Formulas

Square Roots

The square of a number is the number multiplied by itself. Finding the square root is the inverse operation of squaring.

$\sqrt{-121} = \sqrt{(-1)\times 121} = \sqrt{-1}\times\sqrt{121} = i\,11 = 11i$

Example 1: Evaluate. Round to the nearest hundredth where necessary.

a) $\sqrt{25} = 5$ since $5\times5=25$

b) $-\sqrt{121} = -11$ since $11\times11=121$

c) $\sqrt{139} = 11.78978\ldots \doteq 11.79$

d) $5\sqrt{11} \doteq 5(3.32) \doteq 16.60$

$\sqrt{11} = 3.31662479\ldots \doteq 3.32$

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Solving Linear Equations

Example 1: Solve the following equations. Check the solutions for one of them.

a) $5x-7=-3x+17$

$5x+3x = 17+7$

$8x = 24$

$\frac{8x}{8} = \frac{24}{8}$

$\therefore x = 3$

Check:

L.S. $= 5x-7$
$= 5\times3-7$
$= 15-7$
$= 8$

R.S. $= -3x+17$
$= (-3)\times3+17$
$= -9+17$
$= 8$

L.S. = R.S.

b) $\frac{x-3}{4} = \frac{2x+6}{3}$ LCD(3,4) = 12

$12\times\frac{(x-3)}{4} = 12\times\frac{(2x+6)}{3}$ ← Multiply both sides by 12

$3\times\frac{(x-3)}{1} = 4\times\frac{(2x+6)}{1}$

$3(x-3) = 4(2x+6)$ ← simplify

$3x-9 = 8x+24$

$3x-8x = 24+9$

$-5x = 33$

$\frac{-5x}{-5} = \frac{33}{-5}$

$\therefore x = -\frac{33}{5}$

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Example 2: We can use the formula $C = \frac{5(F-32)}{9}$ ... ⊛ to convert degrees to Fahrenheit, F, to degrees Celsius, C. Determine the Celsius equivalent of $212^\circ F$.

Ans: Substitute $F = 212$ into ⊛.

$C = \frac{5(F-32)}{9}$

$= \frac{5(212-32)}{9}$

$= \frac{5(180)}{9}$

$= 5\times20$

$= 100$

$\therefore$ 212° F is 100° C.

Evaluating Powers with Integer Exponents

Positive integer exponent: $x^m = \underbrace{x\times x\times x\times x\times\cdots\times x}_{m\text{ - factors}}$

Zero exponent: $x^0 = 1$, provided $x \neq 0$.

Negative integer exponent: $x^{-m} = \frac{1}{x^m}$, provided $x \neq 0$.

Note that x^m is the reciprocal of x^{-m}.

* $\frac{2}{3}$ its reciprocal is $\frac{3}{2}$
* 4 its reciprocal is $\frac{1}{4}$

$\frac{(1)}{\left(\frac{2}{3}\right)} = 1\times\frac{3}{2} = \frac{3}{2}$

$\left(\frac{2}{3}\right)^{-1} = \frac{1}{\left(\frac{2}{3}\right)^1} = \frac{3}{2}$

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Example 1: Evaluate the following.

a) $2^3 = 2\times2\times2 = 8$

b) $3^{-2} = \frac{1}{3^2} = \frac{1}{3\times3} = \frac{1}{9}$

c) $(1000000)^0 = 1$

$x^{-m} = \frac{1}{x^m}$

d) $\left(\frac{3}{4}\right)^{-2} = \left(\frac{4}{3}\right)^2 = \frac{4}{3}\times\frac{4}{3} = \frac{4\times4}{3\times3} = \frac{16}{9}$

OR $\left(\frac{4}{3}\right)^2 = \frac{4^2}{3^2} = \frac{4\times4}{3\times3} = \frac{16}{9}$

$\left(\frac{3}{4}\right)^{-2} = \frac{1}{\left(\frac{3}{4}\right)^2} = \frac{1}{\left(\frac{3}{4}\times\frac{3}{4}\right)} = \frac{1}{\left(\frac{9}{16}\right)} = 1\times\frac{16}{9} = \frac{16}{9}$

e) $0.5^{-3} = \left(\frac{1}{2}\right)^{-3} = \left(\frac{2}{1}\right)^3 = (2)^3 = 2\times2\times2 = 8$

Homework: Pg. 338-340: #1-3 & Pg. 346: #1-6 ad

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