Solve each equation.

|  |  |  |
| --- | --- | --- |
| 1. $-b+b=20$
 | 1. $m-4+1=2$
 | 1. $4\left(4+5m\right)+4=20+6m$
 |
| 1. $-8\left(3p+6\right)=-7p+20$
 | 1. $-5\left(3-8n\right)=-2n-15$
 | 1. $-40-4x=-2(5x+8)$
 |

Find each product.

|  |  |  |
| --- | --- | --- |
| 1. $7n^{2}\left(-8n+8\right)$
 | 1. $-5\left(-5k+3\right)$
 | 1. $-7p^{2}(-p^{2}+3)$
 |
| 1. $\left(6m+5\right)\left(5m-4\right)$
 | 1. $\left(x-1\right)\left(8x-6\right)$
 | 1. $(m-4)(5m^{2}-5m+2)$
 |

Write each expression in radical form. Do not evaluate.

|  |  |  |
| --- | --- | --- |
| 1. $3^{\frac{5}{4}}$
 | 1. $r^{\frac{3}{2}}$
 | 1. $\left(5p\right)^{\frac{4}{3}}$
 |

Write each expression in exponential form. Do not evaluate.

|  |  |  |
| --- | --- | --- |
| 1. $\sqrt[4]{x^{3}}$
 | 17. $\sqrt[3]{10b} $ | 18. $\sqrt[5]{x^{4}}$ |

Simplify each expression and then determine whether each answer is rational or irrational.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 19. $\sqrt{27}$ | 20. $\sqrt{36}$ | 21. $\sqrt{50}$ | 22. $\sqrt[3]{875}$ | 23. $\sqrt[3]{192}$ |

Evaluate. Round to 2 decimal places if necessary.

|  |  |  |
| --- | --- | --- |
| 24. $625^{\frac{5}{4}}$ | 25. $64^{\frac{3}{2}}$ | 26. $4^{\frac{1}{2}}$ |

|  |  |
| --- | --- |
| 27. A population of bacteria is growing rapidly. The population at any hour, h, can be represented using the function $f\left(h\right)=2\*4^{h}$. What is the population of bacteria after $4\frac{1}{2}$ hours? | 28. A car loses value each year. The value of the car t years from today can be modeled using the function $f\left(t\right)=15,000\*0.85^{t}$. If Elizabeth wants to sell her car in $2\frac{1}{3}$ years, what will the car’s value be when she sells it?  |

Use the properties of exponents to simplify the expressions. Your answer should contain only positive exponents. Do not evaluate.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 29. $b^{\frac{1}{2}}b^{\frac{1}{4}}$ | 30. $5^{\frac{3}{4}}\*5^{\frac{3}{2}}$ | 31. $\left(x^{\frac{7}{4}}y^{\frac{5}{3}}\right)^{\frac{1}{2}}$ | 32. $\left(7^{\frac{1}{5}}\right)^{\frac{3}{4}}$ | 33. $\frac{y^{\frac{3}{2}}}{y^{\frac{2}{3}}}$ |

Simplify each expression and then determine whether each answer is rational or irrational.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 34. $3\sqrt{5}+2\sqrt{5}$ | 35. $2\sqrt{9}-3$ | 36. $3\sqrt{45}-3\sqrt{20}$ | 37. $\sqrt{5}(\sqrt{15}+4)$ | 38. $\sqrt{3}\*5\sqrt{3}$ |

Solve each equation. Round to the nearest hundredth.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 39. $4=\sqrt[3]{v^{2}}$ | 40. $\sqrt{b^{3}}=27$ | 41. $4=d^{\frac{4}{3}}$ | 42. $\left(2x-5\right)^{\frac{1}{3}}=3$ | 43. $\left(x+1\right)^{\frac{2}{3}}=9$ |

|  |  |
| --- | --- |
| 43. Mia is tracking her savings account balance. She knows the equation $y=8000p^{t}$ can be used to find her balance y in any year t, but she can’t remember what p represents. Her balance today, $3\frac{2}{3}$ years after opening her account is $9,905.54. What is the value of p? | 44. A new fashion trend is catching on at a high school. Five students came to school after the holidays wearing new Palioxis-brand sneakers and 6 months later, 35 total students were wearing Palioxis sneakers. In the equation $y=5r^{t}$, y is the number of students wearing the sneakers after time t in years. Find r. |

Simplify

|  |  |  |  |
| --- | --- | --- | --- |
| 45. $\frac{6}{\sqrt{2}}$ | 46. $\sqrt{-49}$ | 47. $\sqrt{-12}$ | 48. $-\sqrt{-121}$ |
| 49. $(5i)(-3i)$ | 50. $\left(6+5i\right)+(1+5i)$ | 51. $\left(-5i\right)+(5i)$ | 52. $\left(-1-8i\right)-(5+4i)$ |
| 53. $\left(7i\right)\left(-2+6i\right)$ | 54. $(3-3i)(-7+5i)$ | 55. $i^{13}$ | 56. $i^{16}$ |
| 57. $-\frac{2}{-3i}$ | 58. $\frac{5-10i}{-2i}$ | 59. $\frac{8i}{3-8i}$ | 60. $\frac{-8+i}{-3-9i}$ |