# Skills from previous math classes that you need to self-review for Math 42

**From Prealgebra & Algebra:**

Fractions
- Add / subtract
- Multiply / divide

Quadratic functions
- Factoring
- Quadratic formula

Negative exponents

Rational expressions
- Add / subtract
- Complex fractions
- Equations

Radicals
- Simplify
- Add / subtract
- Multiply / rationalize the denominator / divide
- Equations

**From Geometry:**

Pythagorean Theorem

Angles of triangles

Circumference and areas of circles

**From Precalculus:**

Single step transformations of functions & graphs (relationship between algebraic & graphical transformations)
- Horizontal / vertical
- Shift / reflect / stretch & compress

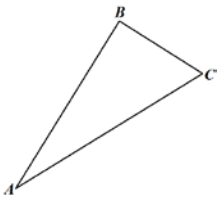
Symmetry of functions & graphs (relationship between algebraic & graphical symmetry)

Inverse functions

# Unless stated otherwise, you must be able to solve these without using your calculator

# All answers must be completely simplified and not involve decimals

[1] The triangle $ABC$ is shown on the right. Angle $ABC$ is a right angle.




**NOTE: The diagram is NOT to scale.**

[a] If $BC = 5$ and $AC = 9$, find $AB$.

[b] If $AB = 6$ and $BC = 4$, find $AC$.

[2] Expand and simplify the following expressions.

[a] $(2s - 3c)^2$ [b] $(3s - c^{-1})(2s^{-1} - c)$

[3] Perform the following operations. Simplify and write final answers as both improper and mixed fractions.

[a] $\frac{11}{12} + \frac{13}{18}$ [b] $\frac{72}{35} \div \frac{27}{49}$

[4] Simplify the following expressions. Rationalize the denominator where appropriate.

[a] $\sqrt{108}$ [b] $5\sqrt{18} - 6\sqrt{32}$ [c] $\sqrt{12}\sqrt{20}$ [d] $\frac{22}{7 - 3\sqrt{5}}$

[e] $\frac{26}{5\sqrt{2} + \sqrt{11}}$

[5] [a] If a circle has a radius of $1\frac{2}{3}$ cm, what is its circumference ?

[b] If a circle has a diameter of $1\frac{1}{2}$ inches, what is its area ?

[c] If a circle has a circumference of $1\frac{3}{4}$ inches, what is its diameter ?

[d] If a circle has an area of $2\frac{1}{4}$ cm$^2$, what is its radius ?

[e] One angle of a triangle measures $42^\circ$. If one of the angles of the triangle is twice as large as another angle of the triangle, what is the measure of the largest angle of the triangle ? **NOTE: This question has 3 possible answers. Find all 3 answers.**

[6] Simplify the following complex fractions.

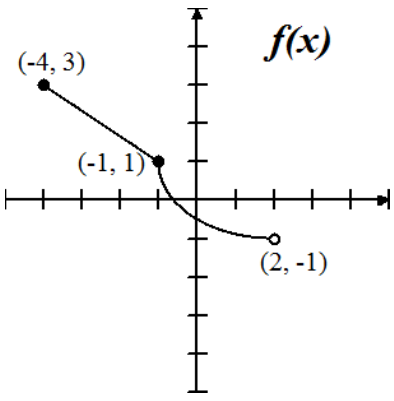
[a] $\frac{\frac{1}{4} - \frac{5}{6}}{\frac{2}{3} + \frac{1}{2}}$ [b] $\frac{s^{-2} - c^{-2}}{s - c}$

[7] If $3$ units of A is equivalent to $5$ units of B, and $7$ units of B is equivalent to $4$ units of C, how many units of A is equivalent to $9$ units of C ?

[8] Solve for $x$ in the following equations.

[a] $\frac{12}{x} = \frac{21}{13}$ [b] $2x^2 - 3 = 2x - x^2$ [c] $17 - 2\sqrt{1 - 3x} = 9$

[9] The graph of $f(x)$ is shown on the right.




[a] What is the domain of $f$ ? Write your answer in interval notation.

What is the range of $f$ ? Write your answer in interval notation.

[b] Sketch the following graphs.

$y = f(x) - 2$

$y = f(x + 2)$

$y = f(2x)$

$y = 2f(x)$

$y = f(-x)$

$y = -f(x)$

[c] Does $f^{-1}$ exist ? Why or why not ? If $f^{-1}$ exists, sketch its graph.

[10] Determine algebraically if the graphs of the following functions are symmetric over the $y-$axis, over the origin, or neither.

[a] $f(x)=x^5(1+x^3)^2$ [b] $f(x)=\dfrac{1+x^4}{x+x^3}$ [c] $f(x)=x^4(1+x^2)^3$ [d] $f(x)=\dfrac{x+x^2}{1+x^2}$

**HINT:**

The questions above involve material from the following classes.

| | | |
|---|---|---|
| Geometry: | | [1], [5] |
| Prealgebra/Algebra: | Math 210/212/114 | [2]-[8] |
| Precalculus I: | Math 41 | [9]-[10] |

**NOTE:**

There is no solution key for this prerequisite package since it only involves material that you have learned before.
You are encouraged to work together with your classmates, and to consult your old textbooks and notes.
Feel free to ask me to look over your solutions, or to direct you to relevant sections in your old textbooks.
However, I will not give solutions to any questions.