^{-1}(x) = 2x - 3$

Quiz 55

- Not a function because it fails the vertical line test.
- Nonlinear because the rate of change is not constant.
- Quadratic because the second differences are constant.
- $\frac{f(2) - f(-1)}{2 - (-1)} = \frac{8 - (-1)}{2 - (-1)} = 3$
- Set y equal to $f(x)$:
Switch x and y :
Solve for y :
 $y = 3x - 6$
 $x = 3y - 6$
 $3y = x + 6$
 $y = \frac{1}{3}x + 2$
Write in function notation: $f^{-1}(x) = \frac{1}{3}x + 2$

Quiz 56

- A** represents direct variation.
- Plug $(2, 8)$ into $y = kx$:
Solve for k :
Find the equation:
 $8 = k(2)$
 $k = 4$
 $y = 4x$
- Find the equation:
 $-9 = k(3); k = -3$
 $y = -3x$
Find y when $x = -5$:
 $y = -3(-5)$
 $y = 15$
- Find the equation:
 $1 = k(5); k = 1/5$
 $y = (1/5)x$
Find x when $y = 2$:
 $2 = (1/5)x$
 $x = 10$

5. $x =$ time in minutes, $y =$ number of words
 $80 = 2k$, so $k = 40$ and $y = 40x$.
 When $x = 5$, $y = 40(5) = 200$.
 Emma will type 200 words in 5 minutes.

Quiz 57

1. **B** represents inverse variation.
2. Plug (2, 3) into $xy = k$: $2 \times 3 = k$
 Write the equation: $xy = 6$ or $y = 6/x$
3. Find the equation: Find y when $x = 5$:
 $(-2) \times 10 = k$ $5y = -20$
 $xy = -20$ or $y = -20/x$ $y = -4$
4. Find the equation: Find x when $y = 3$:
 $2 \times 6 = k$ $x(3) = 12$
 $xy = 12$ or $y = 12/x$ $x = 4$
5. $x =$ speed, $y =$ time
 $k = 60 \text{ mph} \times 1/3 \text{ hour} = 20$, so $xy = 20$ or $y = 20/x$.
 When $x = 50$, $y = 2/5 = 0.4$.
 It will take 0.4 hour, or 24 minutes.

Quiz 58

1. 13 and 15 2. 5, 2, -1, -4, -7
3. $a_n = a_1 + (n - 1)d$ 4. $a_1 = 8, d = -5$
 $a_n = 10 + 6(n - 1)$ $a_n = 8 - 5(n - 1)$
 $= 6n + 4$ $= -5n + 13$
5. $a_1 = 16, d = 7$
 $a_n = 16 + 7(n - 1)$
 $= 7n + 9$

Quiz 59

1. 32 and 64 2. 2, 6, 18, 54, 162
3. $a_n = a_1 r^{n-1}$ 4. $a_1 = 2, r = 5$
 $a_n = 3(2)^{n-1}$ $a_n = 2(5)^{n-1}$
5. $a_1 = 1, r = -3$
 $a_n = (-3)^{n-1}$

Quiz 60

1. Arithmetic sequence 2. Geometric sequence
 $a_1 = 2, d = 7$ $a_1 = 2, r = 3$
 $a_n = 2 + 7(n - 1)$ $a_n = 2(3)^{n-1}$
 $= 7n - 5$
3. Arithmetic sequence 3. Geometric sequence
 $a_1 = 5, d = -4$ $a_1 = 5, r = 2$
 $a_1 = 5, a_n = a_{n-1} - 4$ $a_1 = 5, a_n = 2a_{n-1}$

5. Geometric sequence

$a_1 = 4, r = -3$
 $a_1 = 4, a_n = -3a_{n-1}$

Quiz 61

1. Find the rule: Find the 8th term:
 $a_1 = 6, d = 3$ $a_8 = 3(8) + 3 = 27$
 $a_n = 6 + 3(n - 1)$
 $= 3n + 3$
2. Find the rule: Find the 8th term:
 $a_1 = 1, r = 2$ $a_8 = (2)^{8-1} = 128$
 $a_n = (2)^{n-1}$
3. 4, 4.7, 5.4, 6.1, 6.8, ... is an arithmetic sequence.
 $a_1 = 4, d = 0.7$
 $a_n = 0.7n + 3.3$
 $a_6 = 0.7(6) + 3.3 = 7.5$
 The height of the tree will be about 8 feet.
4. The value after the 1st year is $22000 \times 0.8 = 17600$.
 The value after the 2nd year is $17600 \times 0.8 = 14080$.
 17600, 14080, 11264, ... is a geometric sequence.
 $a_1 = 17600, r = 0.8$
 $a_n = 17600(0.8)^{n-1}$
 $a_5 = 17600(0.8)^{5-1} = 7208.96$
 The value of the car will be about \$7,209.
5. 68000, 69200, 70400, ... is an arithmetic sequence.
 $a_1 = 68000, d = 1200$
 $a_n = 1200n + 66800$
 $a_9 = 1200(9) + 66800 = 77600$
 His salary will be \$77,600.

Quiz 62

1. Find the equation: Find y when $x = 2$:
 $12 = k(4); k = 3$ $y = 3(2) = 6$
 $y = 3x$
2. Find the equation: Find x when $y = 2$:
 $k = (-5) \times (-4) = 20$ $x(2) = 20$
 $xy = 20$ or $y = 20/x$ $x = 10$
3. Arithmetic sequence 4. Geometric sequence
 $a_1 = 15, d = 2$ $a_1 = 1, r = 5$
 $a_n = 15 + 2(n - 1)$ $a_1 = 1, a_n = 5a_{n-1}$
 $= 2n + 13$
5. 20, 40, 80, 160, 320, ... $a_6 = 20(2)^{6-1} = 640$
 $a_1 = 20, r = 2$ There will be 640
 $a_n = 20(2)^{n-1}$ bacteria.

Quiz 63

- $\sqrt{6^2} = 6$
- $\sqrt[3]{(-4)^3} = -4$
- $\sqrt[4]{3^4} = 3$
- $\sqrt{12^2} + \sqrt{4^2} \times \sqrt[3]{(-2)^3} = 12 + 4 \times (-2) = 4$
- $(\sqrt{5^2} + \sqrt[3]{3^3} + \sqrt[5]{2^5}) \times \sqrt{0.2^2}$
 $= (5 + 3 + 2) \times 0.2 = 2$

Quiz 64

- $\sqrt{25 \cdot 2} = 5\sqrt{2}$
- $\sqrt{9 \cdot 3} = 3\sqrt{3}$
- $3\sqrt{4 \cdot 5} = 6\sqrt{5}$
- $2\sqrt{16 \cdot 7} = 8\sqrt{7}$
- $\frac{\sqrt{24}}{\sqrt{121}} = \frac{\sqrt{4 \cdot 6}}{11} = \frac{2\sqrt{6}}{11}$

Quiz 65

- $\sqrt{x^2} \cdot \sqrt{y^2} = xy$
- $\sqrt{9 \cdot 5 \cdot x^2 \cdot x} = \sqrt{9} \cdot \sqrt{x^2} \cdot \sqrt{5x} = 3x\sqrt{5x}$
- $2 \cdot \sqrt{9 \cdot 7 \cdot x^2 \cdot x^2 \cdot y} = 2 \cdot \sqrt{9} \cdot \sqrt{x^2} \cdot \sqrt{x^2} \cdot \sqrt{7y}$
 $= 2 \cdot 3 \cdot x \cdot x \cdot \sqrt{7y} = 6x^2\sqrt{7y}$
- $-3 \cdot \sqrt{9 \cdot 2 \cdot x^2 \cdot y^2 \cdot y^2 \cdot y}$
 $= -3 \cdot \sqrt{9} \cdot \sqrt{x^2} \cdot \sqrt{y^2} \cdot \sqrt{y^2} \cdot \sqrt{2y}$
 $= -3 \cdot 3 \cdot x \cdot y \cdot y \cdot \sqrt{2y} = -9xy^2\sqrt{2y}$
- $\frac{\sqrt{9}}{\sqrt{x^6y^2z^4}} = \frac{3}{\sqrt{x^2 \cdot x^2 \cdot x^2 \cdot y^2 \cdot z^2 \cdot z^2}}$
 $= \frac{3}{x \cdot x \cdot x \cdot y \cdot z \cdot z} = \frac{3}{x^3yz^2}$

Quiz 66

- $(4\sqrt{3} + \sqrt{3}) + (2\sqrt{5} - \sqrt{5}) = 5\sqrt{3} + \sqrt{5}$
- $3\sqrt{6} - \sqrt{4 \cdot 6} = 3\sqrt{6} - 2\sqrt{6} = \sqrt{6}$
- $\sqrt{16 \cdot 2} + \sqrt{9 \cdot 2} = 4\sqrt{2} + 3\sqrt{2} = 7\sqrt{2}$
- $\sqrt{5^2} - \sqrt{49 \cdot 2} + 3\sqrt{16 \cdot 2}$
 $= 5 - 7\sqrt{2} + 12\sqrt{2} = 5 + 5\sqrt{2}$
- $\sqrt{25 \cdot 3} + 2\sqrt{9 \cdot 5} - 4\sqrt{9 \cdot 3} - \sqrt{16 \cdot 5}$
 $= 5\sqrt{3} + 6\sqrt{5} - 12\sqrt{3} - 4\sqrt{5} = -7\sqrt{3} + 2\sqrt{5}$

Quiz 67

- $\sqrt{12} = \sqrt{4 \cdot 3} = 2\sqrt{3}$
- $\sqrt{40x^2} = \sqrt{4 \cdot 10 \cdot x^2} = 2x\sqrt{10}$
- $\sqrt{36x^4y^2} = \sqrt{6^2 \cdot x^2 \cdot x^2 \cdot y^2} = 6x^2y$
- $\frac{3}{\sqrt{7}} \cdot \frac{\sqrt{7}}{\sqrt{7}} = \frac{3\sqrt{7}}{7}$
- $\sqrt{\frac{54x^3}{2x}} = \sqrt{27x^2} = \sqrt{9 \cdot 3 \cdot x^2} = 3x\sqrt{3}$

Quiz 68

- Isolate the square root: $\sqrt{x} = 4$
Square both sides: $(\sqrt{x})^2 = 4^2$
Solve and check: $x = 16$
- Square both sides: $(\sqrt{2x-3})^2 = 1^2$
Solve and check: $2x-3 = 1$
 $x = 2$
- Square both sides: $(2\sqrt{x+1})^2 = (\sqrt{3x+4})^2$
Solve and check: $4(x+1) = 3x+4$
 $x = 0$
- Square both sides: $(\sqrt{5x-1})^2 = (\sqrt{x-9})^2$
Solve and check: $5x-1 = x-9$
 $x = -2$
 -2 makes the radicands negative, so no solution.
- Isolate the cube root: $\sqrt[3]{x+9} = -2$
Cube both sides: $(\sqrt[3]{x+9})^3 = (-2)^3$
Solve and check: $x+9 = -8$
 $x = -17$

Quiz 69

- $x =$ side length
Area = 60, so $x^2 = 60$ and $x = 2\sqrt{15}$.
The length of one side is $2\sqrt{15}$ inches.
- Hypotenuse = x , Legs = 3 and 4
The Pythagorean Theorem gives $3^2 + 4^2 = x^2$.
 $x^2 = 3^2 + 4^2 = 25$; $x = 5$
The length of the hypotenuse is 5 cm.

