

Accelerated 6 • Unit 9 Worksheet

Putting It All Together

Name: _____

Date: _____

Part A • Connections

These tasks weave together multiple units. Show your work.

1. A lawn is rectangular with dimensions 12 m by 8 m. The owner wants a circular flower bed in the center with a radius of 1.5 m. (Use $\pi \approx 3.14$.)

- Find the area of the lawn (without flowers): _____ m^2
- Find the area of the flower bed: _____ m^2
- Find the GRASS area (lawn minus flower bed): _____ m^2
- Grass seed covers 2 m^2 per gram. How many grams needed? _____ g
- Seed costs \$0.15 per gram, and the store applies an 8% tax. What is the total cost?

Part B • Voting

2. A class of 30 students votes for class president. Lin: 12 votes. Diego: 10 votes. Mai: 8 votes.

- What percent of the class voted for each? Lin _____%, Diego _____%, Mai _____%
- Is there a majority winner (more than 50%)? ☐ Yes ☐ No Explain.

c. Suppose a 'runoff' is held between the TOP TWO and Mai's 8 voters split evenly between Lin and Diego. Who wins the runoff? By what margin?

Part C • Designing a Course (Multi-Step)

3. Design a 5-km (5000 m) running course. You want 60% of the course to be on flat trail, 25% uphill, and 15% downhill.

- How many meters of each type? Flat _____, Uphill _____, Downhill _____
 - Verify your three answers sum to 5000 m: _____
 - A runner moves at 4 m/s on flat, 3 m/s uphill, and 6 m/s downhill. How long (in seconds, then minutes) to complete the course?
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- What is the AVERAGE speed for the whole course? Is it the same as the simple average of 4, 3, 6? Why or why not?
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Part D • A Big-Picture Problem

4. A water tank holds 480 liters. A pump fills it at 12 L/min. A leak drains it at 2 L/min.

- Net fill rate: _____ L/min
 - Time to fill the tank from empty: _____ min
 - The pump is run only between 8 a.m. and 4 p.m. (8 hours). The leak is always there. How much water in the tank at 4 p.m. (start empty)? _____ L. Is it full? _____
 - Overnight, only the leak is active. How long does it take to drain to empty?
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Part E • Statistical Reasoning

5. A polling organization wants to estimate, for a city of 200,000 people, what fraction prefer Park A vs Park B.

a. They sample 1000 people. 620 prefer A; 380 prefer B. Estimate the proportion for each.

b. Estimate how many people in the WHOLE city prefer each park: A _____, B _____

c. If they re-sampled tomorrow with 1000 different people, would they get EXACTLY the same numbers? Why?

d. Mai says: 'Just sample 5 random friends — they're random because I didn't pick on purpose.' Why is this a bad idea?

Part F • Thinking Deeply

6. A circle has area $100\pi \text{ cm}^2$. A square has the same area as this circle. Which has the smaller perimeter?

Radius of the circle: _____

Side of the square: _____

Circumference: _____ Square perimeter: _____

Which is smaller? By how much (approximately)?

Generalize: which shape encloses the SAME area with the LESS perimeter? Why?

7. A train leaves Station A at 9:00 a.m. going 60 km/h east. A second train leaves Station B (300 km east of A) at 9:30 a.m. going 80 km/h west. When and where do they meet?

Position of train 1 at time t (in hours after 9:00 a.m.): _____

Position of train 2 at time t : _____

Set them equal and solve for t :

Meeting time: _____ Distance from A: _____ km

8. Diego claims: "A 25% increase followed by a 25% decrease leaves you LESS than where you started." Test his claim with \$200. Then explain in your OWN words what mathematical fact makes this true.

9. An item costs \$80. A store offers TWO discounts: 'Take 30% off' OR 'Take 10% off, then another 20% off the new price.' Which is the better deal?

30% off: _____

10% then 20%: _____

Better deal: _____ by \$ _____

Will the result generalize for ANY starting price? Explain.

10. Open-ended: write a real-world problem that requires the use of AT LEAST THREE of: area, percent, ratio, equation, rational number, statistics. Then solve it.
