

Problem Set

For problems #1–10, use prime factorization, if appropriate, to answer each question: **Yes**, **No**, or **Cannot Be Determined**. If your answer is **Cannot Be Determined**, use two numerical examples to show how the problem could go either way. All variables in problems 1–12 are assumed to be positive integers unless otherwise indicated.

1. If a is divided by 7 or by 18, an integer results. Is $\frac{a}{42}$ an integer?
2. If 80 is a factor of r , is 15 a factor of r ?
3. If 7 is a factor of n and 7 is a factor of p , is $n + p$ divisible by 7?
4. If 8 is not a factor of g , is 8 a factor of $2g$?
5. If j is divisible by 12 and 10, is j divisible by 24?
6. If 12 is a factor of xyz , is 12 a factor of xy ?
7. If 6 is a divisor of r and r is a factor of s , is 6 a factor of s ?
8. If 24 is a factor of h and 28 is a factor of k , must 21 be a factor of hk ?
9. If 6 is not a factor of d , is $12d$ divisible by 6?
10. If 60 is a factor of u , is 18 a factor of u ?
- 11.

Quantity A

The number of distinct
prime factors of 40

Quantity B

The number of distinct
prime factors of 50

12.

Quantity A

The product of 12 and an even prime number

Quantity B

The sum of the greatest four factors of 12

13.

$$x = 20, y = 32, \text{ and } z = 12$$

Quantity A

The remainder when x is divided by z

Quantity B

The remainder when y is divided by z

14. If a and b are positive integers such that the remainder is 4 when a is divided by b , what is the smallest possible value of $a + b$?

15. If $\frac{x}{y}$ has a remainder of 0 and $\frac{z}{y}$ has a remainder of 3, what is the remainder of $\frac{xz}{y}$?

Problem Set

For problems #1–15, answer each question **Odd**, **Even**, or **Cannot Be Determined**. Try to explain each answer using the rules you learned in this section. All variables in problems #1–15 are assumed to be integers unless otherwise indicated.

1. If n is odd, p is even, and q is odd, what is $n + p + q$?
2. If r is a prime number greater than 2, and s is odd, what is rs ?
3. If t is odd, what is t^4 ?
4. If u is even and w is odd, what is $u + uw$?
5. If $x \div y$ yields an odd integer, what is x ?
6. If $a + b$ is even, what is ab ?
7. If c , d , and e are consecutive integers, what is cde ?
8. If f and g are prime numbers, what is $f + g$?
9. If h is even, j is odd, and k is odd, what is $k(h + j)$?
10. If m is odd, what is $m^2 + m$?
11. If n , p , q , and r are consecutive integers, what is their sum?
12. If $t = s - 3$, what is $s + t$?
13. If u is odd and w is even, what is $(uw)^2 + u$?
14. If xy is even and z is even, what is $x + z$?
15. If a , b , and c are consecutive integers, what is $a + b + c$?

16. 202 divided by some prime number x yields an odd number. 411 multiplied by some prime number y yields an even number.

Quantity A

x

Quantity B

y

17.

Quantity A

The tenths digit of the product of two even integers divided by 4

Quantity B

The tenths digit of the product of an even and an odd integer divided by 4

18.

x is a non-negative even integer.

Quantity A

x

Quantity B

1