3. Hypotenuse = $7\sqrt{2}$, Legs = x and x
 The Pythagorean Theorem gives $x^2 + x^2 = (7\sqrt{2})^2$.
 $2x^2 = 98$; $x^2 = 49$; $x = 7$
 The length of each leg is 7 cm.

4. Diagonal = 8, length = 6, width = x
 The Pythagorean Theorem gives $6^2 + x^2 = 8^2$.
 $x^2 = 64 - 36 = 28$; $x = 2\sqrt{7}$
 The width of the rectangle is $2\sqrt{7}$ inches.

5. $d = \sqrt{(-3 - 2)^2 + (4 - (-6))^2} = \sqrt{125} = 5\sqrt{5}$

Quiz 70

1. $\sqrt{3^2} - \sqrt[4]{2^4} \times \sqrt[5]{(-2)^5} - \sqrt[3]{(-1)^3}$
 $= 3 - 2 \times (-2) - (-1) = 8$

2. $\sqrt{9 \cdot 3 \cdot x^2 \cdot x^2 \cdot x \cdot y^2} = 3x^2y\sqrt{3x}$

3. $\frac{4}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} + \sqrt{50} = \frac{4\sqrt{2}}{2} + \sqrt{25 \cdot 2} = 2\sqrt{2} + 5\sqrt{2} = 7\sqrt{2}$

4. Square both sides: $(\sqrt{x+3})^2 = (\sqrt{2x-7})^2$
 Solve and check: $x+3 = 2x-7$
 $x = 10$

5. x = side length > y = diagonal
 Area = 36, so $x^2 = 36$. $6^2 + 6^2 = y^2$
 Solve for x , and $x = 6$. $y = 6\sqrt{2}$
 The side length is 6 cm. --- The diagonal is $6\sqrt{2}$ cm.

Quiz 71

1. $\frac{1}{3^2} = \frac{1}{9}$ 2. 1

3. $\frac{5^5}{5^3} = 25$ 4. $\frac{6^3}{2 \cdot 6^2} = 3$

5. $\frac{10^5}{2^3 \cdot (-5)^4} = 20$

Quiz 72

1. $4x^{3+2} = 4x^5$ 2. $3 \cdot 2 \cdot x^{5-4} = 6x$

3. $20x^{2-5+1} = 20x^{-2} = \frac{20}{x^2}$ 4. $x^{5-1-2} = x^2$

5. $\frac{8}{-2}x^{3-4-2} = -4x^{-3} = -\frac{4}{x^3}$

Quiz 73

1. $2^5x^{2 \times 5} = 32x^{10}$

2. $(-3)^2x^{-3 \times 2} = 9x^{-6} = \frac{9}{x^6}$

3. $4^{-3}x^{-4 \times -3} = \frac{x^{12}}{4^3} = \frac{x^{12}}{64}$ 4. $\frac{(-2)^3}{x^3} = -\frac{8}{x^3}$

5. $\frac{3^{-2}}{x^{2 \times -2}} = \frac{3^{-2}}{x^{-4}} = \frac{x^4}{3^2} = \frac{x^4}{9}$ or 5. $\left(\frac{x^2}{3}\right)^2 = \frac{x^4}{3^2} = \frac{x^4}{9}$

Quiz 74

1. $1 \cdot 2^3x^6 = 8x^6$

2. $9x \cdot (-3)^{-2}x^{-10} = 9 \cdot \frac{1}{9} \cdot x^{-9} = x^{-9} = \frac{1}{x^9}$
 or $\frac{9x}{(-3x^5)^2} = \frac{9x}{(-3)^2x^{10}} = \frac{9x}{9x^{10}} = \frac{1}{x^9}$

3. $(-6)^2x^6 \cdot 2^{-2}x^6 = \frac{(-6)^2}{2^2} \cdot x^{12} = \frac{36}{4} \cdot x^{12} = 9x^{12}$
 or $\frac{(-6x^3)^2}{(2x^{-3})^2} = \frac{(-6)^2x^6}{2^2x^{-6}} = \frac{36}{4} \cdot x^{12} = 9x^{12}$

4. $\left(\frac{3x^2}{x^4}\right)^3 = \left(\frac{3}{x^2}\right)^3 = \frac{3^3}{x^6} = \frac{27}{x^6}$

5. $\frac{(-4x^7)^3}{(8x^7)^2} = \frac{(-4)^3x^{21}}{8^2x^{14}} = \frac{-64}{64} \cdot x^7 = -x^7$

Quiz 75

1. 2.4×10^8 2. 5×10^{-7}

3. 0.00049

4. $35 \times 10^{12} = 3.5 \times 10^{13}$ 5. $0.25 \times 10^{-3} = 2.5 \times 10^{-4}$

Quiz 76

1. $x^{2/3}$ 2. $\sqrt[4]{x^5}$

3. $(3^2)^{1/2} = 3^1 = 3$ 4. $(2^4)^{5/4} = 2^5 = 32$

5. $(10^3)^{-2/3} = 10^{-2} = \frac{1}{10^2} = \frac{1}{100}$

Quiz 77

1. $x^{1/2 + 2/3} = x^{7/6}$

2. $(2^3x^{1/4})^{4/3} = 2^4x^{1/3} = 16x^{1/3}$

3. $(3^3x^{3/4})^{2/3} = 3^2x^{1/2} = 9x^{1/2}$

4. $x^{1/2} \cdot x^{1/3} = x^{5/6} = \sqrt[6]{x^5}$

5. $\frac{x^{5/6}}{x^{1/3}} = x^{1/2} = \sqrt{x}$

Quiz 78

- B** represents exponential growth.
C and D represent exponential decay.
- C** represents exponential decay.
B and D represent exponential growth.
- The equation represents exponential decay because the growth factor is $1/5$ which is less than 1.
B represents exponential decay.
- $a = 6$ and $b = 1.03$, so $y = 6(1.03)^x$.
When $x = 5$, $y = 6(1.03)^5 = 6.95564...$
It will cost about \$6.96.
- $a = 18000$ and $b = 0.85$, so $y = 18000(0.85)^x$.
When $x = 10$, $y = 18000(0.85)^{10} = 3543.73927...$
It will be worth about \$3,543.74.

Quiz 79

- $\frac{6^3}{3^2} = 24$
- $(4^3)^{2/3} = 4^2 = 16$
- $4x^5 \cdot 3x^0 \cdot 6^{-1}x^{-2} = \frac{4 \cdot 3}{6} \cdot x^{5+0-2} = 2x^3$
- $(10^3x^{3/4})^{1/3} = 10x^{1/4}$
- $30 \times 10^7 = 3 \times 10^8$

Quiz 80

- B** not a polynomial because of the exponent -2 .
- The degree is 4 and the leading coefficient is 3.
- $(2x - 4x) + (7 - (-2)) = -2x + 9$
- $x^2 + (-3x + 7x) + (5 - 5) = x^2 + 4x$
- $x^3 + (-2x^2 - x^2) + (4x - (-3x)) + (9 - 2) = x^3 - 3x^2 + 7x + 7$

Quiz 81

- $(-2)(-5)x^{4+2} = 10x^6$
- $3x^2(x^2) + 3x^2(-2x) + 3x^2(3) = 3x^4 - 6x^3 + 9x^2$
- $x^2 + 3x + 4x + 12 = x^2 + 7x + 12$
- $5x^2 + x - 10x - 2 = 5x^2 - 9x - 2$
- $4x^2 - 2x + 2x - 1 = 4x^2 - 1$

Quiz 82

- $2x^2 + 6x - x - 3 = 2x^2 + 5x - 3$
- $x^3 + 2x^2 - 5x + 4x^2 + 8x - 20 = x^3 + 6x^2 + 3x - 20$
- $3x^3 + 6x^2 - x^2 - 2x + 4x + 8 = 3x^3 + 5x^2 + 2x + 8$
- $x^4 - x^3 + x^2 + 2x^3 - 2x^2 + 2x - 3x^2 + 3x - 3 = x^4 + x^3 - 4x^2 + 5x - 3$
- $(x^2 - x + 2x - 2)(4x + 1) = (x^2 + x - 2)(4x + 1) = 4x^3 + x^2 + 4x^2 + x - 8x - 2 = 4x^3 + 5x^2 - 7x - 2$

Quiz 83

- $x^2 + 2 \cdot x \cdot 3 + 3^2 = x^2 + 6x + 9$
- $(3x)^2 - 2 \cdot 3x \cdot 2 + 2^2 = 9x^2 - 12x + 4$
- $(2x)^2 - 5^2 = 4x^2 - 25$
- $(40 + 3)^2 = 40^2 + 2 \cdot 40 \cdot 3 + 3^2 = 1600 + 240 + 9 = 1849$
- $(30 - 2)(30 + 2) = 30^2 - 2^2 = 900 - 4 = 896$

Quiz 84

- $x^2 - 3x + 2x - 6 = x^2 - x - 6$
- $x^2 - 2 \cdot x \cdot 3 + 3^2 = x^2 - 6x + 9$
- $(3x)^2 - 4^2 = 9x^2 - 16$
- $(2x)^2 + 2 \cdot 2x \cdot 5 + 5^2 = 4x^2 + 20x + 25$
- $4x^2 + 3x - 16x - 12 = 4x^2 - 13x - 12$

