VOLUME 1



enVision® Mathematics

SAVVAS

CONTENTS

TOPICS

1 Rational Number Operations

2 Real Numbers

3 Analyze and Use Proportional Relationships

4 Analyze and Solve Percent Problems

5 Generate Equivalent Expressions

6 Solve Problems Using Equations and Inequalities

7 Analyze and Solve Linear Equations

8 Use Sampling to Draw Inferences About Populations

9 Probability

10 Solve Problems Involving Geometry

11 Congruence and Similarity

12 Understand and Apply the Pythagorean Theorem

13 Solve Problems Involving Surface Area and Volume

TOPIC 1

Rational Number Operations

Topic Opener 2

enVision® STEM Project 4

Review What You Know 5

Math Literacy Activity 6

Pick a Project 7

1-1 **Relate Integers and Their Opposites** 9

1-2 **Understand Rational Numbers** 15

1-3 **Add Integers** 21

1-4 **Subtract Integers** 27

1-5 **Add and Subtract Rational Numbers** 33

Mid-Topic Checkpoint 39

Mid-Topic Performance Task 40

1-6 **Multiply Integers** 41

1-7 **Multiply Rational Numbers** 47

1-8 **Divide Integers** 53

1-9 **Divide Rational Numbers** 59

1-10 **Solve Problems with Rational Numbers** 65

3-Act Mathematical Modeling: Win Some, Lose Some 71

Topic Review 75

Fluency Practice Activity 81

TOPIC 2 Real Numbers

Topic Opener 82

enVision® STEM Project 84

Review What You Know 85

Math Literacy Activity 86

Pick a Project 87

2-1 **Rational Numbers as Decimals** 89

2-2 **Understand Irrational Numbers** 95

2-3 **Compare and Order Real Numbers** 101

2-4 **Evaluate Square Roots and Cube Roots** 107

2-5 **Solve Equations Using Square Roots and Cube Roots** 113

Mid-Topic Checkpoint 119

Mid-Topic Performance Task 120

2-6 **Use Properties of Integer Exponents** 121

2-7 **More Properties of Integer Exponents** 127

2-8 **Use Powers of 10 to Estimate Quantities** 133

2-9 **Understand Scientific Notation** 139

3-Act Mathematical Modeling: Hard-Working Organs 145

2-10 **Operations with Numbers in Scientific Notation** 149

Topic Review 155

Fluency Practice Activity 161

TOPIC 3

Analyze and Use Proportional Relationships

Topic Opener 162

enVision® STEM Project 164

Review What You Know 165

Math Literacy Activity 166

Pick a Project 167

3-1 **Connect Ratios, Rates, and Unit Rates** 169

3-2 **Determine Unit Rates with Ratios of Fractions** 175

3-3 **Understand Proportional Relationships: Equivalent Ratios** 181

3-4 **Describe Proportional Relationships: Constant of Proportionality** 187

Mid-Topic Checkpoint 193

Mid-Topic Performance Task 194

3-Act Mathematical Modeling: Mixin' It Up 195

3-5 **Graph Proportional Relationships** 199

3-6 **Apply Proportional Reasoning to Solve Problems** 205

Topic Review 211

Fluency Practice Activity 215

TOPIC 4

Analyze and Solve Percent Problems

Topic Opener 216

enVision® STEM Project 218

Review What You Know 219

Math Literacy Activity 220

Pick a Project 221

4-1 **Analyze Percents of Numbers** 223

4-2 **Connect Percent and Proportion** 229

4-3 **Represent and Use the Percent Equation** 235

Mid-Topic Checkpoint 241

Mid-Topic Performance Task 242

4-4 **Solve Percent Change and Percent Error Problems** 243

