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.

Primes

$$\begin{array}{r} 2\overline{)60} \\ 2\overline{)30} \\ 3\overline{)15} \\ 5 \end{array}$$

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. $234 = 2 \times 3 \times 3 \times 13$.

1.37 Exercises

Name

Section Date

ANSWERS

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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

17. 225

18. 132

19. 189

20. 330

21. 336

22. 500

23. 840

24. 1170

25. 12

26. 26

27. 50

28. 52

29. 78

30. 110

31. 200

32. 105

33. 154

34. 252

35. 300

36. 1260

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