

# HP ALGEBRA II

## SUMMER

## PACKET



Name: \_\_\_\_\_ Period: \_\_\_\_\_

The purpose of this packet is to both convey to students the foundational skills needed to be successful in this course and to provide them an opportunity to self-assess and develop these skills before entering the class. In order to be successful in this and all subsequent math courses at Servite, students must master and retain the content and skills from all previous math classes. As such, we ask that you please work on this assignment with integrity and diligence always striving to meet the intended purpose and goal of this assignment.

**Directions:** Please print this packet. You **must show all work** in the space provided. You **may not** use a calculator. For every word problem, write your answer in the form of a sentence. After you make an honest attempt at each problem, check your answer. If your answer is incorrect, try to identify where you went wrong, review the topic, and redo the problem correctly.

This packet will be **collected** on the **second day** of school, and you will be given a homework grade for completing it. Per Servite School policy, if this packet is not turned in on the second day of school, you will receive half credit if it is turned in the following day. After that, you will receive a zero for this packet. An assessment will be given at the beginning of the school year to make sure you have mastered all pre-requisites and will count as a quiz grade. If you earn less than a 75% on the assessment, a meeting with the counseling staff will be held to reevaluate your goals and potential success in the course.

Have a great summer and we are looking forward to seeing you in August!

**I understand that I have to show all my work and cannot use a calculator.**

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**(Student Signature)**

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**(Date)**

**I have checked to see that my child has shown all work and completed all problems without the use of a calculator.**

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**(Parent/Guardian Signature)**

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**(Date)**

## Section 1: Numbers and Algebra

**Evaluate (find the value of).**

1.  $\frac{30 - 4}{3 \cdot 2^3}$

2.  $-3^2 \div 3 + 2^2 \cdot 7 - 20 \div 5$

3.  $2(5^2 + 36 \div 6 - 4)$

4.  $25^{1/2}$

**Simplify.**

5.  $\sqrt{108x^2}$

6.  $\sqrt{75x^{12}y^{20}z^5} \cdot \sqrt{2}$

7.  $\frac{5}{\sqrt{10}}$

8.  $\frac{9}{\sqrt{3}+1}$  (Hint: use conjugate)

**Simplify using rules of exponents.**

9.  $(3y^2)(2x^3y)(-7x^2y^4)$

10.  $(5x^2y)^3$

11.  $\frac{a^2b^9}{a^6b^3}$

12.  $\frac{-40ab^6}{25a^{-6}b^{-3}}$

13.  $(2c^3)(5c)^4$

14.  $\frac{4a^2b + 3ab^3}{ab^3}$

15.  $(3^{-1} + 5^{-1})^{-1}$

**16. Underline the irrational numbers, and circle the integers in this list.**

3.28, -4, 1.333333..., 0,  $\frac{5}{9}$ ,  $\sqrt{3}$ ,  $\pi$ , -5.8282828..., 23

**Evaluate each expression for the given values of the variables.**

17.  $3|2a + 1| + 2|3 - a|$ ;  $a = -4$

18.  $\frac{3(2x+3) - 2(x-6)}{x+4}$ ;  $x = 3$

**For  $f(x) = 5x^2 + 3x + 2$  and  $g(x) = \frac{1}{x+3}$ , find the values of:**

19.  $f(3) + f(-1)$

20.  $g\left(\frac{2}{3}\right)$

**Expand and simplify the expression.**

21.  $(2x + 1)(x^2 - 4x + 7)$

22.  $2p^2 - (3p^2 - 2q^2) + (p + 2q)(q - 5p)$

23.  $(3x + 5y)^2$

24.  $3(a + 5b) - \frac{7}{3}(2b - a)$

## Section 2: Equations and Inequalities

Solve the equations for the variables.

1.  $4t + 13 = 57$

2.  $5 - 2y = 15$

3.  $\frac{5}{6}t - \frac{3}{4}t + \frac{2}{3} = \frac{5}{8}$

4.  $\frac{x}{4} + 3 = -2$

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

6.  $3 + 2(5 + 3x) = 4 - (7 - 2x)$

Solve for the indicated variable.

7.  $P = 2l + 2w$  (solve for  $l$ )

8.  $tx - 7 = 3t + ux$  (solve for  $x$ )

9.  $\frac{1}{R} + \frac{1}{S} = \frac{1}{T}$  (solve for  $R$ )

**Solve the inequalities.**

10.  $5 - 2x < 3 + 4(6 + \frac{3}{2}x)$

11.  $3x - 1 \leq 5$  or  $2x - 4 \geq x$

12.  $5|3x - 7| + 4 > 23$

### Section 3: Quadratic Functions

Factor completely.

