

## Fall 07 Algebra Evaluation

MTY Academy

Fall 07-Algebra

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1. Factor each of the following completely by grouping terms.

(1)  $8ac - 20ad - 2bc + 5bd$

(2)  $x^3 - 2x^2 - 16x + 32$

(3)  $y^2 + 2y + 1 - 4x^2$

(4)  $x^2 - 6x - y^2 + 4y + 5$

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2. Factor each of the following polynomials, using any method.

(1)  $x^3 - 5x^2 - 24x$

(2)  $4x^2 - 24xy + 36y^2$

(3)  $(2x + 3y)^2 + 2(2x + 3y) - 8$

(4)  $8x^3 + 27y^3$

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3. Solve each of the following equations by factoring. Check your answers for the indicated problems.

(1)  $x^2 - 2x - 8 = 0$  (check your answer)

(2)  $5x^2 + 3x - 2 = 0$

(3)  $(y + 1)^2 - 4 = 0$  (check your answer)

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4. Solve each of the following equations by completing a square.

(1)  $3x^2 + 9x - 2 = 0$

(2)  $(2x + 5)(x - 2) = (x + 3)(x - 1)$

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5. Solve each of the following equations by using the quadratic formula.

(1)  $2x^2 + x = 3(x - 2)$

(2)  $(x + 2)(x - 3) = 6$

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6. Find the value of  $\sqrt{6 + \sqrt{6 + \sqrt{6 + \sqrt{6 + \dots}}}}$  .

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7. Use the discriminant  $b^2 - 4ac$  to determine the number of solutions to equation  $3x^2 - 4x + 2 = 2x^2 - 5x + 9$ .

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8. If both  $-2$  and  $3$  are solutions to the equation  $x^2 + bx + c = 0$ , what is the value of  $2c - 3b$ ?

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9. Given an equation  $2x^2 + bx + c = 0$ , if the sum of two solutions to this equation is  $\frac{1}{2}$  and the product of the two solutions is  $-4$ ,

(1) what are the values of  $b$  and  $c$ ?

(2) what are the solutions to this equation?

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10. Solve each of the following equations, using the substitution method. Indicate your substitution for each equation.

(1)  $(x + 2)^4 - 3(x + 2)^2 - 4 = 0$

(2)  $3\left(\frac{1}{x-2}\right)^2 - 2\left(\frac{1}{x-2}\right) - 5 = 0$

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11. Two ships leave port, one sailing east and the other south. Some time later they are 15 miles apart, with the eastbound ship 3 miles further from port than the southbound ship.

(1) Draw a picture to indicate the given information.

(2) How far is each ship from the port?

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12. A picture has a height and a width in the ratio of 4 to 3. It is to be enlarged to have an area of 192 square inches. What will be the dimensions of the enlargement?

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13. A garden measuring 12 meters by 16 meters is to have a pedestrian pathway installed all around it, increasing the total area to 285 square meters. What will be the width of the pathway? (Round up to nearest tenth.)

14. Solve each of the following inequalities, using the sign-chart method. Graph the solution set and write the solution set in interval notation.

(1)  $x^2 - 4x > 2x - 9$

(2)  $(x + 2)(x - 4) \leq 2x - 12$

(3)  $x(x + 1)(2x - 3) > x(3x + 1)(x - 3)$

(4)  $(x + 2)^2(x + 3)(x - 5) < 0$

15. Simplify each of the following rational expressions. No negative exponents are allowed in your final answers. Show your work in detail!

(1)  $\frac{(5x^2y)^3}{10x^{-3}y^2}$

(2)  $\frac{18x^{-2}y^4z^3}{72xy^{-5}z^{-2}}$

16. Simplify each of the following rational expressions. No negative exponents are allowed in your final answers. Show your work in detail!

(1)  $\frac{2x^2 + 2x - 4}{(x^2 - x - 6)(x - 4)}$

(2)  $\frac{3a + 6b}{a^2 + 4ab + 4b^2}$

(3)  $\frac{3x^2 - 5xy - 2y^2}{3x^2 - 2xy - y^2}$

(4)  $\frac{(x + 2y)^2 + (x + 2y) - 2}{2x + 4y + 4}$

17. Use the long division to do each of the following division. Verify your answers.

$$\frac{-7x^4 - 5x^2 + 4x}{x^2 - x + 2}$$

18. Use the Synthetic division to do each of the following division.

(1)  $\frac{3x^3 + 4x^2 + 2x - 1}{x + 2}$

(2)  $\frac{-2x^4 + 15x^2 + 4x}{x - 3}$