Quiz 85

- $\frac{25}{-5} \cdot x^{4-3} = -5x$
 - $\frac{6x^3}{3x} - \frac{12x^2}{3x} + \frac{9x}{3x} = 2x^2 - 4x + 3$
 - | | |
|---------|----------------------------|
| $x - 3$ | $x - 2$ |
| | $x^2 - 5x + 6$ |
| | $x^2 - 3x$ |
| | <hr style="width: 100%;"/> |
| | $-2x + 6$ |
| | <hr style="width: 100%;"/> |
| | $-2x + 6$ |
| | <hr style="width: 100%;"/> |
| | 0 |
 - | | |
|----------|----------------------------|
| $3x + 1$ | $x - 4$ |
| | $3x^2 - 11x - 4$ |
| | $3x^2 + x$ |
| | <hr style="width: 100%;"/> |
| | $-12x - 4$ |
| | <hr style="width: 100%;"/> |
| | $-12x - 4$ |
| | <hr style="width: 100%;"/> |
| | 0 |
- Answer: $x - 2$ Answer: $x - 4$

$$\begin{array}{r}
 5. \quad 2x - 1 \overline{) \begin{array}{r} 4x + 5 \\ 8x^2 + 6x - 5 \\ 8x^2 - 4x \\ \hline 10x - 5 \\ 10x - 5 \\ \hline 0 \end{array}} \\
 \end{array}$$

Answer: $4x + 5$

Quiz 86

$$1. \quad x + 2 \overline{) \begin{array}{r} x + 2 \\ x^2 + 4x + 5 \\ x^2 + 2x \\ \hline 2x + 5 \\ 2x + 4 \\ \hline 1 \end{array}}$$

Answer:

$$x + 2 + \frac{1}{x + 2}$$

$$2. \quad x - 3 \overline{) \begin{array}{r} x - 2 \\ x^2 - 5x + 4 \\ x^2 - 3x \\ \hline -2x + 4 \\ -2x + 6 \\ \hline -2 \end{array}}$$

Answer:

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

$$3. \quad 3x - 1 \overline{) \begin{array}{r} 3x - 1 \\ 9x^2 - 6x + 4 \\ 9x^2 - 3x \\ \hline -3x + 4 \\ -3x + 1 \\ \hline 3 \end{array}}$$

Answer:

$$3x - 1 + \frac{3}{3x - 1}$$

$$4. \quad 2x + 3 \overline{) \begin{array}{r} 2x - 3 \\ 4x^2 + 0x + 1 \\ 4x^2 + 6x \\ \hline -6x + 1 \\ -6x - 9 \\ \hline 10 \end{array}}$$

Answer:

$$2x - 3 + \frac{10}{2x + 3}$$

$$5. \quad 3x + 1 \overline{) \begin{array}{r} 3x - 1 \\ 9x^2 + 0x - 5 \\ 9x^2 + 3x \\ \hline -3x - 5 \\ -3x - 1 \\ \hline -4 \end{array}}$$

Answer:

$$3x - 1 - \frac{4}{3x + 1}$$

Quiz 87

$$1. \quad (5x^2 - 3x^2) + (-2x - x) + (3 - (-1)) \\ = 2x^2 - 3x + 4$$

$$2. \quad 2x^2 - x + 6x - 3 \\ = 2x^2 + 5x - 3$$

$$3. \quad x^2 - 2 \cdot x \cdot 2 + 2^2 \\ = x^2 - 4x + 4$$

$$4. \quad x - 5 \overline{) \begin{array}{r} 2x + 1 \\ 2x^2 - 9x - 5 \\ 2x^2 - 10x \\ \hline x - 5 \\ x - 5 \\ \hline 0 \end{array}}$$

Answer:

$$2x + 1$$

$$5. \quad x - 6 \overline{) \begin{array}{r} x - 2 \\ x^2 - 8x + 9 \\ x^2 - 6x \\ \hline -2x + 9 \\ -2x + 12 \\ \hline -3 \end{array}}$$

Answer:

$$x - 2 - \frac{3}{x - 6}$$

Quiz 93

1. $3(x - 3)$
2. $4x(3x + 4)$
3. $x^2y(7y - 2)$
4. $3x^2(5x^3 + 4x - 3)$
5. $xy(x^2y^2 + 6xy - 10)$

Quiz 94

1. $x^2(x - 3) + 2(x - 3) = (x - 3)(x^2 + 2)$
2. $2x^2(x + 4) + 3(x + 4) = (x + 4)(2x^2 + 3)$
3. $2x^3(3x^2 - 5) - (3x^2 - 5) = (3x^2 - 5)(2x^3 - 1)$
4. $2(x^3 + x^2 + 3x + 3) = 2[x^2(x + 1) + 3(x + 1)] = 2(x + 1)(x^2 + 3)$
5. $x^2(5x^3 - x^2 - 10x + 2) = x^2[x^2(5x - 1) - 2(5x - 1)] = x^2(5x - 1)(x^2 - 2)$

Quiz 95

1. $c = 2 \times 3 = 6$
 $b = 2 + 3 = 5$
 $(x + 2)(x + 3)$
2. $c = -1 \times -3 = 3$
 $b = -1 + -3 = -4$
 $(x - 1)(x - 3)$
3. $c = -2 \times 4 = -8$
 $b = -2 + 4 = 2$
 $(x - 2)(x + 4)$
4. $c = 2 \times 5 = 10$
 $b = 2 + 5 = 7$
 $(x + 2)(x + 5)$
5. $c = -4 \times 7 = -28$
 $b = -4 + 7 = 3$
 $(x - 4)(x + 7)$

Quiz 96

1. $(x + 4)(x + 6)$
2. $(x + 2)(x - 8)$
3. $2(x^2 - 2x - 15) = 2(x + 3)(x - 5)$
4. $4(x^2 + 5x - 6) = 4(x - 1)(x + 6)$
5. $3(x^2 - 9x + 14) = 3(x - 2)(x - 7)$

Quiz 97

1. Set up $(x \quad)(2x \quad)$, then check factors of 1.
Possible factorization: $(x + 1)(2x + 1)$
 $(x - 1)(2x - 1)$
Middle term: $x + 2x = 3x$ ✓
 $-x - 2x = -3x$
The answer is $(x + 1)(2x + 1)$.

2. Set up $(x \quad)(8x \quad)$ and $(2x \quad)(4x \quad)$, then check factors of 3.

Possible factorization:	Middle term:	
$(x + 1)(8x + 3)$	$3x + 8x = 11x$	
$(2x + 1)(4x + 3)$	$6x + 4x = 10x$	
$(x - 1)(8x - 3)$	$-3x - 8x = -11x$	
$(2x - 1)(4x - 3)$	$-6x - 4x = -10x$	
$(x + 3)(8x + 1)$	$x + 24x = 25x$	
$(2x + 3)(4x + 1)$	$2x + 12x = 14x$	
$(x - 3)(8x - 1)$	$-x - 24x = -25x$	
$(2x - 3)(4x - 1)$	$-2x - 12x = -14x$	✓

The answer is $(2x - 3)(4x - 1)$.

3. Set up $(x \quad)(3x \quad)$, then check factors of -8.

Possible factorization:	Middle term:	
$(x + 1)(3x - 8)$	$-8x + 3x = -5x$	
$(x - 1)(3x + 8)$	$8x - 3x = 5x$	
$(x + 2)(3x - 4)$	$-4x + 6x = 2x$	
$(x - 2)(3x + 4)$	$4x - 6x = -2x$	
$(x + 4)(3x - 2)$	$-2x + 12x = 10x$	
$(x - 4)(3x + 2)$	$2x - 12x = -10x$	✓
$(x + 8)(3x - 1)$	$-x + 24x = 23x$	
$(x - 8)(3x + 1)$	$x - 24x = -23x$	

The answer is $(x - 4)(3x + 2)$.

4. Set up $(x \quad)(5x \quad)$, then check factors of -9.

Possible factorization:	Middle term:	
$(x + 1)(5x - 9)$	$-9x + 5x = -4x$	
$(x - 1)(5x + 9)$	$9x - 5x = 4x$	
$(x + 3)(5x - 3)$	$-3x + 15x = 12x$	✓
$(x - 3)(5x + 3)$	$3x - 15x = -12x$	
$(x + 9)(5x - 1)$	$-x + 45x = 44x$	
$(x - 9)(5x + 1)$	$x - 45x = -44x$	

The answer is $(x + 3)(5x - 3)$.

5. Set up $(x \quad)(9x \quad)$ and $(3x \quad)(3x \quad)$, then check factors of 16.

Possible factorization:	Middle term:	
$(x + 1)(9x + 16)$	$16x + 9x = 25x$	
$(3x + 1)(3x + 16)$	$48x + 3x = 51x$	
$(x - 1)(9x - 16)$	$-16x - 9x = -25x$	
$(3x - 1)(3x - 16)$	$-48x - 3x = -51x$	
...	...	
$(x + 4)(9x + 4)$	$4x + 36x = 40x$	
$(3x + 4)(3x + 4)$	$12x + 12x = 24x$	
$(x - 4)(9x - 4)$	$-4x - 36x = -40x$	
$(3x - 4)(3x - 4)$	$-12x - 12x = -24x$	✓
...	...	

The answer is $(3x - 4)^2$.

Quiz 98

- $ac = -36, b = -5$
 $rs = 4 \times -9 = -36$
 $r + s = 4 + -9 = -5$
- $ac = -12, b = -11$
 $rs = 1 \times -12 = -12$
 $r + s = 1 + -12 = -11$
- $ac = 28, b = 16$
 $rs = 2 \times 14 = 28$
 $r + s = 2 + 14 = 16$
- $ac = 60, b = 19$
 $rs = 4 \times 15 = 60$
 $r + s = 4 + 15 = 19$
- $ac = -60, b = -17$
 $rs = 3 \times -20 = -60$
 $r + s = 3 + -20 = -17$

$$\begin{aligned}
 &6x^2 + 4x - 9x - 6 \\
 &= 2x(3x + 2) - 3(3x + 2) \\
 &= (3x + 2)(2x - 3) \\
 &3x^2 + x - 12x - 4 \\
 &= x(3x + 1) - 4(3x + 1) \\
 &= (3x + 1)(x - 4) \\
 &4x^2 + 2x + 14x + 7 \\
 &= 2x(2x + 1) + 7(2x + 1) \\
 &= (2x + 1)(2x + 7) \\
 &5x^2 + 4x + 15x + 12 \\
 &= x(5x + 4) + 3(5x + 4) \\
 &= (5x + 4)(x + 3) \\
 &12x^2 + 3x - 20x - 5 \\
 &= 3x(4x + 1) - 5(4x + 1) \\
 &= (4x + 1)(3x - 5)
 \end{aligned}$$

Quiz 99

- $x^2 + 2 \cdot x \cdot 3 + 3^2$
 $= (x + 3)^2$
- $x^2 - 6^2$
 $= (x + 6)(x - 6)$
- $x^2 - 2 \cdot x \cdot 7 + 7^2$
 $= (x - 7)^2$
- $(3x)^2 - 2^2$
 $= (3x + 2)(3x - 2)$
- $(2x)^2 + 2 \cdot 2x \cdot 5 + 5^2$
 $= (2x + 5)^2$

