Math 3: Strategies and Formulas to Memorize

Provided by Madrona Tutoring

Math: Strategies and Formulas There are two strategies that apply to many problems that don't fall into any particular math category

Working Backwards

Sometimes, it's just easier to work backwards from the answers that the test gives you. Usually, this is when the answers are easy whole numbers. Other times, they might be a little more difficult to work with (decimals or fractions) but the question is such that it would take a very long time to figure out what the answer is. Essentially, it's important to recognize that for any math question, there are only ever five possible answers. Sometimes, its just easier to plug them in and see which one works.

That said, when you are working backwards from the answers, start in the middle of the answer group. Star with H or C. This is because they answers always go in ascending order, and if you start in the middle you can see whether or not you'll need to go to a bigger or smaller number to get the right answer. Basically, we want to avoid a situation where the answer is E, and you've worked your way through all the answers from A. If we start in the middle, then you won't have to waste time going through all the answers.

1. Which of the answers is a solution for this equation: $x^2 - 24x = 0$
    (a) 36
    (b) 24
    (c) 18
    (d) 12
    (e) 6
2. When a certain cube's length is increased by three, the surface area of the cube increases by 162 square inches. What is the original side length of the cube?
    (a) 1
    (b) 2
    (c) 3
    (d) 4
    (e) 5

Inventing Numbers:

Sometimes, a problem won't give you some necessary information, and will ask you to think abstractly (using variables). We don't want you to try to invent your own equations when we can avoid it. Instead, you can just invent a number and pretend it's the number they're talking about. That way, we have a concrete number that we can do math with, and it's much easier to figure out what they want.

A few pointers: When you invent numbers for a problem, avoid using 0 and 1. They can do really weird things with quadratics, or problems with division, and they can give you false answers. Also, when you are dealing with a question that's asking about percentages, start with a number that's really easy to do percentages with (10 or 100).

1. Kay high jumped for track all through high school. From 2014 to 2015 she improved 10%. From 2015 to 2016 she improved 20%. How much did she improve overall?
   (a) 32
   (b) 30
   (c) 22
   (d) 20
2. a and b and positive integers such that $a = 4b$. Which of the following expresses $3b$ in terms of a?
   (a) $a/4$
   (b) $3a/4$
   (c) $2a/3$
   (d) $3a^3()$

Formulas to memorize:

There are some formulas that you should know for sure before you start the test. Some of these are definitely a little advanced (trig and end of algebra II) but if you can get a grip on them, you'll have the tools for getting some of the harder questions.

Geometric Figures:

Number of degrees inside: $(n-2)180$

Circles:

Area: $2\pi r^2$

Sector Area $\frac{angle}{360} 2(\pi) r^2$

Circumference (Circle perimeter): $2(\pi) r^2$

Arc Length: (part of permiter): $\frac{angle}{360} 2(\pi) r^2$

Circle Equation: $(x-h)^2 + (y-k)^2 = r^2$

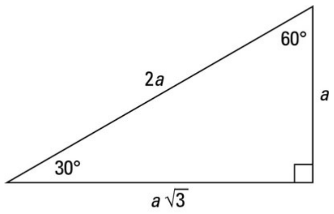
- Note that h, k is the center of the circle.

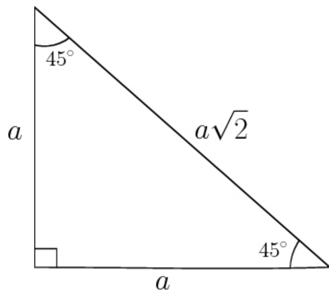
Triangles:

Area: $\frac{1}{2}bh$

Pythagorean Theorum: $a^2 + b^2 = c^2$

Special triangles: 30/60/90 and 45/45/90





Cubes:

Surface Area:$6s^2$

Volume: s^3

Rectangular Prisms:

Surface Area: $2bw + 2bl + 2wl$

Volume: bwl

Lines and Stuff:

Slope Intercept form: $y = mx + b$

Slope formula: $\frac{x_2 - x_1}{y_2 - y_1}$

Mid point formula: $(\frac{x_1 + x_2}{2}), (\frac{y_1 + y_2}{2})$

Distance Formula: $\sqrt[2]{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

Exponents and Roots

$x^a x^b = x^{a+b}$

$x^a / x^b = x^{a-b}$

$(x^a)^b = x^{ab}$

$x^{-a} = 1/x^a$

$x^{a/b} = \sqrt[b]{x^a}$ and/or $x^{a/b} = (\sqrt[b]{x})^a$