# Algebra 2
# Final Exam

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MATH

# Algebra 2 Final Exam

This exam is comprehensive over the entire course and includes 12 questions. You have 60 minutes to complete the exam.

The exam is worth 100 points. The 8 multiple choice questions are worth 5 points each (40 points total) and the 4 free response questions are worth 15 points each (60 points total).

Mark your multiple choice answers on this cover page. For the free response questions, show your work and make sure to circle your final answer.

| | | | | | |
|---|---|---|---|---|---|
| 1. (5 pts) | A | B | C | D | E |
| 2. (5 pts) | A | B | C | D | E |
| 3. (5 pts) | A | B | C | D | E |
| 4. (5 pts) | A | B | C | D | E |
| 5. (5 pts) | A | B | C | D | E |
| 6. (5 pts) | A | B | C | D | E |
| 7. (5 pts) | A | B | C | D | E |
| 8. (5 pts) | A | B | C | D | E |

1. **(5 pts)** At a local market, a woman sells a 4-pack of homemade organic soap for $\$18$. Her markup is $72\,\%$. What is her cost to make the 4-pack of soap?

| | | | | | |
|---|---|---|---|---|---|
| A | $\$0.72$ | C | $\$10.47$ | E | $\$72.00$ |
| B | $\$4.72$ | D | $\$7.53$ | | |

2. **(5 pts)** Rationalize the denominator of the rational expression.

$$\frac{4-\sqrt{2}}{\sqrt{2}+3}$$

A $\dfrac{14+7\sqrt{2}}{7}$

B $\dfrac{14-7\sqrt{2}}{7}$

C $-\dfrac{14-7\sqrt{2}}{7}$

D $\dfrac{14-7\sqrt{2}}{-7}$

E $\dfrac{-14-7\sqrt{2}}{7}$

3. **(5 pts)** Solve $\sqrt{x^2 - 10x - 16} = x - 4$.

| | | | | | |
|---|---|---|---|---|---|
| A | $x = -16$ | C | $x = 4$ | E | $x = 0$ |
| B | $x = 2$ | D | $x = -2$ | | |

4. **(5 pts)** If you sit in a hammock, it will stretch. The amount of stretch varies directly with the amount of weight in the hammock. If a person weighs $120$ pounds, the hammock will stretch $4$ inches. What distance will a person who weighs $135$ pounds stretch the hammock?

| | | | | | |
|---|---|---|---|---|---|
| A | 1 | C | 2 | E | 4.5 |
| B | 1.5 | D | 4 | | |

5. **(5 pts)** Factor $8x^2 - 10x + 3$.

A $(2x - 1)(4x - 3)$

B $(2x - 1)(4x + 3)$

C $(2x + 1)(4x - 3)$

D $(4x + 3)(2x + 1)$

E $(4x - 3)(2x + 1)$

6. **(5 pts)** Find $f(g(x))$ if $f(x) = x^2 + 4x - 7$ and $g(x) = 4x + 3$.

A $2(8x^2 - 20x + 7)$

B $2(8x^2 + 20x - 7)$

C $2(8x^2 - 20x - 7)$

D $2(8x^2 + 20x + 7)$

E $-2(8x^2 + 20x + 7)$

7. **(5 pts)** Simplify $\log_2(1/8) + \log_2 16$.

A 2

C 1

E 4

B 16

D 64

8. **(5 pts)** Find the inverse of $y = (x - 2)/3$.

A $y = 3x + 2$

D $y = x^2 + 3x + 2$

B $y = 3x - 2$

E $y = \dfrac{x - 3}{2}$

C $y = 2x + 3$

9. **(15 pts)** Solve the system of equations.

$$y = x^2 - x - 6$$

$$y - 2x = -2$$

10. **(15 pts)** Simplify the imaginary expression.

$$\frac{3 + 5i}{3i^3 + 2i^6}$$

11. **(15 pts)** If Julie pedals her bicycle at $20$ mph for $1.5$ hours, how far did she travel?

12. **(15 pts)** What is the domain of $f \circ g$?

$$f(x) = \frac{4}{x+2}$$

$$g(x) = \frac{1}{x}$$