Quiz 100

- $(x - 2)(x + 7)$
- $(2x + 3)(x - 3)$
- $5(x^2 - 2x + 1)$
 $= 5(x - 1)^2$
- $-(4x^2 - 49)$
 $= -(2x + 7)(2x - 7)$
- $-3(x^2 - 2x - 15)$
 $= -3(x + 3)(x - 5)$

Quiz 101

- $-3(2x^2 + 3x - 20)$
- $(x^2 + 4)(x^2 - 4)$
 $= -3(2x - 5)(x + 4)$
 $= (x^2 + 4)(x + 2)(x - 2)$
- $(5x - 1)(4x + 3)$
- $5x(x^2 + 4x + 4)$
 $= 5x(x + 2)^2$
- $2(x^3 + 2x^2 - 16x - 32)$
 $= 2[x^2(x + 2) - 16(x + 2)]$
 $= 2(x + 2)(x^2 - 16)$
 $= 2(x + 2)(x + 4)(x - 4)$

Quiz 102

1. $(x+2)(x+5)$ 2. $(3x+1)(4x-3)$
 3. $-2x(x^2-25)$ 4. $x^2(4x+1)-4(4x+1)$
 $= -2(x+5)(x-5)$ $= (4x+1)(x^2-4)$
 $= (4x+1)(x+2)(x-2)$
 5. $x^2(9x^2+6x+1)$
 $= x^2(3x+1)^2$

Quiz 103

1. $x = \pm\sqrt{75}$ 2. $x^2 = 16$
 $x = \pm 5\sqrt{3}$ $x = \pm 4$
 3. $x^2 = 24$ 4. $4x^2 = 121$
 $x = \pm\sqrt{24}$ $x^2 = 121/4$
 $x = \pm 2\sqrt{6}$ $x = \pm 11/2$
 5. $-3x^2 = -15$
 $x^2 = 5$
 $x = \pm\sqrt{5}$

Quiz 104

1. $5x^2 = 100$ 2. $x+2 = \pm\sqrt{81}$
 $x^2 = 20$ $x+2 = \pm 9$
 $x = \pm\sqrt{20}$ $x = -2 \pm 9$
 $x = \pm 2\sqrt{5}$ $x = 7, x = -11$
 3. $(x-5)^2 = 54$ 4. $(x-1)^2 = 4$
 $x-5 = \pm\sqrt{54}$ $x-1 = \pm 2$
 $x-5 = \pm 3\sqrt{6}$ $x = 1 \pm 2$
 $x = 5 \pm 3\sqrt{6}$ $x = 3, x = -1$
 5. $3(x+4)^2 = 33$
 $(x+4)^2 = 11$
 $x+4 = \pm\sqrt{11}$
 $x = -4 \pm \sqrt{11}$

Quiz 105

1. $(x+2)(x+5) = 0$ 2. $(x+5)(x-5) = 0$
 $x = -2, x = -5$ $x = -5, x = 5$
 3. $x^2 - 2x - 24 = 0$ 4. $x^2 + 4x - 45 = 0$
 $(x+4)(x-6) = 0$ $(x-5)(x+9) = 0$
 $x = -4, x = 6$ $x = 5, x = -9$
 5. $x^2 - x - 6 = 0$
 $(x+2)(x-3) = 0$
 $x = -2, x = 3$

Quiz 106

1. $(4x-3)(x+1) = 0$ 2. $(3x+2)(3x-2) = 0$
 $x = 3/4, x = -1$ $x = -2/3, x = 2/3$

3. $2x^2 - 12x + 18 = 0$ 4. $x^2 + 4x - 5 = 0$
 $2(x^2 - 6x + 9) = 0$ $(x-1)(x+5) = 0$
 $2(x-3)^2 = 0$ $x = 1, x = -5$
 $x = 3$
 5. $x^2 - 7x + 12 = 0$
 $(x-3)(x-4) = 0$
 $x = 3, x = 4$

Quiz 107

1. $x^2 + 2x + 1 = 2 + 1$ 2. $x^2 - 6x + 9 = 3 + 9$
 $(x+1)^2 = 3$ $(x-3)^2 = 12$
 $x+1 = \pm\sqrt{3}$ $x-3 = \pm\sqrt{12}$
 $x = -1 \pm \sqrt{3}$ $x = 3 \pm 2\sqrt{3}$
 3. $x^2 + 10x = -5$ 4. $x^2 - 4x = -1$
 $x^2 + 10x + 25 = 20$ $x^2 - 4x + 4 = 3$
 $(x+5)^2 = 20$ $(x-2)^2 = 3$
 $x+5 = \pm\sqrt{20}$ $x-2 = \pm\sqrt{3}$
 $x = -5 \pm 2\sqrt{5}$ $x = 2 \pm \sqrt{3}$
 5. $x^2 + 2x = 3$ $x+1 = \pm 2$
 $x^2 + 2x + 1 = 4$ $x = -1 \pm 2$
 $(x+1)^2 = 4$ $x = 1, x = -3$

Quiz 108

1. $x^2 + 4x + 4 = 1 + 4$ $x+2 = \pm\sqrt{5}$
 $(x+2)^2 = 5$ $x = -2 \pm \sqrt{5}$
 2. $x^2 + \frac{4}{3}x = \frac{4}{3}$ $x + \frac{2}{3} = \pm \frac{4}{3}$
 $x^2 + \frac{4}{3}x + \frac{4}{9} = \frac{4}{3} + \frac{4}{9}$ $x = -\frac{2}{3} \pm \frac{4}{3}$
 $\left(x + \frac{2}{3}\right)^2 = \frac{19}{9}$ $x = \frac{2}{3}, x = -2$
 3. $x^2 + 6x - 5 = 0$ $(x+3)^2 = 14$
 $x^2 + 6x = 5$ $x+3 = \pm\sqrt{14}$
 $x^2 + 6x + 9 = 5 + 9$ $x = -3 \pm \sqrt{14}$
 4. $5x^2 - 6x = 11$
 $x^2 - \frac{6}{5}x = \frac{11}{5}$ $x - \frac{3}{5} = \pm \frac{8}{5}$
 $x^2 - \frac{6}{5}x + \frac{9}{25} = \frac{11}{5} + \frac{9}{25}$ $x = \frac{3}{5} \pm \frac{8}{5}$
 $\left(x - \frac{3}{5}\right)^2 = \frac{64}{25}$ $x = \frac{11}{5}, x = -1$
 5. $3x^2 - 12x = -3$ $(x-2)^2 = 3$
 $x^2 - 4x = -1$ $x-2 = \pm\sqrt{3}$
 $x^2 - 4x + 4 = -1 + 4$ $x = 2 \pm \sqrt{3}$

Quiz 109

1. $a = 1, b = 0, c = -8$

$$x = \frac{-0 \pm \sqrt{0^2 - 4(1)(-8)}}{2(1)} = \frac{\pm\sqrt{32}}{2} = \pm 2\sqrt{2}$$

2. $a = 1, b = 4, c = 3$

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

$x = -1, x = -3$

3. $a = 2, b = -7, c = 4$

$$x = \frac{-(-7) \pm \sqrt{(-7)^2 - 4(2)(4)}}{2(2)} = \frac{7 \pm \sqrt{17}}{4}$$

4. $a = 5, b = 2, c = -1$

$$x = \frac{-2 \pm \sqrt{2^2 - 4(5)(-1)}}{2(5)} = \frac{-2 \pm \sqrt{24}}{10} = \frac{-1 \pm \sqrt{6}}{5}$$

5. $a = 9, b = -12, c = 4$

$$x = \frac{-(-12) \pm \sqrt{(-12)^2 - 4(9)(4)}}{2(9)} = \frac{12 \pm \sqrt{0}}{18} = \frac{2}{3}$$

Quiz 110

1. $a = 4, b = -8, c = 3$

$$x = \frac{-(-8) \pm \sqrt{(-8)^2 - 4(4)(3)}}{2(4)} = \frac{8 \pm \sqrt{16}}{8} = \frac{8 \pm 4}{8}$$

$x = 3/2, x = 1/2$

2. Divide both sides by 6 to simplify.

$x^2 - 9 = 0; a = 1, b = 0, c = -9$

$$x = \frac{-0 \pm \sqrt{0^2 - 4(1)(-9)}}{2(1)} = \frac{\pm\sqrt{36}}{2} = \frac{\pm 6}{2} = \pm 3$$

3. $x^2 - 8x + 5 = 0; a = 1, b = -8, c = 5$

$$x = \frac{-(-8) \pm \sqrt{(-8)^2 - 4(1)(5)}}{2(1)} = \frac{8 \pm \sqrt{44}}{2}$$

$= 4 \pm \sqrt{11}$

4. $5x^2 + 10x + 4 = 0; a = 5, b = 10, c = 4$

$$x = \frac{-10 \pm \sqrt{10^2 - 4(5)(4)}}{2(5)} = \frac{-10 \pm \sqrt{20}}{10}$$

$= \frac{-5 \pm \sqrt{5}}{5}$

5. $2x^2 - 7x + 2 = 0; a = 2, b = -7, c = 2$

$$x = \frac{-(-7) \pm \sqrt{(-7)^2 - 4(2)(2)}}{2(2)} = \frac{7 \pm \sqrt{33}}{4}$$

Quiz 111

1. By taking square roots: $(x - 3)^2 = 25$
 $x - 3 = \pm 5$
 $x = 3 \pm 5$
 $x = 8, x = -2$

2. By factoring:
 $(x - 2)(x + 5) = 0$
 $x = 2, x = -5$

3. By comp. the square:
 $2x^2 + 4x = 8$
 $x^2 + 2x = 4$
 $x^2 + 2x + 1 = 4 + 1$
 $(x + 1)^2 = 5$
 $x + 1 = \pm\sqrt{5}$
 $x = -1 \pm \sqrt{5}$

4. By the quad. formula:
 $a = 1, b = 5, c = 3$
 $x = \frac{-5 \pm \sqrt{13}}{2}$

5. By the quad. formula:
 $a = 3, b = 6, c = 2$
 $x = \frac{-3 \pm \sqrt{3}}{3}$

Quiz 112

1. $D = (-6)^2 - 4(1)(9) = 0 \Rightarrow$ One solution

2. $D = (-5)^2 - 4(1)(7) = -3 < 0 \Rightarrow$ No solution

3. $D = 5^2 - 4(2)(-2) = 41 > 0 \Rightarrow$ Two solutions

4. By the quad. formula:
 $a = 1, b = -8, c = 5$
 $x = 4 \pm \sqrt{11}$

5. By factoring:
 $(2x + 1)(x + 4) = 0$
 $x = -1/2, x = 4$

Quiz 113

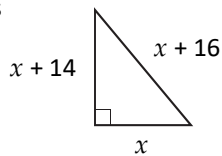
1. $x =$ the first integer; $9 - x =$ the second integer
 The sum of their squares = 53, so $x^2 + (9 - x)^2 = 53$.
 $2x^2 - 18x + 28 = 0; 2(x - 2)(x - 7) = 0; x = 2, x = 7$
 The two positive integers are 2 and 7.

