# Welcome to Algeboard!

**Scoring.** For answering a question correctly, add the dollar value of that question to your total. For missing a question, *subtract* the dollar value for the question from your score.

**Instructions.** One or two can play.

1. **For one person**. Solve the problems in any order you wish. Passing grade is to accumulate total wealth of \$3,500. Upon passing, the title of **The Grand Poohbah of Algeboard** will be conferred on you.
2. **For two people**. Take turns answering questions. Each player must keep track of their own total earnings. The one with the highest total earnings is declared the winner and new champion of **Algeboard!**

**To Begin:** Go to the next page.

| Potpourri | Algebraic Operations | Factoring | Solving | Word Problems |
|---|---|---|---|---|
| 100 | 100 | 100 | 100 | 100 |
| 200 | 200 | 200 | 200 | 200 |
| 300 | 300 | 300 | 300 | 300 |
| 400 | 400 | 400 | 400 | 400 |
| 500 | 500 | 500 | 500 | 500 |

# Category: Potpourri

**For $100:** A number having an infinite, non-repeating decimal expansion. What is ...

(a) an integer

(b) a rational number

(c) an irrational number

(d) a real number

(e) a complex number.

# Category: Potpourri

**For $200:** In interval notation, the set of all real numbers that exceeds 3. What is ...

(a) $(-\infty, 3)$ (b) $(-\infty, 3]$ (c) $(3, +\infty)$
(d) $[3, +\infty)$ (e) n.o.t.

# Category: Potpourri

**For $300:** A *simplification* of the expression $(-x^2y^{-3})(-2x^2y^4)^3$. What is ...

(a) $-8x^7y^4$ (b) $8x^7y^{10}$ (c) $-8x^8y^{12}$

(d) $8x^8y^9$ (e) $8x^8y^4$ (f) n.o.t.

# Category: Potpourri

**For $400:** A *simplification* of $\left(\dfrac{2x^{-2}y^3}{x^{-1}}\right)^{-2}$. What is ...

(a) $\dfrac{2y}{x}$ (b) $\dfrac{y^2}{4x^2}$ (c) $\dfrac{x^2}{4y^6}$ (d) $\dfrac{4x^6}{y^6}$ (e) n.o.t.

# Category: Potpourri

**For $500:** The *distance* between the points $P(-1,5)$ and $Q(3,-3)$ in the plane. What is ...

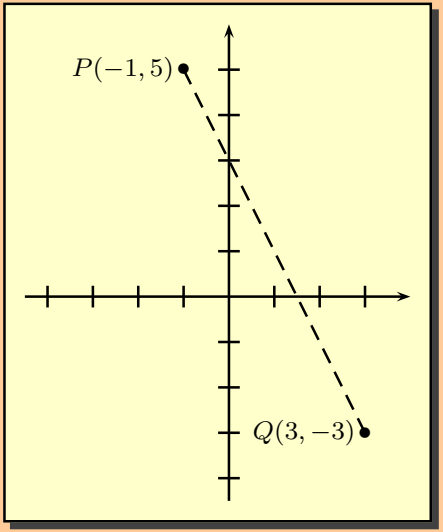
(a) 9

(b) $2\sqrt{5}$

(c) $4\sqrt{5}$

(d) $2\sqrt{2}$

(e) $2\sqrt{17}$



# Category: Algebraic Operations

**For $100:** The result of *combining* similar terms in the expression $2(3x^2 - 4x + 2) - (5x^2 - 6x + 5)$. What is ...

(a) $x^2 - 2x + 1$

(b) $x^2 - 2x - 1$

(c) $x^2 + 2x - 3$

(d) $x^2 + 2x - 1$

(e) n.o.t.

# Category: Algebraic Operations

**For $200:** The Least Common Denominator of the expression:

$$\frac{1}{x} - \frac{2}{x^2} + \frac{3}{x^2 - x}.$$

What is ...

(a) $x^2(x-1)$ (b) $x^3(x-1)$ (c) $x^2(x^2-x)$
(d) $x^3(x^2-x)$ (e) n.o.t.

# Category: Algebraic Operations

**For $300:** Consider the equations:

1. $a^n a^m = a^{nm}$
2. $\dfrac{c}{a+b} = \dfrac{c}{a} + \dfrac{c}{b}$
3. $\sqrt{a+b} = \sqrt{a} + \sqrt{b}$
4. $\sqrt{a^2} = a$

The statements that are *false*. What is/are ...

