

Exponents and roots problems are very common on the GMAT. So, it's extremely important to know how to manipulate them, how to factor out, take roots, multiply, divide, etc. Below are 11 problems to test your skills. Please post your thought process/solutions along with the answers.

I'll post OA's with detailed solutions tomorrow. Good luck.

1. If $357^x * 117^y = a$, where x and y are positive integers, what is the units digit of a ?
- (1) $100 < y^2 < x^2 < 169$
 (2) $x^2 - y^2 = 23$

Solution: [tough-and-tricky-exponents-and-roots-questions-125967.html#p1029239](https://www.manhattanreview.com/gmat/solutions/125967.html#p1029239)

2. If x , y , and z are positive integers and $xyz = 2,700$, is \sqrt{x} an integer?
- (1) y is an even perfect square and z is an odd perfect cube.
 (2) \sqrt{z} is not an integer.

Solution: [tough-and-tricky-exponents-and-roots-questions-125967.html#p1029240](https://www.manhattanreview.com/gmat/solutions/125967.html#p1029240)

3. If $x > y > 0$ then what is the value of $\frac{\sqrt{2x} + \sqrt{2y}}{x - y}$?
- (1) $x + y = 4 + 2\sqrt{xy}$
 (2) $x - y = 9$

Solution: [tough-and-tricky-exponents-and-roots-questions-125967.html#p1029241](https://www.manhattanreview.com/gmat/solutions/125967.html#p1029241)

4. If $xyz \neq 0$ is $(x^{-4}) * (\sqrt[3]{y}) * (z^{-2}) < 0$?
- (1) $\sqrt[5]{y} > \sqrt[4]{x^2}$
 (2) $y^3 > \frac{1}{z^4}$

Solution: [tough-and-tricky-exponents-and-roots-questions-125967.html#p1029242](https://www.manhattanreview.com/gmat/solutions/125967.html#p1029242)

5. If x and y are negative integers, then what is the value of xy ?
- (1) $x^y = \frac{1}{81}$
 (2) $y^x = -\frac{1}{64}$

Solution: [tough-and-tricky-exponents-and-roots-questions-125967.html#p1029243](https://www.manhattanreview.com/gmat/solutions/125967.html#p1029243)

6. If $x > 0$ then what is the value of y^x ?
- (1) $\frac{4^{(x+y)^2}}{4^{(x-y)^2}} = 128^{xy}$
 (2) $x \neq 1$ and $xy = 1$

Solution: [tough-and-tricky-exponents-and-roots-questions-125967.html#p1029244](https://www.manhattanreview.com/gmat/solutions/125967.html#p1029244)

7. If x is a positive integer is \sqrt{x} an integer?
- (1) $\sqrt{7 * x}$ is an integer
 (2) $\sqrt{9 * x}$ is not an integer

Solution: [tough-and-tricky-exponents-and-roots-questions-125967-20.html#p1029245](https://www.manhattanreview.com/gmat/solutions/125967-20.html#p1029245)

8. What is the value of $x^2 + y^3$?
- (1) $x^6 + y^9 = 0$
 (2) $27x^2 = \frac{3}{3^3y^2 + 1}$

Solution: [tough-and-tricky-exponents-and-roots-questions-125967-20.html#p1029246](https://www.manhattanreview.com/gmat/solutions/125967-20.html#p1029246)

9. If x , y and z are non-zero numbers, what is the value of $\frac{x^3+y^3+z^3}{xyz}$?

(1) $xyz = -6$

(2) $x+y+z = 0$

Solution: [tough-and-tricky-exponents-and-roots-questions-125967-20.html#p1029247](https://www.manhattanreview.com/online-content/answers/125967-20.html#p1029247)

10. If x and y are non-negative integers and $x+y > 0$ is $(x+y)^{xy}$ an even integer?

(1) $2^{x-y} = \sqrt{(x+y)} \sqrt{16}$

(2) $2^x + 3^y = \sqrt{(x+y)} \sqrt{25}$

Solution: [tough-and-tricky-exponents-and-roots-questions-125967-20.html#p1029248](https://www.manhattanreview.com/online-content/answers/125967-20.html#p1029248)

11. What is the value of xy ?

(1) $3^x * 5^y = 75$

(2) $3^{(x-1)}(y-2) = 1$