2. $x =$ the smaller integer; $x + 4 =$ the larger integer
 The larger + the square of the smaller = 24,
 so $(x + 4) + x^2 = 24$.
 $x^2 + x - 20 = 0; (x - 4)(x + 5) = 0; x = 4, x = -5$
 The two positive integers are 4 and 8.

3. $x =$ the base of the triangle = the height of the triangle
 The Pythagorean Theorem gives $x^2 + x^2 = 2^2$.
 $2x^2 = 4; x^2 = 2; x = \sqrt{2}, x = -\sqrt{2}$
 The perimeter is $\sqrt{2} + \sqrt{2} + 2 = 2 + 2\sqrt{2}$ feet.

4. $x =$ the width of the strip
 $8 - x$ and $7 - x =$ the dimensions of the new rectangle
 The new area = the original area - 36,
 so $(8 - x)(7 - x) = 8 \times 7 - 36$.
 $x^2 - 15x + 36 = 0; (x - 3)(x - 12) = 0; x = 3, x = 12$
 The width of the strip is 3 cm.

5. x = the distance traveled by car B
 $x + 14$ = the distance traveled by car A
 $x + 16$ = the distance between the two cars
 The Pythagorean Theorem gives
 $x^2 + (x + 14)^2 = (x + 16)^2$.
 $x^2 - 4x - 60 = 0$
 $(x + 6)(x - 10) = 0$
 $x = -6, x = 10$



Car B traveled 10 miles. Car A traveled 24 miles. The two cars are 26 miles apart.

Quiz 114

1. By taking square roots: $2(x + 4)^2 = 16$
 $(x + 4)^2 = 8$
 $x + 4 = \pm\sqrt{8}$
 $x = -4 \pm 2\sqrt{2}$
2. By factoring: $(x + 4)(x + 6) = 0$
 $x = -4, x = -6$
3. By factoring: $5(x^2 - 4x + 4) = 0$
 $5(x - 2)^2 = 0$
 $x = 2$
4. By the quad. formula: $a = 2, b = 1, c = -2$
 $x = \frac{-1 \pm \sqrt{17}}{4}$
5. Legs = x and $x - 4$, hypotenuse = $x + 4$
 The Pythagorean Theorem gives $x^2 + (x - 4)^2 = (x + 4)^2$.
 $x^2 - 16x = 0; x = 0, x = 16$
 The dimensions are 12 cm, 16 cm, and 20 cm.

Quiz 115

- 1.
- 2.
- 3.
- 4.
- 5.

Quiz 116

1. $x = -\frac{8}{2(1)} = -4$
 $y = -7$ at $x = -4$
 Vertex: $(-4, -7)$
2. $x = -\frac{6}{2(-1)} = 3$
 $y = 8$ at $x = 3$
 Vertex: $(3, 8)$

- 3.
- 4.

- 5.

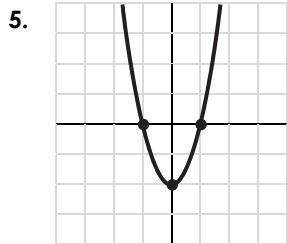
Quiz 117

1. $h = 5, k = 3$
 Vertex: $(5, 3)$
2. $h = -2, k = -9$
 Vertex: $(-2, -9)$
- 3.
- 4.
- 5.

Quiz 118

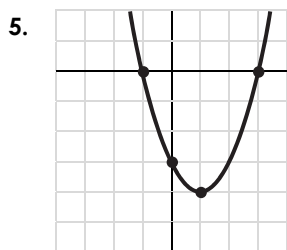
1. x -intercepts: $-3, 3$
 Find the vertex:
 $x = (-3 + 3)/2 = 0$
 $y = -9$ at $x = 0$
 Vertex: $(0, -9)$
2. x -intercepts: $3, 9$
 Find the vertex:
 $x = (3 + 9)/2 = 6$
 $y = 6$ at $x = 6$
 Vertex: $(6, 6)$

- 3.
- 4.



Quiz 119

- $y = x^2 + 6x + 9 - 9 + 5$
 $= (x + 3)^2 - 4$
- $y = -2(x^2 - 4x + 4 - 4) - 1$
 $= -2(x^2 - 4x + 4) + 8 - 1$
 $= -2(x - 2)^2 + 7$
- $y = (x + 2)(x - 4)$
- $y = \frac{1}{2}(x^2 + 6x) = \frac{1}{2}x(x + 6)$



Quiz 120

- $y = -4(x - 1)^2$
 $= -4x^2 + 8x - 4$
Vertex: (1, 0)
x-intercept(s): 1
y-intercept: -4
- $y = \frac{1}{3}(x + 1)(x - 5)$
 $= \frac{1}{3}x^2 - \frac{4}{3}x - \frac{5}{3}$
x-intercepts: -1, 5
Vertex: (2, -3)
 $x = (-1 + 5)/2 = 2$
 $y = -3$ at $x = 2$
y-intercept: -5/3
- $y = -x^2 - 4x + 5$
 $= -(x^2 + 4x - 5)$
 $= -(x - 1)(x + 5)$
x-intercepts: 1, -5
 $y = -(x^2 + 4x + 4 - 4) + 5$
 $= -(x^2 + 4x + 4) + 4 + 5$
 $= -(x + 2)^2 + 9$
Vertex: (-2, 9)
- $y = 2x^2 - 8$
 $= 2(x - 0)^2 - 8$
y-intercept: -8
Vertex: (0, -8)
 $y = 2(x^2 - 4)$
 $= 2(x + 2)(x - 2)$
x-intercepts: -2, 2

- $y = -x^2 + 6x - 5$
 $= -(x^2 - 6x + 5)$
 $= -(x - 1)(x - 5)$
y-intercept: -5
x-intercepts: 1, 5
 $y = -(x^2 - 6x + 9 - 9) - 5$
 $= -(x^2 - 6x + 9) + 9 - 5$
 $= -(x - 3)^2 + 4$
Vertex: (3, 4)

Quiz 121

- Vertex form: $y = a(x - 1)^2 + 3$
Plug in (0, 2): $2 = a(0 - 1)^2 + 3$
Solve for a: $2 = a + 3; a = -1$
Vertex form: $y = -(x - 1)^2 + 3$
Standard form: $y = -x^2 + 2x + 2$
- $y = a(x - 5)^2 + 3$
 $-6 = a(2 - 5)^2 + 3$
 $-6 = 9a + 3; a = -1$
 $y = -(x - 5)^2 + 3$
 $y = -x^2 + 10x - 22$
- $y = a(x + 3)^2$
 $8 = a(-1 + 3)^2$
 $8 = 4a; a = 2$
 $y = 2(x + 3)^2$
 $y = 2x^2 + 12x + 18$
- $y = a(x + 2)(x - 1)$
 $-6 = a(0 + 2)(0 - 1)$
 $-6 = -2a; a = 3$
 $y = 3(x + 2)(x - 1)$
 $y = 3x^2 + 3x - 6$
- $y = ax(x - 8)$
 $5 = a(-2)(-2 - 8)$
 $5 = 20a; a = 1/4$
 $y = \frac{1}{4}x(x - 8)$
 $y = \frac{1}{4}x^2 - 2x$

Quiz 122

- There is no scaling or flipping, so $a = 1$.
The vertex is at (3, 0) after shifting, so $h = 3$ and $k = 0$.
 $y = (x - 3)^2$
- $y = -x^2 + 2$
- $y = (x + 2)^2 - 5$
- $y = 3(x - 4)^2 + 2$
- $y = -2(x + 1)^2$

Quiz 123

- $h(t) = -16(t - 4)^2 + 256$
It reaches the maximum height after 4 seconds.
- $h(t) = -16(t + 3)(t - 3)$
It will hit the ground after 3 seconds.
- $-16t^2 + 64t + 80 = 80$
 $-16t^2 + 64t = 0; -16t(t - 4) = 0; t = 0, t = 4$
It will be at a height of 80 feet again after 4 seconds.
- $h(t) = -16(t - 1)^2 + 256$
The maximum height is 256 feet.
- $c(x) = 0.2(x - 20)^2 + 10$
The cost is minimized when 20 parts are produced.

Quiz 124

1. $y = x^2 - 2x + 1 - 1 + 2$
 $y = (x - 1)^2 + 1$
 Vertex: (1, 1)
 y-intercept: 2

2. $y = -\frac{1}{2}(x^2 - 8x + 12)$
 $y = -\frac{1}{2}(x - 2)(x - 6)$
 x-intercept: 2, 6
 Vertex: (4, 2)

3. Find the function: $y = a(x - 2)(x - 6)$
 $-5 = a(7 - 2)(7 - 6)$
 $-5 = 5a; a = -1$
 $y = -(x - 2)(x - 6)$
- Find the vertex:
 $x = (2 + 6)/2 = 4$
 $y = 4$ at $x = 4$
 Vertex: (4, 4)
4. The graph is scaled by 3 and flipped, so $a = -3$.
 The vertex is at (0, 4) after shifting, so $h = 0$ and $k = 4$.
 $y = -3x^2 + 4$
5. $h(t) = -16(t - 3)^2 + 400$
 It reaches the maximum height after 3 seconds.