3-Act Mathematical Modeling: The Smart Shopper 249

4-5 **Solve Markup and Markdown Problems** 253

4-6 **Solve Simple Interest Problems** 259

Topic Review 265

Fluency Practice Activity 269

TOPIC 5

Generate Equivalent Expressions

Topic Opener 270

enVision® STEM Project 272

Review What You Know 273

Math Literacy Activity 274

Pick a Project 275

5-1 **Write and Evaluate Algebraic Expressions** 277

5-2 **Generate Equivalent Expressions** 283

5-3 **Simplify Expressions** 289

5-4 **Expand Expressions** 295

5-5 **Factor Expressions** 301

Mid-Topic Checkpoint 307

Mid-Topic Performance Task 308

3-Act Mathematical Modeling: I've Got You Covered 309

5-6 **Add Expressions** 313

5-7 **Subtract Expressions** 319

5-8 **Analyze Equivalent Expressions** 325

Topic Review 331

Fluency Practice Activity 335

TOPIC 6 Solve Problems Using Equations and Inequalities

Topic Opener 336

enVision® STEM Project 338

Review What You Know 339

Math Literacy Activity 340

Pick a Project 341

6-1 **Write Two-Step Equations** 343

6-2 **Solve Two-Step Equations** 349

6-3 **Solve Equations Using the Distributive Property** 355

Mid-Topic Checkpoint 361

Mid-Topic Performance Task 362

6-4 **Solve Inequalities Using Addition or Subtraction** 363

6-5 **Solve Inequalities Using Multiplication or Division** 369

3-Act Mathematical Modeling: Digital Downloads 375

6-6 **Solve Two-Step Inequalities** 379

6-7 **Solve Multi-Step Inequalities** 385

Topic Review 391

Fluency Practice Activity 395

TOPIC 7

Analyze and Solve Linear Equations

Topic Opener 396

enVision® STEM Project 398

Review What You Know 399

Math Literacy Activity 400

Pick a Project 401

7-1 **Combine Like Terms to Solve Equations** 403

7-2 **Solve Equations with Variables on Both Sides** 409

7-3 **Solve Multistep Equations** 415

7-4 **Equations with No Solutions or Infinitely Many Solutions** 421

Mid-Topic Checkpoint 429

Mid-Topic Performance Task 430

3-Act Mathematical Modeling: Powering Down 431

7-5 **Compare Proportional Relationships** 435

7-6 **Connect Proportional Relationships and Slope** 441

7-7 **Analyze Linear Equations: $y = mx$** 447

7-8 **Understand the *y*-Intercept of a Line** 453

7-9 **Analyze Linear Equations: $y = mx + b$** 459

Topic Review 465

Fluency Practice Activity 471

TOPIC 8 Use Sampling to Draw Inferences About Populations

Topic Opener 472

enVision® STEM Project 474

Review What You Know 475

Math Literacy Activity 476

Pick a Project 477

8-1 **Populations and Samples** 479

8-2 **Draw Inferences from Data** 487

Mid-Topic Checkpoint 495

Mid-Topic Performance Task 496

8-3 **Make Comparative Inferences About Populations** 497

8-4 **Make More Comparative Inferences About Populations** 503

3-Act Mathematical Modeling: Raising Money 509

Topic Review 513

Fluency Practice Activity 517

TOPIC 9 Probability

Topic Opener 518

enVision® STEM Project 520

Review What You Know 521

Math Literacy Activity 522

Pick a Project 523

9-1 **Understand Likelihood and Probability** 525

9-2 **Understand Theoretical Probability** 531

9-3 **Understand Experimental Probability** 537