(a) 1 (b) 2 (c) 3 (d) 4
(e) 1 & 2 (f) 1 & 3 (g) 1 & 4 (h) 2 & 3
(i) 2 & 4 (j) 3 & 4 (k) 1, 2 & 3 (l) 1, 3 & 4
(m) 1, 2, 3 & 4 (n) The correct "false" choice is not listed.

# Category: Algebraic Operations

**For $400:** The result of *combining* the terms of the expression

$$\frac{2}{x} - \frac{2}{x-1} + \frac{1}{(x-1)^2}.$$

What is ...

(a) $\dfrac{1-x}{x(x-1)^2}$ (b) $\dfrac{1-6x}{x(x-1)^2}$ (c) $\dfrac{2-5x}{x(x-1)^2}$

(d) $\dfrac{2-x}{x(x-1)^2}$ (e) $\dfrac{1+x}{x(x-1)^2}$ (f) n.o.t.

# Category: Algebraic Operations

**For $500:** The *simplification* of the following expression:

$$\frac{x^2-4}{x+3}\cdot\frac{3x^2+9x}{x^2-2x}$$

What is ...

(a) $x+2$

(b) $x-2$

(c) $3(x+2)$

(d) $3(x-2)$

(e) $\dfrac{(x+2)(3x^2+9)}{x(x+3)}$

(f) $\dfrac{(x-2)(3x^2+9)}{x+3}$

(g) $\dfrac{3(x^2-4)}{x-2}$

(h) n.o.t.

# Category: Factoring

**For $100:** The $x$-intercepts of the polynomial $p(x) = 4x^2 - x$.

What is/are ...

(a) 0 (b) 1/4 (c) 4 (d) 0 and 4
(e) 0 and 1/4 (f) n.o.t.

# Category: Factoring

**For $200:** The *factorization* of $x^2 - 6x - 16$? What is ...

(a) $(x-4)(x+4)$

(b) $(x-2)(x+8)$

(c) $(x+2)(x-8)$

(d) $(x-1)(x+16)$

(e) $(x+1)(x-16)$

# Category: Factoring

**For $300:** The *factorization* of $6x^2 + 5x - 21$. What is ...

(a) $(x + 7)(6x - 3)$

(b) $(x - 3)(6x + 7)$

(c) $(2x - 3)(3x - 7)$

(d) $(2x - 3)(3x + 7)$

(e) $(2x + 3)(3x - 7)$

# Category: Factoring

**For $400:** The *factorization* of $8x^3 + 27$. What is ...

(a) $(2x - 3)(4x^2 - 6x + 9)$

(b) $(2x - 3)(4x^2 + 6x + 9)$

(c) $(2x + 3)(4x^2 + 6x + 9)$

(d) $(2x + 3)(4x^2 - 6x + 9)$

(e) n.o.t.

# Category: Factoring

**For $500:** The *factorization*, with the aid of the much celebrated QUADRATIC FORMULA, of the polynomial $2x^2 - 2x - 1$. What is ...

(a) $\frac{1}{2}(2x - 1 - \sqrt{3})(2x - 1 + \sqrt{3})$

(b) $\frac{1}{4}(x - 1 - \sqrt{3})(x - 1 + \sqrt{3})$

(c) $\frac{1}{2}(2x + 1 - \sqrt{3})(2x + 1 + \sqrt{3})$

(d) $2(x - 2 - \sqrt{12})(x - 2 + \sqrt{12})$

(e) $\frac{1}{2}(2x - 2 - \sqrt{12})(2x - 2 + \sqrt{12})$

(f) n.o.t.

# Category: Solving

**For $100:** The *solution* to the equation

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

What is ...

(a) $x = -\dfrac{1}{11}$ (b) $x = \dfrac{1}{9}$ (c) $x = \dfrac{9}{11}$ (d) $x = \dfrac{9}{7}$

(e) n.o.t.

# Category: Solving

**For $200:** The *solution set* to the equation

$$3x^2 = 4x + 1$$

What is ...

(a) $\left\{ \frac{4}{3}, \frac{1}{3} \right\}$

(b) $\left\{ \frac{2+\sqrt{7}}{3}, \frac{2-\sqrt{7}}{3} \right\}$

(c) $\left\{ \frac{4+3\sqrt{2}}{6}, \frac{4-3\sqrt{2}}{6} \right\}$

(d) $\left\{ \frac{2+\sqrt{2}}{3}, \frac{2-\sqrt{2}}{3} \right\}$

(e) n.o.t.

# Category: Solving

**For $300:** The *ordinate of intersection* of the two lines $2x - 3y = 3$ and $4x + 2y = 2$. What is ...

(a) $x = \frac{3}{4}$ (b) $x = 0$ (c) $y = -\frac{1}{2}$

(d) $y = -\frac{1}{4}$ (e) n.o.t.

