Math Sheet

Name _____ Score _____ Teacher _____ Date _____

Work Word Problems

Define x in hours, write the reciprocal work-rate equation first, clear denominators without rounding, solve exactly, and give the final time to the nearest hundredth. Both workers start together, complete the same one job, and work at constant additive rates without interference.

1. Jessica can reupholster furniture alone in 6 hours. When Dan helps, they start together and complete the same job in 3 hours at constant rates without interference. How many hours would Dan take to complete the job alone?

2. Jason can paint a room alone in 8 hours. Mary can complete the same job alone in 4 hours. If they start together and work at constant rates without interference, how many hours will the one job take?

3. Alyssa can clean an attic alone in 11 hours. Tim can complete the same job alone in 9 hours. If they start together and work at constant rates without interference, how many hours will the one job take?

4. Sally can spread mulch alone in 7 hours. When Mike helps, they start together and complete the same job in 4 hours at constant rates without interference. How many hours would Mike take to complete the job alone?

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5. Joan can vacuum a house alone in 11 hours. When Tom helps, they start together and complete the same job in 9 hours at constant rates without interference. How many hours would Tom take to complete the job alone?

6. Sam can clean a store alone in 12 hours. Benny can complete the same job alone in 8 hours. If they start together and work at constant rates without interference, how many hours will the one job take?

7. Melanie can repair a roof alone in 6 hours. When Benny helps, they start together and complete the same job in 5 hours at constant rates without interference. How many hours would Benny take to complete the job alone?

8. Keith can paint a house alone in 12 hours. Sally can complete the same job alone in 10 hours. If they start together and work at constant rates without interference, how many hours will the one job take?

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Define x in hours, write the reciprocal work-rate equation first, clear denominators without rounding, solve exactly, and give the final time to the nearest hundredth. Both workers start together, complete the same one job, and work at constant additive rates without interference.

9. Sandy can restock a store alone in 7 hours. Melanie can complete the same job alone in 2 hours. If they start together and work at constant rates without interference, how many hours will the one job take?

10. Nancy can trim shrubs alone in 3 hours. When Sara helps, they start together and complete the same job in 2 hours at constant rates without interference. How many hours would Sara take to complete the job alone?

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Answer Key

Define x in hours, write the reciprocal work-rate equation first, clear denominators without rounding, solve exactly, and give the final time to the nearest hundredth. Both workers start together, complete the same one job, and work at constant additive rates without interference.

1. Jessica can reupholster furniture alone in 6 hours. When Dan helps, they start together and complete the same job in 3 hours at constant rates without interference. How many hours would Dan take to complete the job alone?

Let x be Dan's solo completion time.

Reciprocal work-rate model: 3 / 6 + 3 / x = 1.

Multiply both sides by 6*x; x > 0 keeps the denominator nonzero. Rearranging the resulting terms gives the cleared linear equation. Cleared equation: 3 * x = 18.

Solve exactly: x = 6.

Dan alone: exact 6 hours; nearest hundredth 6.00 hours

Domain: x > 3 > 0 and 6 > 3.

Check: Exact job fractions: 1/2 + 1/2 = 1 whole job.

2. Jason can paint a room alone in 8 hours. Mary can complete the same job alone in 4 hours. If they start together and work at constant rates without interference, how many hours will the one job take?

Let x be the time for Jason and Mary to complete the job together.

Reciprocal work-rate model: x / 8 + x / 4 = 1.

Multiply both sides by 32 (8*4); all solo times are positive. Cleared equation: 12 * x = 32.

Solve exactly: x = 8/3.

Jason and Mary together: exact 8/3 hours; nearest hundredth 2.67 hours

Domain: x > 0 and x < both positive solo times.

Check: Exact job fractions: 1/3 + 2/3 = 1 whole job.

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Define x in hours, write the reciprocal work-rate equation first, clear denominators without rounding, solve exactly, and give the final time to the nearest hundredth. Both workers start together, complete the same one job, and work at constant additive rates without interference.

3. Alyssa can clean an attic alone in 11 hours. Tim can complete the same job alone in 9 hours. If they start together and work at constant rates without interference, how many hours will the one job take?

Let x be the time for Alyssa and Tim to complete the job together.

Reciprocal work-rate model: $x / 11 + x / 9 = 1$.

Multiply both sides by 99 (11*9); all solo times are positive. Cleared equation: $20 * x = 99$.

Solve exactly: $x = 99/20$.

Alyssa and Tim together: exact 99/20 hours; nearest hundredth 4.95 hours

Domain: $x > 0$ and $x <$ both positive solo times.

Check: Exact job fractions: $9/20 + 11/20 = 1$ whole job.

4. Sally can spread mulch alone in 7 hours. When Mike helps, they start together and complete the same job in 4 hours at constant rates without interference. How many hours would Mike take to complete the job alone?