9-4 **Use Probability Models** 543

Mid-Topic Checkpoint 549

Mid-Topic Performance Task 550

3-Act Mathematical Modeling: Photo Finish 551

9-5 **Determine Outcomes of Compound Events** 555

9-6 **Find Probabilities of Compound Events** 561

9-7 **Simulate Compound Events** 567

Topic Review 573

Fluency Practice Activity 579

TOPIC 10 Solve Problems Involving Geometry

Topic Opener 580

enVision® STEM Project 582

Review What You Know 583

Math Literacy Activity 584

Pick a Project 585

10-1 **Solve Problems Involving Scale Drawings** 587

10-2 **Draw Geometric Figures** 593

10-3 **Draw Triangle with Given Conditions** 599

10-4 **Solve Problems Using Angle Relationships** 607

10-5 **Solve Problems Involving Circumference of a Circle** 613

Mid-Topic Checkpoint 619

Mid-Topic Performance Task 620

10-6 **Solve Problems Involving Area of a Circle** 621

3-Act Mathematical Modeling: Whole Lotta Dough 627

10-7 **Describe Cross Sections** 631

10-8 **Solve Problems Involving Surface Area** 637

10-9 **Solve Problems Involving Volume** 643

Topic Review 649

Fluency Practice Activity 655

TOPIC 11 Congruence and Similarity

Topic Opener 656

enVision® STEM Project 658

Review What You Know 659

Math Literacy Activity 660

Pick a Project 661

11-1 **Analyze Translations** 663

11-2 **Analyze Reflections** 669

11-3 **Analyze Rotations** 675

11-4 **Compose Transformations** 681

3-Act Mathematical Modeling: Tricks of the Trade 687

11-5 **Understand Congruent Figures** 691

Mid-Topic Checkpoint 697

Mid-Topic Performance Task 698

11-6 **Describe Dilations** 699

11-7 **Understand Similar Figures** 705

11-8 **Angles, Lines, and Transversals** 711

11-9 **Interior and Exterior Angles of Triangles** 719

11-10 **Angle-Angle Triangle Similarity** 725

Topic Review 731

Fluency Practice Activity 737

TOPIC 12

Understand and Apply the Pythagorean Theorem

Topic Opener 738

enVision® STEM Project 740

Review What You Know 741

Math Literacy Activity 742

Pick a Project 743

3-Act Mathematical Modeling: Go with the Flow 745

12-1 **Understand the Pythagorean Theorem** 749

12-2 **Understand the Converse of the Pythagorean Theorem** 755

Mid-Topic Checkpoint 761

Mid-Topic Performance Task 762

12-3 **Apply the Pythagorean Theorem to Solve Problems** 763

12-4 **Find Distance in the Coordinate Plane** 769

Topic Review 775

Fluency Practice Activity 779



Solve Problems Involving Surface Area and Volume

Topic Opener 780

enVision® STEM Project 782

Review What You Know 783

Math Literacy Activity 784

Pick a Project 785

13-1 **Find Surface Area of Three-Dimensional Figures** 787

13-2 **Find Volume of Cylinders** 793

Mid-Topic Checkpoint 799

Mid-Topic Performance Task 800

13-3 **Find Volume of Cones** 801

13-4 **Find Volume of Spheres** 807

3-Act Mathematical Modeling: Measure Up 813

Topic Review 817

Fluency Practice Activity 821

Lesson 1-1
Relate Integers and Their Opposites

Go Online

I can...
relate integers, their opposites, and their absolute values.

Solve & Discuss It!

ACTIVITY

When preparing for a rocket launch, the mission control center uses the phrase "T minus" before liftoff.

