

Trail Relay

Mission: Relay teams must run at least 2 miles to earn a medal. Before running, estimate with benchmark fractions (0, $\frac{1}{2}$, 1). Then run each leg on the number line to check.

Big question: How can benchmark fractions help us estimate and check fraction sums?

★ Warm-up: Closer to...?

Is each fraction closer to 0, $\frac{1}{2}$, or 1? Explain.

$\frac{5}{6}$ ✓ **Close to 1 (only $\frac{1}{6}$ away).**

$\frac{3}{8}$ ✓ **Close to $\frac{1}{2}$ ($\frac{1}{2} = \frac{4}{8}$).**

Key vocabulary

Benchmark fraction	A friendly fraction for comparing, like 0, $\frac{1}{2}$, and 1.
Estimate	A close, reasonable guess.
Reasonable	Makes sense compared to your estimate.
Number line	A line with numbers placed in order at equal spaces.

1 Box 1

Run relay 1

In the simulator: Run both legs.

What is the team's exact total? (Mixed number.)

Answer: _____ mi ✓ **1.416666666666667**

Show your thinking:

Medal?

Did relay 1 reach the 2-mile goal?

☐ No: 1 $\frac{5}{12}$ miles is less than 2 ☐ Yes ☐ Exactly 2

✓ **No: 1 $\frac{5}{12}$ miles is less than 2**

2 Box 2

Relay 2

In the simulator: Estimate, then run relay 2 ($\frac{5}{6} + \frac{3}{8} + \frac{1}{2}$).

What is the exact total?

Answer: _____ mi ✓ **1.7083333333333333**

Show your thinking:

3 Box 3

Relay 3

In the simulator: Estimate, then run relay 3 ($7/8 + 4/5$).

What is the exact total?

Answer: _____ mi ✓ **1.675**

Show your thinking:

4 Box 4

Use benchmarks

Using only benchmarks, sort each relay.

Sort: $1/8 + 1/5$ · $7/8 + 9/10$ · $2/5 + 1/3$ · $5/6 + 1/2$

Definitely more than 1 mile	Definitely less than 1 mile
$7/8 + 9/10$ $5/6 + 1/2$	$1/8 + 1/5$ $2/5 + 1/3$

5 Box 5

Reasonable?

Use benchmarks. Is Jordan's answer reasonable?

☐ No: both are close to 1, so the sum should be close to 2, and $11/13$ is less than 1 ☐ Yes ☐ Can't tell

✓ **No: both are close to 1, so the sum should be close to 2, and $11/13$ is less than 1**

6 Box 6

Legend: fourth runner 🏆 Legend only

Relay 1 ran $3/4 + 2/3$ miles. How far must a THIRD runner go to reach exactly 2 miles?

Answer: _____ mi ✓ **0.5833333333333334**

Show your thinking:

7 Box 7

Coach's note

Explain how you can tell $7/8 + 4/5$ is more than $1\frac{1}{2}$ without finding the exact answer.

Look for: Uses a benchmark; Compares to $1\frac{1}{2}$

Exit ticket: answer the big question in your own words

How can benchmark fractions help us estimate and check fraction sums?

Look for: Benchmark fractions (0, $\frac{1}{2}$, 1) help you estimate: $\frac{7}{8}$ is close to 1, $\frac{3}{8}$ is close to $\frac{1}{2}$. Estimating first lets you check if an exact answer is reasonable. On a number line, adding fractions is putting hops end to end.

Completion codes

Students see a code like **ABC-13** when they finish. The first part must match below. The letter is the level (E = Explorer, I = Investigator, L = Legend), and the number at the end is how many stars they earned.

Level	Code starts with
 Explorer	13N-E
 Investigator	19Z-I
 Legend	1UA-L

Watch for these misconceptions

- "Add the tops and add the bottoms." $\frac{1}{2} + \frac{1}{3}$ is not $\frac{2}{5}$.
- "Multiplying always makes a number bigger." Multiplying by a fraction less than 1 makes it smaller.
- "You need a common denominator to multiply." Only for adding and subtracting.