Quiz 125

1. $\frac{x}{7}$ for $x \neq 0$
2. $\frac{(x + 2)(x - 2)}{x(x + 2)} = \frac{x - 2}{x}$ for $x \neq 0, -2$
3. $\frac{x + 7}{(x - 2)(x + 7)} = \frac{1}{x - 2}$ for $x \neq 2, -7$
4. $\frac{(x - 3)^2}{(2x + 1)(x - 3)} = \frac{x - 3}{2x + 1}$ for $x \neq -\frac{1}{2}, 3$
5. $\frac{x(x + 1)(x + 4)}{(x + 4)(x + 1)(x - 1)} = \frac{x}{x - 1}$ for $x \neq -4, -1, 1$

Quiz 126

1. $\frac{2}{3x}$ for $x \neq 0$
2. $\frac{x^2 + 3x}{x + 5} \cdot \frac{2x + 10}{x + 3} = \frac{x(x + 3)}{x + 5} \cdot \frac{2(x + 5)}{x + 3} = 2x$
 for $x \neq -5, -3$

3. $\frac{(x - 2)^2}{3x(x - 2)} \cdot \frac{x^2}{x - 2} = \frac{x}{3}$ for $x \neq 0, 2$
4. $\frac{(x - 3)(x + 5)}{x(2x + 3)} \cdot \frac{2x + 3}{x + 5} = \frac{x - 3}{x}$ for $x \neq 0, -\frac{3}{2}, -5$
5. $\frac{2x^2 - 3x - 20}{4x^3 - 25x} \cdot \frac{x^2}{x^2 - 4x}$
 $= \frac{(2x + 5)(x - 4)}{x(2x + 5)(2x - 5)} \cdot \frac{x^2}{x(x - 4)} = \frac{1}{2x - 5}$
 for $x \neq 0, -\frac{5}{2}, \frac{5}{2}, 4$

Quiz 127

1. $\frac{x^2 + 9 + 6x}{x + 3} = \frac{(x + 3)^2}{x + 3} = x + 3$ for $x \neq -3$
2. $\frac{(x + 2)(x + 3)}{x(x + 3)} - \frac{(x + 5)x}{(x + 3)x} = \frac{6}{x(x + 3)}$ for $x \neq 0, -3$
3. $\frac{x - 2}{x^2 - 4} = \frac{x - 2}{(x + 2)(x - 2)} = \frac{1}{x + 2}$ for $x \neq -2, 2$
4. $\frac{x + 2}{x - 3} - \frac{x - 2}{(x - 2)(x - 3)} = \frac{x + 2}{x - 3} - \frac{1}{x - 3} = \frac{x + 1}{x - 3}$
 for $x \neq 3, 2$
5. $\frac{3x + 9}{(2x + 1)(x + 3)} + \frac{x}{2x + 1}$
 $= \frac{3x + 9}{(2x + 1)(x + 3)} + \frac{x(x + 3)}{(2x + 1)(x + 3)}$
 $= \frac{x^2 + 6x + 9}{(2x + 1)(x + 3)} = \frac{(x + 3)^2}{(2x + 1)(x + 3)} = \frac{x + 3}{2x + 1}$
 for $x \neq -\frac{1}{2}, -3$

Quiz 128

1. Excluded: $x \neq 0$; LCD = $2x$
 Multiply both sides by the LCD, then solve for x .
 $x - 6 = 1$
 $x = 7$
2. Excluded: $x \neq -4, -5$; LCD = $(x + 4)(x + 5)$
 Multiply both sides by the LCD, then solve for x .
 $2(x + 5) = 3(x + 4)$ $\rightarrow x = -2$
 $2x + 10 = 3x + 12$
3. Excluded: $x \neq -4, 0$; LCD = $x(x + 4)$
 Multiply both sides by the LCD, then solve for x .
 $x^2 - (x + 4) = x + 4$ $\rightarrow (x + 2)(x - 4) = 0$
 $x^2 - 2x - 8 = 0$ $\rightarrow x = -2, x = 4$

4. Excluded: $x \neq -3, 0$; LCD = $x(x + 3)$
 Multiply both sides by the LCD, then solve for x .
 $x^2 = x + 3 - 3x$ $\rightarrow x = 1, x = -3$
 $x^2 + 2x - 3 = 0$ Exclude -3.
 $(x - 1)(x + 3) = 0$ $\rightarrow x = 1$

5. $\frac{3}{x} - \frac{1}{x+2} = \frac{x-2}{x(x+2)}$
 Excluded: $x \neq 0, -2$; LCD = $x(x + 2)$
 Multiply both sides by the LCD, then solve for x .
 $3(x + 2) - x = x - 2$ $\rightarrow x = -8$
 $2x + 6 = x - 2$

Quiz 129

- Excluded: $x \neq 0$; LCD = $4x$
 Multiply both sides by the LCD, then solve for x .
 $x^2 + 12 = 4(x + 2)$ $\rightarrow (x - 2)^2 = 0$
 $x^2 - 4x + 4 = 0$ $\rightarrow x = 2$
- Excluded: $x \neq 0$; LCD = $6x^2$
 Multiply both sides by the LCD, then solve for x .
 $2x - 3(x + 1) = 6(x - 4)$ $\rightarrow x = 3$
 $-x - 3 = 6x - 24$
- Excluded: $x \neq -3/2, -1/2$; LCD = $(2x + 3)(2x + 1)$
 Multiply both sides by the LCD, then solve for x .
 $(x + 1)(2x + 1) = x(2x + 3)$
 $2x^2 + 3x + 1 = 2x^2 + 3x$ $\rightarrow 1 = 0$
 $0x^2 + 0x + 1 = 0$ No solution
- Excluded: $x \neq 1/3, 1$; LCD = $(3x - 1)(x - 1)$
 Multiply both sides by the LCD, then solve for x .
 $x(x - 1) + 3x - 1 = x - 1$
 $x^2 + x = 0$ $\rightarrow x = 0, x = -1$
 $x(x + 1) = 0$
- $\frac{x}{x-2} - \frac{2}{x+3} = \frac{10}{(x-2)(x+3)}$
 Excluded: $x \neq 2, -3$; LCD = $(x - 2)(x + 3)$
 Multiply both sides by the LCD, then solve for x .
 $x(x + 3) - 2(x - 2) = 10$ $\rightarrow x = 2, x = -3$
 $x^2 + x - 6 = 0$ Exclude 2 and -3.
 $(x - 2)(x + 3) = 0$ No solution

Quiz 130

- | | |
|--|---|
| 1. $x =$ time together
$\frac{1}{3} + \frac{1}{6} = \frac{1}{x}$
LCD = $6x$; $x = 2$
It will take 2 hours. | 2. $x =$ time together
$\frac{1}{20} + \frac{1}{30} = \frac{1}{x}$
LCD = $60x$; $x = 12$
It will take 12 minutes. |
|--|---|

3. $x =$ Mark's time alone $\frac{1}{5} + \frac{1}{x} = \frac{1}{3}$ LCD = $15x$; $x = 7.5$ It will take 7.5 hours.	4. $x =$ time together $\frac{1}{2} + \frac{1}{3} + \frac{1}{6} = \frac{1}{x}$ LCD = $6x$; $x = 1$ It will take 1 hour.
---	---

5. $x =$ Pipe A's time alone
 $4x =$ Pipe B's time alone
 $\frac{1}{x} + \frac{1}{4x} = \frac{1}{4}$
 LCD = $4x$; $x = 5$
 It will take 5 hours.

Quiz 131

- $\frac{x(x-2)(x+5)}{(x+5)(x+2)(x-2)} = \frac{x}{x+2}$ for $x \neq -5, -2, 2$
- $\frac{x^2 - 4x - 12}{3x + 4} \cdot \frac{3x^2 + 4x}{x + 2}$
 $= \frac{(x+2)(x-6)}{3x+4} \cdot \frac{x(3x+4)}{x+2} = x(x-6)$
 for $x \neq -\frac{4}{3}, 0, -2$
- $\frac{x^2 - 11}{(x+2)(x-5)} - \frac{2(x+2)}{(x-5)(x+2)} = \frac{x^2 - 2x - 15}{(x+2)(x-5)}$
 $= \frac{(x+3)(x-5)}{(x+2)(x-5)} = \frac{x+3}{x+2}$ for $x \neq -2, 5$
- Excluded: $x \neq 0, -4$; LCD = $x(x + 4)$
 Multiply both sides by the LCD, then solve for x .
 $x + 4 - x^2 = 4$ $\rightarrow x = 0, x = 1$
 $x^2 - x = 0$ Exclude 0.
 $x(x - 1) = 0$ $\rightarrow x = 1$
- $x =$ time together
 $\frac{1}{9} + \frac{1}{6} = \frac{1}{x}$
 LCD = $18x$; $x = 18/5 = 3.6$
 It will take 3.6 hours.

Quiz 138

- Mean = 5 Median = 5 Mode(s) = 3
- Mean = 6 Median = 6.5 Mode(s) = 9
- Mean = 18 Median = 16.5 Mode(s) = 15
- Mean = $(4 + 5 + 9 + x + 2 + 8)/6 = 6$
 Solve for x , and you get $x = 8$.
- Mean = $(3 + x + 6 + 2 + 7 + 3 + 9)/7 = 5$
 Solve for x , and you get $x = 5$.

Quiz 139

1. Range = 6 S. deviation = 2.3 (Mean = 4)
2. Range = 3 S. deviation = 1.1 (Mean = 5)
3. Range = 0 S. deviation = 0 (Mean = 3)
4. Range = 6 S. deviation = 2 (Mean = 4)
5. Range = 5 S. deviation = 1.6 (Mean = 5)

Quiz 140

1. Min = 2 Q1 = 3 Q2 = 6 Q3 = 8 Max = 9
2. Min = 2 Q1 = 4 Q2 = 5 Q3 = 6.5 Max = 8
3. Median = 90 4. Range = 35 5. 25%

Quiz 141

1. Median = 17 2. 20 children 3. 5 games
4. 3 goals 5. 230 children

Quiz 142

1. Symmetric 2. Skewed left
3. Skewed right 4. Mean
5. Interquartile range

Quiz 143

1. Positive correlation 2. Negative correlation
3. Negative correlation 4. No correlation
5. D) $y = -x + 5$

Quiz 144

1. 200 customers 2. $46 + 54 = 100$ customers
3. $52/200 = 26\%$ 4. $54/200 = 27\%$
5. $52/(52+48) = 52\%$

Quiz 145

1. Mean = 5 Median = 5.5 Mode(s) = 6
2. Median = 10 IQR = 3
3. Skewed right 4. D) Mean and IQR
5. $48/200 = 24\%$

Quiz 146

1. Possible: 20 balls 2. Possible: 1 to 6
Favorable: 5 white balls Favorable: 1 to 6
 $P = 5/20 = 1/4$ $P = 6/6 = 1$

3. Possible: 1 to 10
Favorable: 3, 6, 9
 $P = 3/10$
4. Total tries: 30
Hits: 14
 $P = 14/30 = 7/15$
5. Total tries: 27
Misses: $27 - 18 = 9$
 $P = 9/27 = 1/3$

Quiz 147

1. 8 2. 365 3. $2 \times 26 = 52$
4. $5 \times 6 \times 2 = 60$ 5. $6 \times 4 = 24$

Quiz 148

1. $2 \times 2 \times 2 \times 2 = 16$ 2. $6 \times 2 \times 2 = 24$
3. $4 \times 4 \times 4 = 64$ 4. $5 \times 5 \times 5 = 125$
5. $5 \times 4 \times 3 = 60$

