8.EMA.1

Read each question carefully.

AZ-8.EE.A.1 Know and apply the properties of integer exponents to generate equivalent numerical expressions. For example, 3^2 × 3^–5 = 3^–3 = 1/3^3 = 1/27. [From cluster: Work with radicals and integer exponents]

1)

$3^4 =$

A) 2^6

B) 4^3

✔ C) 9^2

D) 81^0

AZ-8.EE.A.1 Know and apply the properties of integer exponents to generate equivalent numerical expressions. For example, 3^2 × 3^–5 = 3^–3 = 1/3^3 = 1/27. [From cluster: Work with radicals and integer exponents]

2)

$\left(3^3\right)^3 =$

A) 3^0

B) 3^1

C) 3^6

✔ D) 3^9

8.EMA.1

AZ-8.EE.A.1 Know and apply the properties of integer exponents to generate equivalent numerical expressions. For example, 3^2 × 3^–5 = 3^–3 = 1/3^3 = 1/27. [From cluster: Work with radicals and integer exponents]

3)

Which of the following has the same value as $\frac{5^{-2}}{5^{-5}}$?

A) $25^{\frac{2}{5}}$

B) 5^{-3}

C) $1^{\frac{2}{5}}$

✔ D) 5^{3}

8.EMA.1

AZ-8.EE.A.3 Use numbers expressed in the form of a single digit times an integer power of 10 to estimate very large or very small quantities, and to express how many times as much one is than the other. For example, estimate the population of the United States as 3 times 10^8 and the population of the world as 7 times 10^9, and determine that the world population is more than 20 times larger. [From cluster: Work with radicals and integer exponents]

You have been hired by a company to compare two internet companies' Wi-Fi ranges. They would like you to provide the report **in feet using scientific notation**.

The first company, *Ivan's Internet Company,* claims that its wireless access points have the greatest range because you can access its signal up to 2640 feet from its device.

The second company, *Winnie's Wi-Fi*, has devices that extend to up to 2.5 miles.
(Hint: 5280 feet = 1 mile)

4) Began your comparison by first rewriting the range of each company's wireless access devices in feet using scientific notation.

A) Ivan's Wi-Fi: 26.4×10^2 ft
Winnie's Wi-Fi: 13.2×10^3 ft

✔ B) Ivan's Wi-Fi: 2.64×10^3 ft
Winnie's Wi-Fi: 1.32×10^4 ft

C) Ivan's Wi-Fi: 2640 ft
Winnie's Wi-Fi: 13,200 ft

D) Ivan's Wi-Fi: 2.64×10^4 ft
Winnie's Wi-Fi: 1.32×10^2 ft

8.EMA.1

AZ-8.EE.A.4 Perform operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are used. Use scientific notation and choose units of appropriate size for measurements of very large or very small quantities (e.g., use millimeters per year for seafloor spreading). Interpret scientific notation that has been generated by technology. [From cluster: Work with radicals and integer exponents]

You have been hired by a company to compare two internet companies' Wi-Fi ranges. They would like you to provide the report **in feet using scientific notation**.

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(Hint: 5280 feet = 1 mile)

5) Analyzing your work from part A, which company has the greater Wi-Fi range?

A) Ivan's Internet Company

✔ B) Winnie's Wi-Fi

8.EMA.1

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(Hint: 5280 feet = 1 mile)

6) Determine ***how many times greater*** the range of one Internet company is than the other by writing their ranges as a ratio, which compares the range of Winnie's wireless access devices to the range of Ivan's wireless access devices. How many times greater is Winnie's Wi-Fi range than Ivan's Wi-Fi range.

✔ A) Winnie's Wi-Fi range is 5 times greater than Ivan's Internet Company.

B) Winnie's Wi-Fi is 2.5 times greater than Ivan's Internet Company.

C) Ivan's Internet Company's Wi-Fi range is 5 times greater than Winnie's Wi-Fi range.

D) Ivan's Internet Company's Wi-Fi range is 2 times greater than Winnie's Wi-Fi range.

8.EMA.1

AZ-8.EE.A.4 Perform operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are used. Use scientific notation and choose units of appropriate size for measurements of very large or very small quantities (e.g., use millimeters per year for seafloor spreading). Interpret scientific notation that has been generated by technology. [From cluster: Work with radicals and integer exponents]

The table below lists the planets, including Pluto, and their approximate diameters in meters.

Planet	*Approximate Diameter (m)*
Mercury	4.88×10^6
Venus	1.21×10^7
Earth	1.28×10^7
Mars	6.79×10^6
Jupiter	1.43×10^8
Saturn	1.2×10^8
Uranus	5.12×10^7
Neptune	4.96×10^7
Pluto	2.3×10^6

7) List the planets (including Pluto) in order from smallest to largest.

A) Jupiter, Saturn, Uranus, Neptune, Earth, Venus, Mars, Mercury, Pluto.

✔ B) Pluto, Mercury, Mars, Venus, Earth, Neptune, Uranus, Saturn, Jupiter.

C) Saturn, Jupiter, Uranus, Neptune, Venus, Earth, Mars, Mercury, Pluto

D) Pluto, Mercury, Mars, Earth, Venus, Neptune, Uranus, Jupiter, Saturn.

8.EMA.1

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Pluto	2.3×10^6

8) Comparing only diameters, about how many times larger is Jupiter than Mercury?

✔ A) Jupiter is about 29 times larger than Mercury.

B) Jupiter is about 11 times larger than Mercury.

C) Jupiter is about 3 times larger than Mercury.

D) Jupiter is 2.9 times larger than Mercury.

8.EMA.1

AZ-8.EE.A.3 Use numbers expressed in the form of a single digit times an integer power of 10 to estimate very large or very small quantities, and to express how many times as much one is than the other. For example, estimate the population of the United States as 3 times 10^8 and the population of the world as 7 times 10^9, and determine that the world population is more than 20 times larger. [From cluster: Work with radicals and integer exponents]

Read the paragraph below and use the equation that follows to solve the problem. Show all your work/steps to solve in the box below.

9) **3908 Nyx** is an asteroid between Mars and Jupiter. Let *d* represent the approximate distance from **3908 Nyx** to the Sun. The average distance from Venus to the Sun is about 7×10^7 miles. The average distance from Jupiter to the Sun is about 5×10^8 miles. At a certain time of year, the square distance from 3908 Nyx to the Sun is equal to the product of the average distance from Venus to the Sun and the average distance from Jupiter to the Sun. The equation below can be used to find the distance from **3908 Nyx** to the Sun, *d*, at this time of year. (Source ©Smarter Balanced Assessment Consortium).

$d^2 = (7 \times 10^7)(5 \times 10^8)$

Solve the equation for *d*. Round your answer to the nearest million.

d = _____ miles