

Honors Algebra 2 Summer Packet

Directions: This packet is due on the first day of class of the 2022-2023 school year. Copy each problem onto a separate piece of paper and solve. Show your procedure, not just your answer. If you use a graph, you should show a properly labeled sketch of that graph.

Honors Algebra 2 is essentially the first class in a 3-year sequence that finishes with AP Calculus. This summer packet consists of skills that when MASTERED will allow you to maneuver through Honors Algebra 2 with greater ease. These topics will not be re-taught during the school year, so each skill has a link to a video included if you need extra help completing the problems.

Skill 1 – Simplifying Expressions Using Exponent Rules.

1. Completely simplify the following expressions with no negative exponents.

a. $x^2y^3 \cdot x^5y^4$

b. $\frac{(5x^2y)^3}{(3xy^4)^2}$

c. $\frac{a^{-3}(2a^{-2}b^3)^{-3}}{b^{-2}(3a^{-5}b^5)^2}$

<https://www.youtube.com/watch?v=0GAMbuPJGOY>

<https://www.youtube.com/watch?v=So4TL4qTwfU>

Skill 2 – Order of Operations.

2. Completely simplify the following expressions *without using a calculator*.

a. $3(1 + 3)^2 - 4(2 - 5)^2$

b. $-(4^2 - 5^2)^2$

c. $(-3)^2 - 3^2$

<https://www.youtube.com/watch?v=8b-rf2AW3Ac>

Skill 3 – Operations with Fractions

3. Completely simplify the following expressions *without using a calculator*.

a. $\frac{3}{4} \cdot \frac{7}{9}$

e. $\frac{3}{5} \cdot \frac{7}{4}$

b. $\frac{3}{4} - \frac{7}{9}$

f. $\frac{3}{5} - \frac{7}{4}$

c. $\frac{3}{4} + \frac{7}{9}$

g. $\frac{3}{5} + \frac{7}{4}$

d. $\frac{3}{4} \div \frac{7}{9}$

h. $\frac{3}{5} \div \frac{7}{4}$

<https://www.youtube.com/watch?v=Rxz7OUzNyV0>

<https://www.youtube.com/watch?v=UInnvrU0hjI>

<https://www.youtube.com/watch?v=ksay1jOnSoo>

Skill 4 – Operations with Radicals

4. Completely simplify the following expressions *without using a calculator*.

a. $\sqrt{8} \cdot \sqrt{2}$

b. $\sqrt{50} + \sqrt{32}$

c. $2\sqrt{27} - 5\sqrt{12}$

d. $\sqrt[3]{16} - \sqrt[3]{54}$

e. $\frac{\sqrt{32}}{\sqrt{50}}$

<https://www.youtube.com/watch?v=rR3HbrR0m94>

<https://www.youtube.com/watch?v=RZ-1uL0ujCI>

https://www.youtube.com/watch?v=tJk6_7lbrlw

Skill 5 – Solve Linear Equations

5. Solve the following equations *without using a calculator*.

a. $-5(1-5x)+4(8x-2)=-3x+8$

b. $-3-6(4x+6)=-111$

c. $ax+by=c$, solve for x

d. $z=b+\frac{m}{a}$, solve for m

e. $\frac{7}{4}x+\frac{2}{3}=\frac{5}{2}x-1$

<https://www.youtube.com/watch?v=zYx4QtAguXc>

<https://www.youtube.com/watch?v=ecEUUbRLDQs>

<https://www.youtube.com/watch?v=lqDZvZdINLM>

Skill 6 – Factor Basic Expressions

6. Completely factor the following expressions. These are not equations, so you do NOT need to “solve” for anything, just factor.

a. $4x^2-25$

b. x^2-6x+5

c. $2x^2+x-6$

d. x^3-4x

e. x^4-16

<https://www.youtube.com/watch?v=zc2CpyRtjvY>

Skill 7 – Solve a Linear System of Equations

7. Solve the following systems by BOTH substitution and elimination.

a.
$$\begin{aligned} -7x - 2y &= -13 \\ x - 2y &= 11 \end{aligned}$$

b.
$$\begin{aligned} 8x - 3y &= 19 \\ 5x + 4y &= 6 \end{aligned}$$

<https://www.youtube.com/watch?v=MT2afriULmU>

<https://www.youtube.com/watch?v=YY9FbDbYVXU>

Skill 8 – Find the Slope Between Two Points

8. Find the slope between the given points.

- a. (2, 4) and (7, 9)
- b. (-3, -1) and (2, 1)
- c. (1, 4) and (7, 4)
- d. (-2, 8) and (-2, 10)

<https://www.youtube.com/watch?v=izsiAR4p4jk>

Skill 9 – Find the Equation of a Line in Slope-Intercept Form

- 9. Find the equation of the line in slope-intercept form with a slope of 7 and y-intercept -2.
- 10. Find the equation of the line in slope-intercept form through (2, 1) and (9, 4)
- 11. Find the equation of the line in slope-intercept form through (1, -2) and perpendicular to $y = 3x + 11$.

<https://www.youtube.com/watch?v=EzmbjWUH9BY>

<https://www.youtube.com/watch?v=QpzN4XeHrHE>

Skill 10 – Find the Equation of a Line in Point-Slope Form

12. Find the equation of the line in point-slope form through the point $(1, -8)$ and a slope of 2.
13. Find the equation of the line in point-slope form through the points $(2, -3)$ and $(4, 7)$.
14. Find the equation of the line in point-slope form parallel to the line $y = 7x - 8$ that goes through the point $(2, -5)$

<https://www.youtube.com/watch?v=ndRpJxdmZJI>