Quiz 149

1. $P(\text{heads and heads}) = P(\text{heads}) \times P(\text{heads}) = \frac{1}{2} \times \frac{1}{2} = \frac{1}{4}$
2. $P(5 \text{ and odd}) = P(5) \times P(\text{odd}) = \frac{1}{6} \times \frac{1}{2} = \frac{1}{12}$
3. $P(\text{both} > 4) = P(1\text{st} > 4) \times P(2\text{nd} > 4) = \frac{1}{3} \times \frac{1}{3} = \frac{1}{9}$
4. $P(\text{odd and even}) = P(\text{odd}) \times P(\text{even}) = \frac{3}{5} \times \frac{2}{5} = \frac{6}{25}$
5. $P(\text{yellow and yellow}) = P(\text{yellow}) \times P(\text{yellow}) = \frac{2}{10} \times \frac{2}{10} = \frac{1}{25}$

Quiz 150

1. $P(\text{odd and odd}) = P(\text{odd}) \times P(\text{odd} | \text{odd}) = \frac{3}{5} \times \frac{2}{4} = \frac{3}{10}$
2. $P(\text{red and red}) = P(\text{red}) \times P(\text{red} | \text{red}) = \frac{3}{10} \times \frac{2}{9} = \frac{1}{15}$
3. $P(5 \text{ and } 5) = P(5) \times P(5 | 5) = \frac{1}{9} \times \frac{0}{8} = 0$
4. $P = 5/25 = 1/5$
 $5 \times 5 = 25$ possible outcomes
5 favorable outcomes: 11, 22, 33, 44, 55
5. $P = 4/36 = 1/9$
 $6 \times 6 = 36$ possible outcomes
4 favorable outcomes: 36, 45, 54, 63

Quiz 151

- $P(2 \text{ or odd}) = P(2) + P(\text{odd})$
 $= \frac{1}{6} + \frac{1}{2} = \frac{2}{3}$
- $P(2 \text{ or prime}) = P(2) + P(\text{prime}) - P(2 \text{ and prime})$
 $= \frac{1}{6} + \frac{1}{2} - \frac{1}{6} = \frac{1}{2}$
- $P(\text{greater than 3 or odd}) = P(\text{greater than 3}) + P(\text{odd}) - P(\text{greater than 3 and odd})$
 $= \frac{1}{2} + \frac{1}{2} - \frac{1}{6} = \frac{5}{6}$
- $P(\text{ace or face}) = P(\text{ace}) + P(\text{face})$
 $= \frac{4}{52} + \frac{12}{52} = \frac{4}{13}$
- $P(\text{black or face}) = P(\text{black}) + P(\text{face}) - P(\text{black and face})$
 $= \frac{26}{52} + \frac{12}{52} - \frac{6}{52} = \frac{8}{13}$

Quiz 152

- $5 \times 4 \times 3 \times 2 \times 1 = 120$
- $(5 \times 4 \times 3)/(3 \times 2 \times 1) = 10$
- $10 \times 9 \times 8 = 720$
- $5 \times 4 \times 3 = 60$
- $(52 \times 51)/(2 \times 1) = 1,326$

Quiz 153

- $C(8, 3) = \frac{8!}{(8-3)!3!} = \frac{8 \times 7 \times 6 \times 5!}{5!3!} = 56$
- $P(4, 4) = \frac{4!}{(4-4)!} = 4! = 24$
- $P(7, 3) = \frac{7!}{(7-3)!} = \frac{7!}{4!} = \frac{7 \times 6 \times 5 \times 4!}{4!} = 210$
- $C(9, 4) = \frac{9!}{(9-4)!4!} = \frac{9 \times 8 \times 7 \times 6 \times 5!}{5!4!} = 126$
- $C(20, 2) = \frac{20!}{(20-2)!2!} = \frac{20 \times 19 \times 18!}{18!2!} = 190$

Quiz 154

- Total possible outcomes = $P(5, 5)$
 Favorable outcomes = 1
 Probability = $\frac{1}{P(5, 5)} = \frac{1}{120}$
- Favorable outcomes = permutations of 4 remaining letters after placing E as the first letter + permutations of 4 remaining letters after placing I as the first letter = $P(4, 4) + P(4, 4) = 2 \times P(4, 4)$
 Probability = $\frac{2 \times P(4, 4)}{P(5, 5)} = \frac{2 \times 24}{120} = \frac{2}{5}$

- Favorable outcomes = E first and I last + I first and E last = $P(3, 3) + P(3, 3) = 2 \times P(3, 3)$
 Probability = $\frac{2 \times P(3, 3)}{P(5, 5)} = \frac{2 \times 6}{120} = \frac{1}{10}$

- Total possible outcomes = $C(9, 2)$
 Favorable outcomes = combinations of choosing 2 balls from 4 yellow balls = $C(4, 2)$
 Probability = $\frac{C(4, 2)}{C(9, 2)} = \frac{6}{36} = \frac{1}{6}$
- Favorable outcomes = combinations of choosing 2 balls from 4 yellow and 3 white balls = $C(7, 2)$
 Probability = $\frac{C(7, 2)}{C(9, 2)} = \frac{21}{36} = \frac{7}{12}$

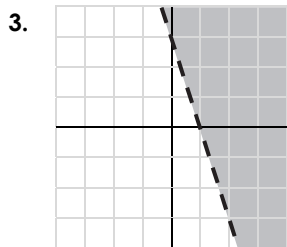
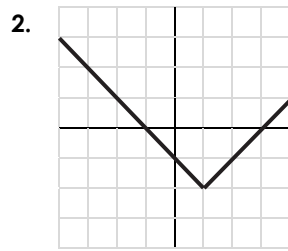
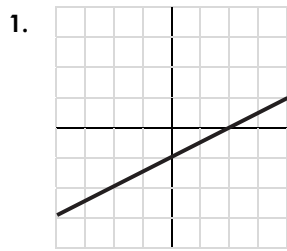
Quiz 155

- $P = 2 \text{ white balls} / 10 \text{ balls} = 1/5$
- $P(\text{three tails}) = P(\text{tails}) \times P(\text{tails}) \times P(\text{tails})$
 $= \frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} = \frac{1}{8}$
- $P = 6/36 = 1/6$
 $6 \times 6 = 36$ possible outcomes
 6 favorable outcomes: 11, 22, 33, 44, 55, 66
- $P(\text{prime or odd}) = P(\text{prime}) + P(\text{odd}) - P(\text{prime \& odd})$
 $= \frac{1}{2} + \frac{1}{2} - \frac{2}{6} = \frac{2}{3}$
- Total possible outcomes = $P(5, 5)$
 Favorable outcomes = permutations of 4 remaining numbers after placing 2 or 4 first = $2 \times P(4, 4)$
 $P = \frac{2 \times P(4, 4)}{P(5, 5)} = \frac{2 \times 24}{120} = \frac{2}{5}$

Quiz 158

- $7x - 8 = 3x + 8$
 $4x - 8 = 8$
 $4x = 16$
 $x = 4$
- $4|x - 5| = 24$
 $|x - 5| = 6$
 $x - 5 = -6$ or $x - 5 = 6$
 $x = -1$ or $x = 11$
- $-30 < -5x \leq 35$
 $-7 \leq x < 6$
- $|-6x| \geq 18$
 $-6x \leq -18$ or $-6x \geq 18$
 $x \geq 3$ or $x \leq -3$
 $x \leq -3$ or $x \geq 3$
- Let three integers be $x, x + 2,$ and $x + 4.$
 $x + (x + 2) + (x + 4) = 78; x = 24$
 The three integers are 24, 26, and 28.

Quiz 159



4.
$$m = \frac{-5 - 7}{2 - (-1)} = -4$$

 Use $(-1, 7)$ to find b :
 $7 = -4(-1) + b$
 $b = 3$
 $y = -4x + 3$

5. The answer is **B**.

Quiz 160

1. Solve by substitution:
 $4x + 5(-2x - 9) = 3$
 $-6x - 45 = 3$
 $x = -8$

$y = -2(-8) - 9 = 7$
 Solution: $(-8, 7)$

2. Solve by elimination:
 eq1 + eq2
 $7x = 7$
 $x = 1$

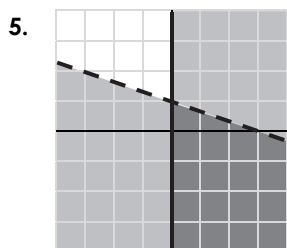
$2(1) + 3y = 8$
 $y = 2$
 Solution: $(1, 2)$

3. Solve by elimination:
 eq1 \times 2 - eq2
 $x = -1$

$3(-1) + 2y = 7$
 $y = 5$
 Solution: $(-1, 5)$

4. x = speed of the plane in still air, y = speed of the wind
 $6(x + y) = 1680$, $7(x - y) = 1680$
 $x = 260$, $y = 20$

The speed of the airplane in still air would be 260 mph and the speed of the wind was 20 mph.



Quiz 161

1. Domain: $0 < x \leq 4$ 2. $f(4) = -1$, so $f^{-1}(-1) = 4$.
 Range: $-1 \leq y \leq 2$ $f(2) + f^{-1}(-1) = 2 + 4 = 6$
3. The table is linear. 4. $k = 2 \times 8 = 16$, so $xy = 16$.
 When $y = 4$, $x = 4$.
5. $a_1 = 5$, $d = 3$
 $a_n = 5 + 3(n - 1) = 3n + 2$

Quiz 162

1. $9 \div 3 - 2 \times (-1) = 3 + 2 = 5$
2. $\sqrt{16 \cdot 5x^2yz^2} = 4xz\sqrt{5y}$
3. $3\sqrt{24} - \sqrt{18} - 2\sqrt{54} + \sqrt{32}$
 $= 3\sqrt{4 \cdot 6} - \sqrt{9 \cdot 2} - 2\sqrt{9 \cdot 6} + \sqrt{16 \cdot 2}$
 $= 6\sqrt{6} - 3\sqrt{2} - 6\sqrt{6} + 4\sqrt{2} = \sqrt{2}$
4. Square both sides.
 $2x + 5 = x + 9$
 $x = 4$
5. $x^2 + 7^2 = 14^2$
 $x^2 = 147$
 $x = \pm\sqrt{147} = \pm 7\sqrt{3}$
 The length is $7\sqrt{3}$ inches.

Quiz 163

1. $15x^{4-3} = 15x$
2. $x^5 \cdot 2^{-2}x^{-4} = \frac{x}{2^2} = \frac{x}{4}$
3. $(3^3x^3)^{2/3} = 3^2x^2 = 9x^2$
4. $(2^5x^{1/4})^{4/5} = 2^4x^{1/5} = 16x^{1/5}$
5. Initial value $a = 200$
 Growth factor $b = 1.05$
 $y = 200(1.05)^x$
- $y = 255.256 \dots$ at $x = 5$
 The coin will be worth about \$255.26.

