Algebra 2 Placement Instructions

This assessment will help determine if this level of Math-U-See is a good place for your child to start. Each level of Math-U-See builds upon the concepts taught in previous levels. Successful placement involves finding the highest level your child has fully mastered and placing them one level above that.

1 Prior to beginning the assessment:

- Understand that the goal isn't to get all the questions correct. We are determining which concepts they have not yet mastered.
- Encourage your child and let them know that this is an assessment and NOT a test.
- Recognize they might already know some of the concepts taught in this level.
- Let your child know there may be questions they don't yet understand.
- Print the assessment and ensure you have a pencil and eraser.
- Your child may want extra paper to work through the questions.

2 Let your child know while taking the assessment:

- If they don't understand or can't do a question have them move to the next one.
- If they want to attempt a question but are not sure they understand it, have them mark it with a happy face.
- If they cannot answer 3 or more questions in a row, it is okay to stop doing this assessment.

3 Grading the assessment:

- A question that your child has marked with a happy face indicates to you that this concept is not completely understood and must be reviewed.
- For incorrect answers, ask your child how they arrived at their answer. If they understand the concept, they should be able to correct the mistake on their own. This is considered a computational error. For the sake of this assessment do not mark this as incorrect.
- If there are only one or two concepts they need to learn or review from a given level, it may be possible to just remediate those and start in the next level higher.

4 Analyzing the results:

Most answers are incorrect or have happy faces.	5 or more answers are incorrect or have happy faces.	Most answers are correct and there are no happy faces.
Have them try the assessement for	**Your child is ready for**	**Have them try the assessment for**
Geometry	**Algebra 2**	**Pre-Calculus**

If you have questions after your child has taken the assessment, please contact us with the results and we will be able to help you determine the best level for them.

FINAL EXAM

Simplify or put in standardform.

1. $(x^7 \div x^3) + (x^2 \cdot x^2) =$

2. $\frac{A^5B^{-3}}{B^3A^2} =$

3. $\left(\frac{8}{27}\right)^{-\frac{1}{3}} =$

4. $2\sqrt{5} + 7\sqrt{5} =$

5. $\frac{x}{3+i} =$

6. $\frac{3}{1+\sqrt{3}} =$

Add or Subtract.

7. $\frac{5}{6x} + \frac{4}{3y} =$

8. $5Q^{-1}RQ^2 + 3QR - R =$

Solve using scientific notation.

9. $(.0009)(.027) =$

10. $\frac{3{,}700{,}000}{.002} =$

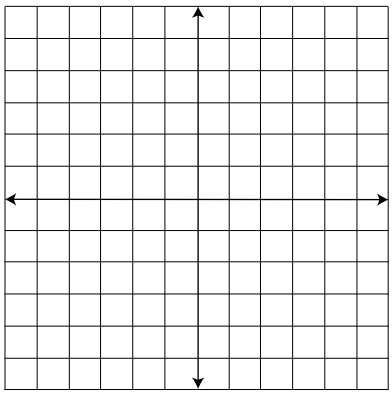
Solve for the unknown.

11. $2X^2 - 9X = 35$

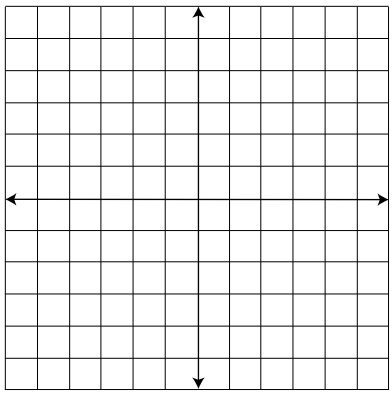
12. $X^2 + 4X - 4 = -3X$

Find the solutions for each pair of equations. Sketch a graph of each equation, and show the solutions.

13. $Y = X^2 + 2$
$Y = X + 2$



14. $X^2 + Y^2 = 1$
$X^2 - Y^2 = 1$



Answer the questions.

15. A new computer is being discounted 15%. If the original price was $1,565, what is the new price?

16. The atomic weight of sodium (Na) is 23 and that of chlorine (Cl) is 35. What is the percentage of sodium in NaCl?

17. The ratio of cats to dogs is 5 to 18. If there are 10 cats, how many dogs are there?

18. There are .62 miles in 1 kilometer. How many miles are there in 10 kilometers?

19. Michael and Alexandra left their home at 8:00 AM to drive to New York. Michael drove at 55 mph and arrived at 5:00 p.m. Alexandra drove at 45 mph and arrived at the same place as Michael. What time did Alexandra arrive?

20. I have 15 coins in my pocket. They are all either dimes or quarters. The value of the coins is $3.15. How many of each coin do I have?

21. Find three consecutive even integers such that three times the first, plus two times the second, minus the third equals 16.

22. A landscaper wants 100 pounds of grass-seed mixture that is 45% type A seed and 55% type B. He has a mixture that is 10% type A and one that is 60% type A. How much of each should he use to make the desired mixture?