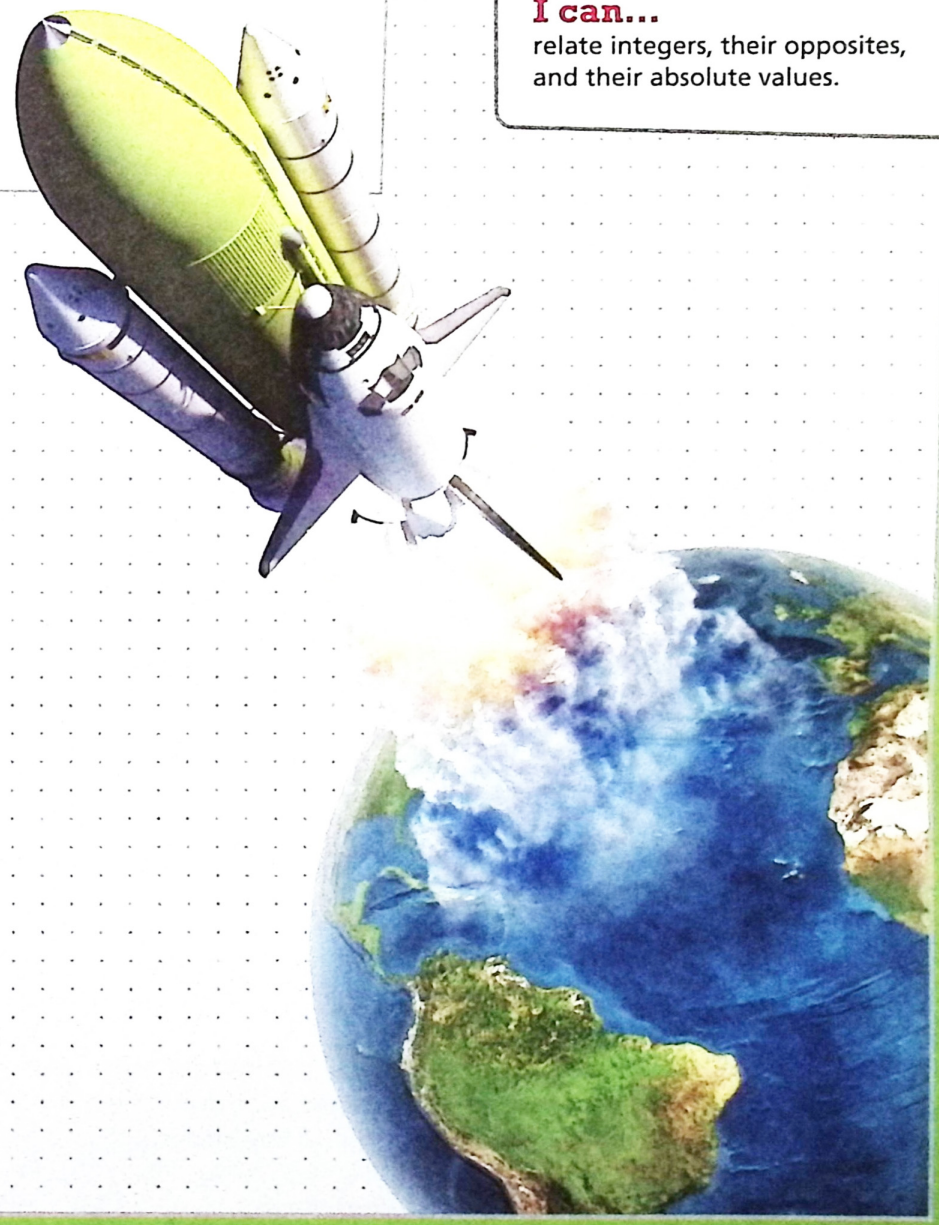
...T minus 3, T minus 2, T minus 1, ...

After the rocket has launched, "T plus" is used while the rocket is in flight.

...T plus 1, T plus 2, T plus 3, ...

When does the rocket launch? What could "T" represent?

Reasoning What integers can you use to represent this situation?



Focus on math practices

Reasoning How are "T minus 4" and "T plus 4" related?

Essential Question How are integers and their opposites related?