Quiz 164

1. $(x^2 - 16)(x - 2)$
 $= x^3 - 2x^2 - 16x + 32$
2. $\frac{3x - 4}{x + 2}$
 $\begin{array}{r} 3x - 4 \\ x + 2 \overline{) 3x^2 + 2x - 8} \\ \underline{3x^2 + 6x} \\ -4x - 8 \\ \underline{-4x - 8} \\ 0 \end{array}$
 Answer: $3x - 4$
3. $3x^2 + x + 9x + 3$
 $= x(3x + 1) + 3(3x + 1)$
 $= (3x + 1)(x + 3)$
4. $8x(x^2 - 2x + 1) = 8x(x - 1)^2$
5. $-(4x^3 + 12x^2 - x - 3)$
 $= -[4x^2(x + 3) - (x + 3)]$
 $= -(x + 3)(4x^2 - 1)$
 $= -(x + 3)(2x + 1)(2x - 1)$

Quiz 165

- By taking square roots:

$$2(x-1)^2 = 18$$

$$(x-1)^2 = 9$$

$$x-1 = \pm 3$$

$$x = 1 \pm 3$$

$$x = 4, x = -2$$
- By factoring:

$$3(x^2 - 3x + 2) = 0$$

$$3(x-1)(x-2) = 0$$

$$x = 1, x = 2$$
- By comp. the square:

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

$$x^2 + 6x + 9 = -3 + 9$$

$$(x+3)^2 = 6$$

$$x+3 = \pm\sqrt{6}$$

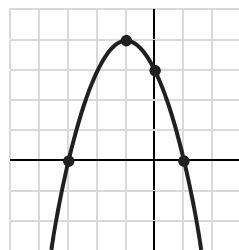
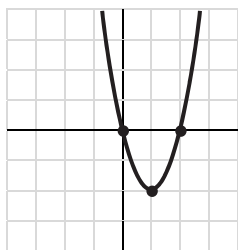
$$x = -3 \pm \sqrt{6}$$
- By the quad. formula:

$$a = 4, b = 7, c = 2$$

$$x = \frac{-7 \pm \sqrt{17}}{8}$$
- $x = \text{width}; 2x + 3 = \text{length}$
 The area is 90, so $x(2x + 3) = 90$.
 $2x^2 + 3x - 90 = 0; (x-6)(2x+15) = 0; x = 6, x = -15/2$
 The dimensions are 6 cm and 15 cm.

Quiz 166

- $y = 2x^2 - 4x$
 $= 2x(x-2)$
 $= 2(x-1)^2 - 2$
 y-intercept: 0
 x-intercepts: 0, 2
 Vertex: (1, -2)
- $y = -x^2 - 2x + 3$
 $= -(x-1)(x+3)$
 $= -(x+1)^2 + 4$
 y-intercept: 3
 x-intercepts: 1, -3
 Vertex: (-1, 4)



- Find the function:
 $y = a(x+2)^2 - 8$
 $10 = a(1+2)^2 - 8$
 $10 = 9a - 8; a = 2$
 $y = 2(x+2)^2 - 8$
- Find the zeros:
 $y = 2x^2 + 8x$
 $y = 2x(x+4)$
 The zeros are 0 and -4.
- $y = -4(x+5)^2$
- $-16t(t-6) = 0$
 After 6 seconds

Quiz 167

- $\frac{(2x+3)(2x-3)}{(2x-3)(x+4)} = \frac{2x+3}{x+4}$ for $x \neq \frac{3}{2}, -4$
- $\frac{5x+15}{x^2-10x+25} \cdot \frac{x-5}{x+3}$
 $= \frac{5(x+3)}{(x-5)^2} \cdot \frac{x-5}{x+3} = \frac{5}{x-5}$ for $x \neq 5, -3$
- $\frac{x(x-4)}{(x-3)(x-4)} - \frac{x-6}{(x-3)(x-4)}$
 $= \frac{x^2-5x+6}{(x-3)(x-4)} = \frac{(x-2)(x-3)}{(x-3)(x-4)} = \frac{x-2}{x-4}$
 for $x \neq 3, 4$
- Excluded: $x \neq 0, -5$; LCD = $x(x+5)$
 Multiply both sides by the LCD, then solve for x .
 $x^2 = 4(x+5) - 3x$ $(x+4)(x-5) = 0$
 $x^2 - x - 20 = 0$ $x = -4, x = 5$
- $x = \text{Leah's time alone}$
 $\frac{1}{60} + \frac{1}{x} = \frac{1}{15}$
 LCD = $60x; x = 20$
 It will take 20 minutes.

Quiz 168

- Mean = 7 Median = 6.5 Mode(s) = 8
- Median = 5.5 3. Skewed left
- Positive correlation 5. $48/(32+48) = 60\%$

Quiz 169

- $P = 3/5$ 2. $P(\text{prime and odd})$
 Possible: 1 to 5 = $P(\text{prime}) \times P(\text{odd})$
 Favorable: 1, 3, 5 = $1/2 \times 1/2 = 1/4$
- $P = 6/36 = 1/6$
 $6 \times 6 = 36$ possible outcomes
 6 favorable outcomes: 16, 25, 34, 43, 52, 61
- $P(\text{red or face}) = P(\text{red}) + P(\text{face}) - P(\text{red and face})$
 $= \frac{26}{52} + \frac{12}{52} - \frac{6}{52} = \frac{8}{13}$
- Total possible outcomes = $C(6, 2)$
 Favorable outcomes = combinations of choosing 2 balls from 4 green balls = $C(4, 2)$
 Probability = $\frac{C(4, 2)}{C(6, 2)} = \frac{6}{15} = \frac{2}{5}$

Quiz 170

- | | |
|---|--|
| 1. $5x = -5$
$x = -1$ | 2. $2x - 3 = 9 - 4x$
$6x = 12$
$x = 2$ |
| 3. Multiply by 100.
$40x + 170 = 202$
$40x = 32$
$x = 4/5$ | 4. Multiply by 12.
$4x + 9 = 6x + 2$
$-2x = -7$
$x = 7/2$ |
| 5. $4 3 - 2x = 12$
$ 3 - 2x = 3$
$3 - 2x = -3$ or $3 - 2x = 3$
$-2x = -6$ or $-2x = 0$
$x = 3$ or $x = 0$ | |

Quiz 171

- | | |
|---|---|
| 1. $9x \leq 36$
$x \leq 4$ | 2. $-2x - 4 > -8$
$-2x > -4$
$x < 2$ |
| 3. $-10 \leq -5x < 3$
$-1 < x \leq 2$ | 4. $4x \geq 12$ or $-x < 2$
$x \geq 3$ or $x > -2$
$x > -2$ |
| 5. Multiply by 5.
$2 x + 3 - 5 < 3$
$2 x + 3 < 8$ | $ x + 3 < 4$
$-4 < x + 3 < 4$
$-7 < x < 1$ |

Quiz 172

- | | |
|--|---|
| 1. $3x + (x + 3) = 15$
$x = 3$
$y = 3 + 3 = 6$
Solution: (3, 6) | 2. eq1 + eq 2
$5x = -5; x = -1$
$2(-1) + y = 7; y = 9$
Solution: (-1, 9) |
| 3. eq1 \times 2 - eq 2
$0x + 0y = -15$
No solution | 4. eq1 \times 2 - eq 2
$9y = -18; y = -2$
$2x + 7(-2) = -4; x = 5$
Solution: (5, -2) |
| 5. eq1 \div 3 - eq2 \div 2
$0x + 0y = 0$
Infinitely many solutions | |

Quiz 173

- | | |
|--|--|
| 1. $4\sqrt{x} = 8$
$\sqrt{x} = 2$
$x = 4$ | 2. $\sqrt{x - 3} = -3 < 0$
No solution |
| 3. $\sqrt{2x - 1} = 3$
$2x - 1 = 9$
$2x = 10$
$x = 5$ | 4. $3x + 8 = x + 4$
$2x = -4$
$x = -2$ |

5. $9(x - 1) = 6x - 7$
 $9x - 9 = 6x - 7$
 $3x = 2$
 $x = 2/3$

Quiz 174

- | | |
|--|--|
| 1. $(x + 3)(x - 6) = 0$
$x = -3, x = 6$ | 2. $(x - 1)^2 = 20$
$x - 1 = \pm\sqrt{20}$
$x = 1 \pm 2\sqrt{5}$ |
| 3. $a = 2, b = 4, c = 7$
$D = b^2 - 4ac$
$= -10 < 0$
No solution | 4. $4(x^2 - x - 6) = 0$
$4(x + 2)(x - 3) = 0$
$x = -2, x = 3$ |
| 5. $x^2 + 10x = -18$
$x^2 + 10x + 25 = -18 + 25$
$(x + 5)^2 = 7$
$x + 5 = \pm\sqrt{7}$
$x = -5 \pm \sqrt{7}$ | |

Quiz 175

1. Excluded: $x \neq 1/4, -3$; LCD = $(4x - 1)(x + 3)$
Multiply both sides by the LCD, then solve for x .
 $2(x + 3) = 3(4x - 1)$ \rightarrow $-10x = -9$
 $2x + 6 = 12x - 3$ \rightarrow $x = 9/10$
2. Excluded: $x \neq 0, -1$; LCD = $2x(x + 1)$
Multiply both sides by the LCD, then solve for x .
 $4(x + 1) + 2x(x - 3) = x(x + 1)$
 $x^2 - 3x + 4 = 0$ \rightarrow No solution
 $D = b^2 - 4ac = -7 < 0$
3. Excluded: $x \neq 0$; LCD = $9x$
Multiply both sides by the LCD, then solve for x .
 $3(x + 2) - 9 = x - 1$ \rightarrow $2x = 2$
 $3x - 3 = x - 1$ \rightarrow $x = 1$
4. Excluded: $x \neq -3, 1$; LCD = $(x + 3)(x - 1)$
Multiply both sides by the LCD, then solve for x .
 $(x + 1)(x - 1) - (x + 3) = 4(x - 1)$
 $x^2 - 5x = 0$ \rightarrow $x = 0, x = 5$
 $x(x - 5) = 0$
5. $\frac{x}{x + 2} = \frac{x + 16}{(x + 2)(x - 5)}$
Excluded: $x \neq -2, 5$; LCD = $(x + 2)(x - 5)$
Multiply both sides by the LCD, then solve for x .
 $x(x - 5) = x + 16$ \rightarrow $x = -2, x = 8$
 $x^2 - 6x - 16 = 0$ \rightarrow Exclude -2.
 $(x + 2)(x - 8) = 0$ \rightarrow $x = 8$