23. In six years, Rose will be two times as old as Anne. Four years ago, Anne was one-third the age of Rose. How old are they now?

24. A boat can go 26 miles downstream in the same time it takes to go 6 miles upstream. The rate of the water is 5 mph. What is the rate of the boat?

Algebra 2 Pre/Post Placement Test

Answer Key

1. $(X^7 \div X^3) + (X^2 X^2) = (X^{7-3}) + (X^{2+2}) =$

$X^4 + X^4 = 2X^4$

2. $\dfrac{A^5B^{-3}}{B^3A^2} = A^5B^{-3}A^{-2}B^{-3} =$

$A^{5+(-2)}B^{-3+(-3)} = A^3B^{-6}$ or $\dfrac{A^3}{B^6}$

3. $\left(\dfrac{8}{27}\right)^{-\frac{1}{3}} = \left(\dfrac{27}{8}\right)^{\frac{1}{3}} = \dfrac{27^{\frac{1}{3}}}{8^{\frac{1}{3}}} = \dfrac{3}{2}$ or $1\dfrac{1}{2}$

4. $2\sqrt{5} + 7\sqrt{5} = (2+7)\sqrt{5} = 9\sqrt{5}$

5. $\dfrac{X}{3+i} = \dfrac{X(3-i)}{(3+i)(3-i)} = \dfrac{3X - Xi}{9 - i^2} =$

$\dfrac{3X - Xi}{9-(-1)} = \dfrac{3X - Xi}{10}$ or $\dfrac{X(3-i)}{10}$

6. $\dfrac{3}{1+\sqrt{3}} = \dfrac{3(1-\sqrt{3})}{(1+\sqrt{3})(1-\sqrt{3})}$

$= \dfrac{3-3\sqrt{3}}{1-3} = \dfrac{3-3\sqrt{3}}{-2}$

7. $\dfrac{5}{6X} + \dfrac{4}{3Y} = \dfrac{5(Y)}{6X(Y)} + \dfrac{4(2X)}{3Y(2X)} = \dfrac{5Y + 8X}{6XY}$

8. $5Q^{-1}RQ^2 + 3QR - R = 5Q^{-1+2}R + 3QR - R =$

$5Q^1R + 3QR - R = 5QR + 3QR - R = 8QR - R$

9. $(.0009)(.027) =$

$(9.0 \times 10^{-4})(2.7 \times 10^{-2}) =$

$(9.0 \times 2.7)(10^{-4} \times 10^{-2}) =$

$24.3 \times 10^{-6} = 2.43 \times 10^{-5}$

If significant digits are taken into account:

2.0×10^{-5} (either answer is correct)

10. $\dfrac{3{,}700{,}000}{.002} = \dfrac{3.7 \times 10^6}{2.0 \times 10^{-3}} =$

$(3.7 \times 10^6) \div (2.0 \times 10^{-3}) =$

$(3.7 \div 2.0)(10^6 \div 10^{-3}) =$

1.85×10^9

2.0×10^9 with significant digits

11. $2X^2 - 9X = 35$

$2X^2 - 9X - 35 = 0$

$X = \dfrac{-(-9) \pm \sqrt{(-9)^2 - 4(2)(-35)}}{2(2)} =$

$\dfrac{9 \pm \sqrt{81-(-280)}}{4} = \dfrac{9 \pm \sqrt{361}}{4} = \dfrac{9 \pm 19}{4}$

$X = \dfrac{9+19}{4}$ $\qquad$ $X = \dfrac{9-19}{4}$

$X = \dfrac{28}{4}$ $\qquad$ $X = \dfrac{-10}{4}$

$X = 7$ $\qquad$ $X = -\dfrac{5}{2}$

$X = -2\dfrac{1}{2}$

12. $X^2 + 4X - 4 = -3X$

$X^2 + 7X - 4 = 0$

$X = \dfrac{-(7) \pm \sqrt{(7)^2 - 4(1)(-4)}}{2(1)} =$

$\dfrac{-7 \pm \sqrt{49-(-16)}}{2} = \dfrac{-7 \pm \sqrt{65}}{2}$

13. sketch parabola and line

(see graph on next page)

$Y = X^2 + 2$

$Y = X + 2 \Rightarrow \quad (X^2 + 2) = X + 2$

$X^2 - X = 0$

$(X)(X-1) = 0$

$X = 0$

$Y = X + 2 \Rightarrow \quad Y = (0) + 2$

$Y = 2$

solution 1: $(0, 2)$

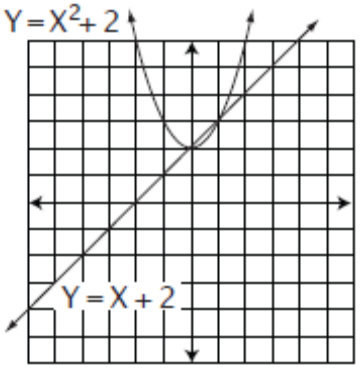
$X - 1 = 0$

$X = 1$

$Y = X + 2 \Rightarrow \quad Y = (1) + 2$

$Y = 3$

solution 2: $(1, 3)$



14. sketch circle and hyperbola

$$\begin{array}{r} X^2+Y^2=1 \\ \underline{X^2-Y^2=1} \\ 2X^2 \quad\quad =2 \end{array}$$

$$X^2=1$$

$$X=\pm 1$$

$X=1$:

$$X^2+Y^2=1 \Rightarrow (1)^2+Y^2=1$$

$$1+Y^2=1$$

$$Y^2=0$$

$$Y=0$$

solution 1: $(1, 0)$

$X=-1$:

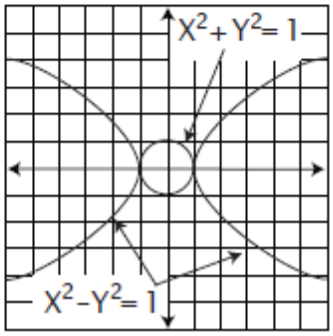
$$X^2+Y^2=1 \Rightarrow (-1)^2+Y^2=1$$

$$1+Y^2=1$$

$$Y^2=0$$

$$Y=0$$

solution 2: $(-1, 0)$



15. $15\% \times \$1{,}565 = .15 \times \$1{,}565 = \$234.75$ off

$\$1{,}565 - \$234.75 = \$1{,}330.25$

16. Weight of NaCl $= 23 + 35 = 58$

$$\frac{\text{Na}}{\text{NaCl}} = \frac{23}{58} \approx .40 = 40\%$$

17. $\dfrac{C}{D} = \dfrac{5}{18} \Rightarrow \dfrac{(10)}{D} = \dfrac{5}{18}$

$$10(18) = 5D$$

$$2(18) = D$$

$$D = 36 \text{ dogs}$$

18. $\dfrac{10 \cancel{\text{ km}}}{1} \times \dfrac{.62 \text{ mi}}{1 \cancel{\text{ km}}} = (10)(.62 \text{ mi}) = 6.2 \text{ mi}$

19. $D_M = R_M T_M \Rightarrow D_M = (55)(9)$

$$D_M = 495 \text{ mi}$$

$$D_A = R_A T_A$$

$$(495) = (45) T_A \Rightarrow \begin{cases} D_A = D_M \\ R_A = 45 \end{cases}$$

$T_A = 11$ hours; arrived at 7:00 PM

20.

$$\begin{array}{rl} -10(D+Q=15) \Rightarrow & -10D-10Q=-150 \\ 100(.10D+.25Q=3.15) \Rightarrow & \underline{10D+25Q=\ \ 315} \\ & 15Q=\ \ 165 \end{array}$$

$$Q = 11 \text{ quarters}$$

$$D+Q=15 \Rightarrow D+(11)=15$$

$$D = 4 \text{ dimes}$$

21. integers are N, $N+2$, and $N+4$

$$3(N)+2(N+2)-(N+4)=16$$

$$3N+2N+4-N-4=16$$

$$4N=16$$

$$N=4$$

*Note that in this line, the entire quantity $(N+4)$ is subtracted. Think of it as distributing -1 across the two terms inside the parentheses.

Integers are 4, 6 and 8.

22. $M_T = 10\%$ mixture; $M_S = 60\%$ mixture

$$-10(M_T + M_S = 100) \Rightarrow \quad -10M_T - 10M_S = -1{,}000$$
$$100(.10M_T + .60M_S = .45(100)) \Rightarrow \quad 10M_T + 60M_S = 4{,}500$$
$$50M_S = 3{,}500$$
$$M_S = 70 \text{ lb}$$

$$M_T + M_S = 100 \Rightarrow \quad M_T + (70) = 100$$
$$M_T = 30 \text{ lb}$$

23. $R + 6 = 2(A + 6)$

$R + 6 = 2A + 12$

$R = 2A + 6$

$(A - 4)(3) = R - 4$

$3A - 12 = R - 4$

$3A - 8 = R \Rightarrow \quad 3A - 8 = (2A + 6)$

$A = 14$ years old

$R = 2A + 6 \Rightarrow \quad R = 2(14) + 6$

$R = 28 + 6$

$R = 34$ years old

24. $D_D = R_D T_D$

$D_D = (B + W) T_D$

$$(26) = (B + (5))(T_D) \Rightarrow \begin{cases} D_D = 26 \\ W = 5 \end{cases}$$

$$T_D = \frac{26}{B + 5}$$

$D_U = R_U T_U$

$D_U = (B - W) T_U$

$$(6) = (B - (5))(T_U) \Rightarrow \begin{cases} D_U = 6 \\ W = 5 \end{cases}$$

$$T_U = \frac{6}{B - 5}$$

$$T_D = T_U \Rightarrow \quad \frac{26}{B + 5} = \frac{6}{B - 5}$$
$$26(B - 5) = 6(B + 5)$$
$$26B - 130 = 6B + 30$$
$$20B = 160$$
$$B = 8 \text{ mph}$$