

1.37

Prime Factorization of an Integer

• Example 1

$108 = 3 \times 3 \times 3 \times 2 \times 2$ This is the prime factorization for 108.

• • • CHECK YOURSELF 1

Find the prime factorization of 186.

• Example 2

In each short division, we write the quotient *below* rather than above the dividend. This is just a convenience for the next division.

Factor 60 by successive division by prime numbers. Start with 2, then 2 again, then 3.

$$\begin{array}{r} \text{Primes} \left\{ \begin{array}{l} \rightarrow 2)60 \\ \rightarrow 2)30 \\ \rightarrow 3)15 \\ \quad 5 \end{array} \right. \end{array}$$

Stop when the final quotient is prime.

To write the factorization of 60, we list each divisor used and the final prime quotient. In our example, we have

$$60 = 2 \times 2 \times 3 \times 5$$

• • • CHECK YOURSELF 2

Find the prime factorization of 234.

• • • CHECK YOURSELF ANSWERS

1. $186 = 2 \times 3 \times 31$.
 2. $234 = 2 \times 3 \times 3 \times 13$.
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1.37 Exercises

Name _____

Section _____

Date _____

A N S W E R S

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____
11. _____
12. _____
13. _____
14. _____
15. _____
16. _____

Find the prime factorization of each number.

- | | |
|---------|---------|
| 1. 18 | 2. 22 |
| 3. 30 | 4. 35 |
| 5. 51 | 6. 42 |
| 7. 63 | 8. 94 |
| 9. 70 | 10. 90 |
| 11. 66 | 12. 100 |
| 13. 130 | 14. 88 |
| 15. 315 | 16. 400 |

A N S W E R S

17. 225

18. 132

17. _____

19. 189

20. 330

18. _____

21. 336

22. 500

19. _____

23. 840

24. 1170

20. _____

25. 12

26. 26

21. _____

27. 50

28. 52

22. _____

29. 78

30. 110

23. _____

31. 200

32. 105

24. _____

33. 154

34. 252

25. _____

35. 300

36. 1260

26. _____

27. _____

28. _____

29. _____

30. _____

31. _____

32. _____

33. _____

34. _____

35. _____

36. _____