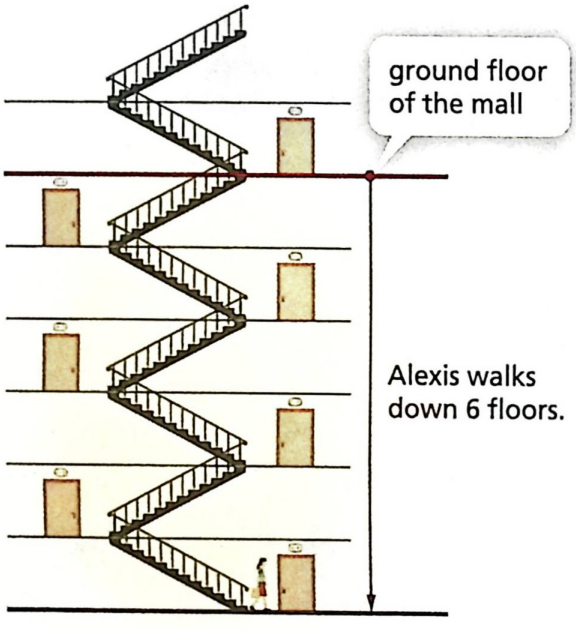
VISUAL LEARNING ASSESS

EXAMPLE 1 Combine Opposite Quantities to Make 0

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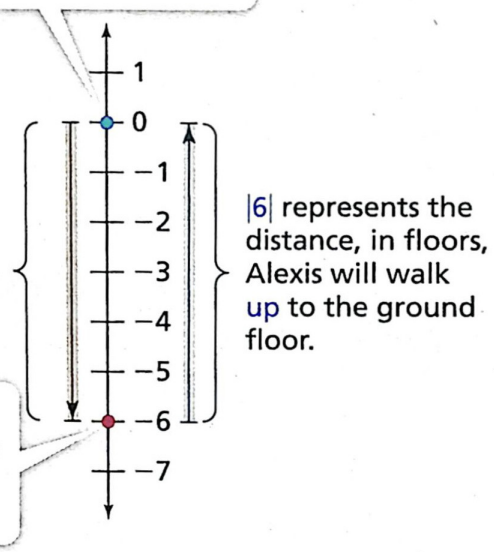
Alexis was shopping on the ground floor of the mall when she realized she had left her phone in her car. She walks down 6 floors to her car in the underground parking garage.

How far will Alexis walk to get back to the ground floor? Use integers to explain.



Use integers on a number line to represent the situation.

The integer 0 represents the location of the ground floor.



$|-6|$ represents the distance, in floors, Alexis walks down to her car.

$|6|$ represents the distance, in floors, Alexis will walk up to the ground floor.

−6 represents Alexis's position after she walks to her car.

$|-6| = |6| = 6$

−6 and 6 are opposites. Opposite quantities combine to make 0.

Alexis will walk the same distance, 6 floors, in the opposite direction to get back to the ground floor.

Try It!

Xavier climbs 9 feet up into an apple tree. What integer represents the direction and how far he will climb to get back down to the ground? What does the integer 0 represent in this situation?

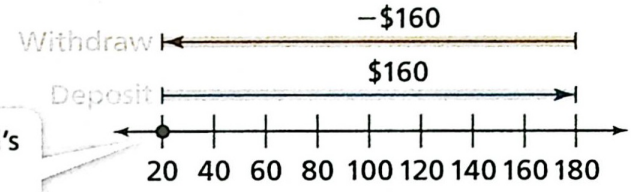
The integer _____ represents Xavier's climb down.

The integer 0 represents _____.

Convince Me! How are the absolute values of opposite integers related?

EXAMPLE 2 Combine Opposite Quantities

Samuel has $20 in his savings account before he makes a deposit of $160. After 2 weeks, he withdraws $160. How did Samuel's savings account balance change?



The initial amount in Samuel's savings account is $20.

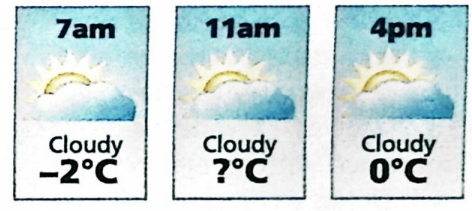
The amounts deposited and withdrawn are opposite quantities and combine to make 0. Samuel's account balance did not change because the amounts deposited and withdrawn combine to make 0.

Try It!

The temperature was 75°. At noon, the temperature increased 7°. By evening, the temperature decreased by 7°. How did the temperature change?

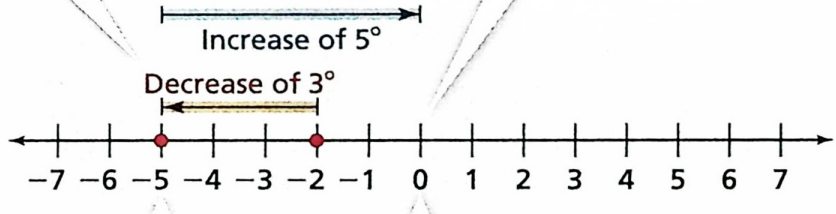
EXAMPLE 3 Represent Change Using Integers

One winter morning, the temperature was −2°C. By 11:00 A.M., the temperature had decreased by 3°. At 4:00 P.M., the temperature reached 0°C. What integer represents the temperature change from 11:00 A.M. to 4:00 P.M.?



Start at −2. The integer −3 represents the temperature decrease, so move 3 units left. The temperature has a change of −3.

Next, move 5 units right to show the temperature increase to 0°C. The temperature has a change of 5.



At 11:00 A.M. the temperature was −5°C.

At 4:00 P.M. the temperature was 0°C.