Let x be Mike's solo completion time.

Reciprocal work-rate model: $4 / 7 + 4 / x = 1$.

Multiply both sides by 7*x; $x > 0$ keeps the denominator nonzero. Rearranging the resulting terms gives the cleared linear equation. Cleared equation: $3 * x = 28$.

Solve exactly: $x = 28/3$.

Mike alone: exact 28/3 hours; nearest hundredth 9.33 hours

Domain: $x > 4 > 0$ and $7 > 4$.

Check: Exact job fractions: $4/7 + 3/7 = 1$ whole job.

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Both workers start together, complete the same one job, and work at constant additive rates without interference.

5. Joan can vacuum a house alone in 11 hours. When Tom helps, they start together and complete the same job in 9 hours at constant rates without interference. How many hours would Tom take to complete the job alone?

Let x be Tom's solo completion time.

Reciprocal work-rate model: 9 / 11 + 9 / x = 1.

Multiply both sides by 11*x; x > 0 keeps the denominator nonzero. Rearranging the resulting terms gives the cleared linear equation. Cleared equation: 2 * x = 99.

Solve exactly: x = 99/2.

Tom alone: exact 99/2 hours; nearest hundredth 49.50 hours

Domain: x > 9 > 0 and 11 > 9.

Check: Exact job fractions: 9/11 + 2/11 = 1 whole job.

6. Sam can clean a store alone in 12 hours. Benny can complete the same job alone in 8 hours. If they start together and work at constant rates without interference, how many hours will the one job take?

Let x be the time for Sam and Benny to complete the job together.

Reciprocal work-rate model: x / 12 + x / 8 = 1.

Multiply both sides by 96 (12*8); all solo times are positive. Cleared equation: 20 * x = 96.

Solve exactly: x = 24/5.

Sam and Benny together: exact 24/5 hours; nearest hundredth 4.80 hours

Domain: x > 0 and x < both positive solo times.

Check: Exact job fractions: 2/5 + 3/5 = 1 whole job.

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Both workers start together, complete the same one job, and work at constant additive rates without interference.

7. Melanie can repair a roof alone in 6 hours. When Benny helps, they start together and complete the same job in 5 hours at constant rates without interference. How many hours would Benny take to complete the job alone?

Let x be Benny's solo completion time.

Reciprocal work-rate model: 5 / 6 + 5 / x = 1.

Multiply both sides by 6*x; x > 0 keeps the denominator nonzero. Rearranging the resulting terms gives the cleared linear equation. Cleared equation: 1 * x = 30.

Solve exactly: x = 30.

Benny alone: exact 30 hours; nearest hundredth 30.00 hours

Domain: x > 5 > 0 and 6 > 5.

Check: Exact job fractions: 5/6 + 1/6 = 1 whole job.

8. Keith can paint a house alone in 12 hours. Sally can complete the same job alone in 10 hours. If they start together and work at constant rates without interference, how many hours will the one job take?

Let x be the time for Keith and Sally to complete the job together.

Reciprocal work-rate model: x / 12 + x / 10 = 1.

Multiply both sides by 120 (12*10); all solo times are positive. Cleared equation: 22 * x = 120.

Solve exactly: x = 60/11.

Keith and Sally together: exact 60/11 hours; nearest hundredth 5.45 hours

Domain: x > 0 and x < both positive solo times.

Check: Exact job fractions: 5/11 + 6/11 = 1 whole job.

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9. Sandy can restock a store alone in 7 hours. Melanie can complete the same job alone in 2 hours. If they start together and work at constant rates without interference, how many hours will the one job take?

Let x be the time for Sandy and Melanie to complete the job together.

Reciprocal work-rate model: x / 7 + x / 2 = 1.

Multiply both sides by 14 (7*2); all solo times are positive. Cleared equation: 9 * x = 14.

Solve exactly: x = 14/9.

Sandy and Melanie together: exact 14/9 hours; nearest hundredth 1.56 hours

Domain: x > 0 and x < both positive solo times.

Check: Exact job fractions: 2/9 + 7/9 = 1 whole job.

10. Nancy can trim shrubs alone in 3 hours. When Sara helps, they start together and complete the same job in 2 hours at constant rates without interference. How many hours would Sara take to complete the job alone?

Let x be Sara's solo completion time.

Reciprocal work-rate model: 2 / 3 + 2 / x = 1.

Multiply both sides by 3*x; x > 0 keeps the denominator nonzero. Rearranging the resulting terms gives the cleared linear equation. Cleared equation: 1 * x = 6.

Solve exactly: x = 6.

Sara alone: exact 6 hours; nearest hundredth 6.00 hours

Domain: x > 2 > 0 and 3 > 2.

Check: Exact job fractions: 2/3 + 1/3 = 1 whole job.