# Category: Solving

**For $400:** The *solution set* to the equation $\dfrac{1}{x} = \dfrac{1}{1+\sqrt{2x+1}}$. What is ...

(a) $\{4\}$ (b) $\{0, 4\}$ (c) $\{\frac{1}{7}, 4\}$ (d) $\{-\frac{1}{2}, \frac{4}{3}, 4\}$
(e) n.o.t.

# Category: Solving

**For $500:** The *solution set*, in interval notation, to the inequality

$$\frac{x-1}{4-3x} \leq 0.$$

What is ...

(a) $(-\infty, 1]$

(b) $[\frac{4}{3}, \infty)$

(c) $(-\infty, 1] \cup (\frac{4}{3}, \infty)$

(d) $(-\infty, 1] \cup [\frac{4}{3}, \infty)$

(e) $(-\infty, 1] \cap [\frac{4}{3}, \infty)$

(f) n.o.t.

# Category: Word Problems

**For $100:** A graphic artist has created a 2 inch by 3 inch rectangle on a computer. Now she wants "rescale" this rectangle to enclose *twice the area* of the original rectangle. The dimensions of this rescaled rectangle have the form $2k$ by $3k$, where $k$ is the "scaling factor." The value of the scaling factor, $k$. What is ...

(a) $k = 2$ (b) $k = 4$ (c) $k = \sqrt{2}$

(d) $k = 2\sqrt{2}$ (e) $k = \sqrt{5}$ (f) n.o.t.

# Category: Word Problems

**For $200:** A aluminum can, closed on both ends, is constructed in the shape of a right circular cylinder. The dimensions of the can have not been set yet: let radius of the base of the can be denoted by $r$ and the height be denoted by the symbol $h$.

The surface area of the can. What is ...

(a) $4\pi r^2 h$

(b) $2\pi r + \pi r^2 h$

(c) $(2\pi r + \pi r^2)h$

(d) $\pi r(4 + rh)$

(e) $2\pi r(r + h)$

(f) n.o.t.

# Category: Word Problems

**For $300:** A six-foot high man stands 12 feet from a 15-foot high street light. It is night and the street light is turned on.

The length of the man's shadow. What is ...

(a) 6 feet (b) 8 feet (c) 9 feet (d) $9\frac{1}{9}$ feet
(e) n.o.t.

# Category: Word Problems

**For $400:** A man has a lawn mower with a 2 foot cutting blade.[1] The man can mow at a speed of 3 feet per second. The man brings the lawn mower onto a straight stretch of lawn, starts the mower on the grass, walks in a straight line for 60 seconds, then turns off the mower. (Ignore the initial acceleration and terminal deceleration times.)

The total area cut by the lawn mower. Accurate to 2 decimal places, what is ...

(a) 360 square feet

(b) 361.57 square feet

(c) 363.14 square feet

(d) n.o.t.

[1] Recall: Such a blade spins on a center axis.

# Category: Word Problems

**For $500:** A professional lawn service wants to understand how to use their resources most efficiently. Two-man crews are sent out on a job with two small mowers and one large one. The small lawn mowers can cut grass at a rate of 40 square yards per minute and the large one can cut at 80 square yards per minute. However, when the large mower is used, there is a 15 minute set up and tear down period, during this time interval, typically, one crew member sets up or tears down the large mower, while the other cuts grass using the small mower. Of course, if it is decided that the large lawn mower is not to be used, both crew members use small mowers to do the job.

This smallest job, measured in square yards, needed to justify the use of the large mower. What is ...

(a) 480 (b) 2,400 (c) 2,600
(d) 3,200 (e) 3,800 (f) n.o.t.

# Message from the Management

That's Right! Way to go, Kiddo!

# Message from the Management

Wonderfully Done! Congrats!

# Message from the Management

Very Good! Keep up the good work!

# Message from the Management

Good, good, good, good!

# Message from the Management

Gee, you're smart! Try a harder one!

# Message from the Management

You're pretty sharp! *Continuez, s'il vous plaît!*

# Message from the Management

You're the tops! But wait ... try another.

# Message from the Management

That's wrong! Sorry. Try Again.

# Message from the Management

Error again. Don't guess, I'm watching! 

# Message from the Management

Please! Please! Work it out first!

# Message from the Management

An error has insinuated itself into your calculations. Recalibrate your thinking! 𝔇𝔖

# Message from the Management

Bah! Humbug! You're haunted by Errors!

# Message from the Management

Try again. This time with order and method.

# Message from the Management

Wrong again! Use your little gray cells!