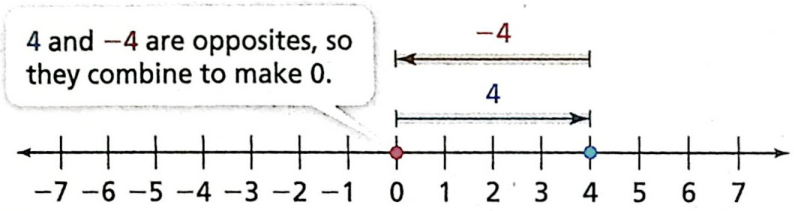
The integer 5 represents the temperature change from 11:00 A.M. to 4:00 P.M.

Try It!

Shaniqua has $45 in her wallet. She spends $4 on snacks and $8 on a movie ticket. What integer represents the change in the amount of money in Shaniqua's wallet? How much money does she have left?

KEY CONCEPT

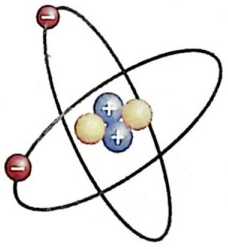
An integer, n, and its opposite, $-n$, combine to make 0.



Do You Understand?

1. **Essential Question** How are integers and their opposites related?

2. **Reasoning** In order for an atom to have a zero charge, every proton, which has a charge of +1, must be matched with an electron, which has a charge of −1. A helium atom has 2 protons and 2 electrons. Explain why a helium atom has a zero charge.



3. **Model with Math** Explain how to use a number line to show that opposite quantities combine to make 0.

Do You Know How?

4. Marcus dives from the surface of the ocean to a reef 18 meters below sea level. What integer represents Marcus's location relative to the surface? How far does Marcus have to go to return to the surface?

5. The temperature of the water in Emily's fish tank was 78°F on Sunday. The water temperature changed by −3° on Monday, and then by 3° on Tuesday. What integer represents the temperature change of the water from Sunday to Tuesday? What was the water temperature on Tuesday?

6. The scores of players on a golf team are shown in the table. The team's combined score was 0. What was Travis's score?

Golfer	Score
CELIA	−3
JANINE	3
SAMI	1
TED	4
TRAVIS	

Name: _____

Practice & Problem Solving

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Leveled Practice **In 7–9, write the integer that represents the situation.**

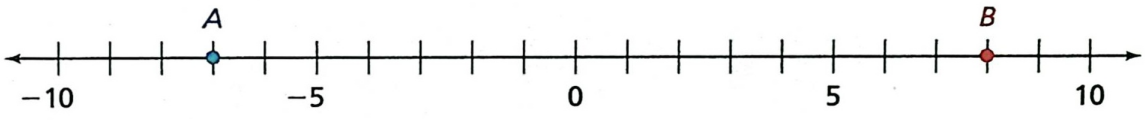
7. Max spent $53 and now has no money left. He had $ ☐ before his purchase.

8. The temperature was 8°F. It dropped so that the temperature was 0°F. ☐ °F represents the change in temperature.

9. An airplane descended 4,000 feet before landing. The integer that represents how many feet the airplane was above the ground before its descent is ☐.

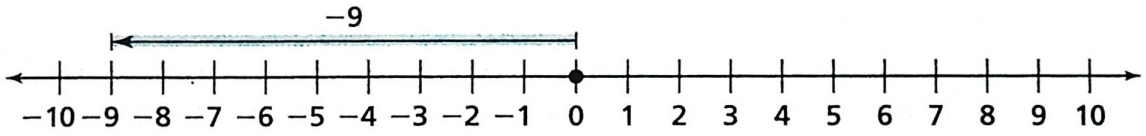
10. Carolyn says that point A and point B represent opposite integers.

a. What is the opposite of the integer represented by point A? By point B?



b. Construct Arguments Do you agree with Carolyn? Explain.

11. A football team lost 9 yards during a play. The team had a combined gain or loss of 0 yards after the next play. What integer represents the yards gained or lost on the next play? Show this on the number line.



12. A roller coaster car goes above and below ground. Use the number line to show its changes in height. What is the height of the car at the end of the ride?

