COLLEGE of CHARLESTON
CENTER FOR STUDENT LEARNING

Praxis Core Math

Some of the Basics

Fractions

Multiplication: Multiply the fraction straight across with numerator times numerator and denominator times denominator.
Ex.

$$\frac{3}{6}\times\frac{5}{2}=\frac{3\times 5}{6\times 2}=\frac{15}{12}$$

Division: To divide fractions we can flip the second fraction and turn the problem into a multiplication problem.
Ex.

$$\frac{5}{8}\div\frac{3}{2}=\frac{5}{8}\times\frac{2}{3}=\frac{10}{24}$$

Addition & Subtraction: We need to have a common denominator to add and subtract fractions.
Ex.

$$\frac{x}{5}-\frac{x}{10}=\frac{x}{5}\left(\frac{2}{2}\right)-\frac{x}{10}$$
$$=\frac{2x}{10}-\frac{x}{10}$$
$$=\frac{2x-x}{10}=\frac{x}{10}$$

Simplification: To simplify fractions, write out the prime factorization of each number and cancel out any prime factors that are present in the top and bottom of the fraction.
Ex.

$$\frac{24}{45}=\frac{2\times 2\times 2\times \cancel{3}}{\cancel{3}\times 3\times 5}=\frac{8}{15}$$

Ratios

All ratios can be rewritten as a fraction. Add the numbers of the ratio to get the denominator and use the individual numbers as numerators.
Ex.

For a recipe the ratio of water to flour for is 2:3.

$$2+3=5$$

What fraction is water?

$$\frac{2}{5}$$

What fraction is flour?

$$\frac{3}{5}$$

Sequence of Operations

Please	Parentheses ()
Excuse	Exponents ^{2}
My **D**ear	Multiplication and Division ×÷
Aunt **S**ally	Addition and Subtraction +−

Units of Measurement

Imperial

Length:
1 foot (ft.) = 12 inches (in.)
1 yard (yd.) = 3 ft.
1 mile (mi.) = 1760 yd. = 5280 ft.

Volume:
1 cup (c.) = 8 fluid ounces (fl. oz.)
1 quart (qt.) = 2 c.
1 pint (pt.) = 2 qt.
1 gallon (gal.) = 2 pt.

Weight:
1 pound (lb.) = 16 ounces (oz.)
1 ton (t.) = 2240 lb.

Metric

kilo-	1,000	Thousand
hector-	100	Hundred
deca-	10	Ten
(base)	1	One
deci-	.1	Tenth
centi-	.01	Hundredth
milli-	.001	Thousandth

Length:
Meter (m)

Volume:
Liter (l)

Weight:
Gram (g)

Conversions between Metric and Imperial:
1 in. ≈ 2.5 cm (≈ diameter of quarter)
1 mi ≈ 1.6 km
1 qt. ≈ 1 l
1 oz. ≈ 28 g (≈ weight of 5 quarters)
2.2 lbs. ≈ 1 kg (≈ weight of a dictionary)

Exponents

An exponent represents the number of times the base is multiplied by itself.

Ex. $2^3=2\times2\times2=8$

Any number to the 0 exponent equals 1

Ex. $2^0=54^0=13^0=1$

Negative exponents can be rewritten as fractions with positive exponents.

Ex. $4^{-2}=\frac{1}{4^2}=\frac{1}{16}$

Exponent Operations

Add the exponents when multiplying the same base.
Ex. $3^4\times3^5=3^9$

Subtract the exponents when dividing the same base.
Ex. $\frac{6^8}{6^3}=6^5$

When a base with an exponent is raised to another exponents, multiply the exponents together.

Ex. $(3^4)^5=3^{20}$

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Roots

A root is the opposite of an exponent. When given an expression like $\sqrt{9}$, think about what number squared is equal to 9. That is $x^2 = 9$, thus $\sqrt{9} = 3$.

Whenever you have only the radical, $\sqrt{}$, that means the square roots. Any other root will index the number on the radical, such as $\sqrt[3]{64}$. This is asking for the cube root of 64 which we can think of as $x^3 = 64$, so $\sqrt[3]{64} = 4$.

Translating words to Numbers

Phrases of Addition:

- Increased by
- Sum of
- More than
- Exceeds by

Phrases of Subtraction:

- Decreased by
- Difference of
- Less/fewer than
- Diminished by

Phrases of Multiplication:

- Times
- Times the Sum/Difference
- Product of

Phrases of Equals

- Is
- Result is
- Results in

Ex.
Find the number to make the sentence true:
Three times the difference of a number and seven is fifteen.

$3 \quad \times \quad (x - 7) \quad = \quad 15$

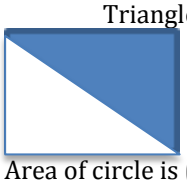
$3(x - 7) = 15$
$3x - 21 = 15$
$3x = 36$
$x = 12$

Geometry

It is more important to understand the principles of geometry and how 2D and 3D shapes relate to one another than to memorize a formulas, because this test is notorious for coming up with new shapes that you haven't seen before in a practice test.

Area is two-dimensional (2D) meaning that to find the area of something you generally multiple something by something.

Square (S x S) or Rectangle (L x W);
Triangle (1/2 L x W) because a triangle is half a square/rectangle.



Area of circle is (πr^2) therefore r x r (and always multiple by π for a circle)

Volume is three-dimensional (3D) meaning that to find the volume of something you generally multiple the area of the base times the height.

Cube is (S x S) x H; Cylinder (πr^2) x H

Three pyramids can fit into a cube therefore you multiple the cube volume times 1/3 to get the volume of a pyramid 1/3 (S x S) x H

Three cones can fit into a cylinder therefore you multiple the cylinder volume times 1/3 to get the volume of a cone 1/3 (πr^2) x H