1.  $x^2 - 144$

2.  $-6x^2 + 600$

3.  $3x^2 + 31x + 36$

4.  $2x^2y^2 - 19xy + 24$

5.  $63x^3 + 54x^2 - 112x - 96$

6.  $x^2 - 5x + 6$

7.  $324x^2 - 100$

8.  $16x^2y^5 + 24xy^2$



**Solve algebraically.**

9.  $x^2 + 6x + 3 = 0$

10.  $x^2 = 1 - 5x$

11.  $(x - 5)^2 + 4x = 52$

12.  $\frac{x(x-3)}{2} = 5$

**Solve by factoring.**

13.  $(x - 5)(x + 3) = 9$

14.  $4x^2 - 20x + 25 = 0$

**Solve by completing the square.**

15.  $x^2 - 20x = 5$

16.  $3x^2 - 6x - 5 = 0$

**Solve the word problem.**

17. The area in square feet of a rectangular field is  $n^2 - 120n + 3500$ . The width in feet is  $n - 50$ . Find the length of the field.

**For each quadratic function, identify the axis of symmetry, coordinates of the vertex and any zeros.**

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

19.  $y = -x^2 - 4x - 3$

## Section 4: Lines

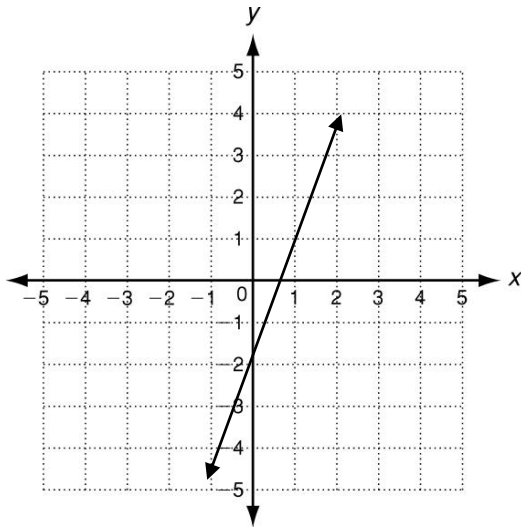
Give the equation of a line satisfying the given conditions.

1. through points  $(-1, 3)$  and  $(5, -6)$
2. through the points  $(9, 4)$  and  $(9, 3)$

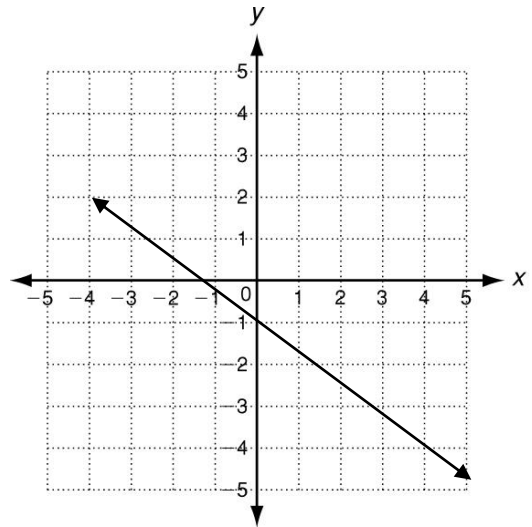
3. parallel to  $2x + 3y = 7$  and through  $(3, 8)$
4. perpendicular to  $y = -4x + 1$  and through  $(0, 2)$

**Give the equation of the lines shown.**

5.

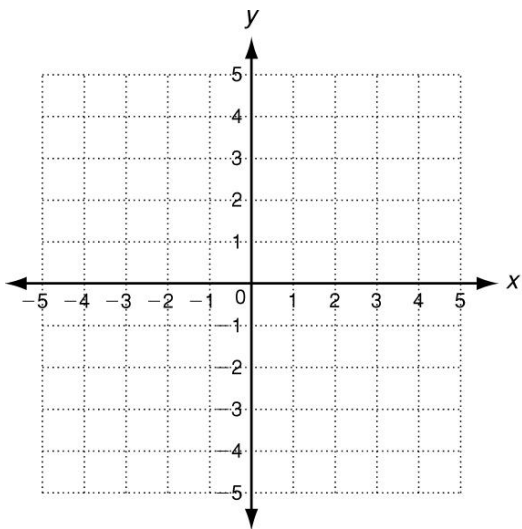


6.

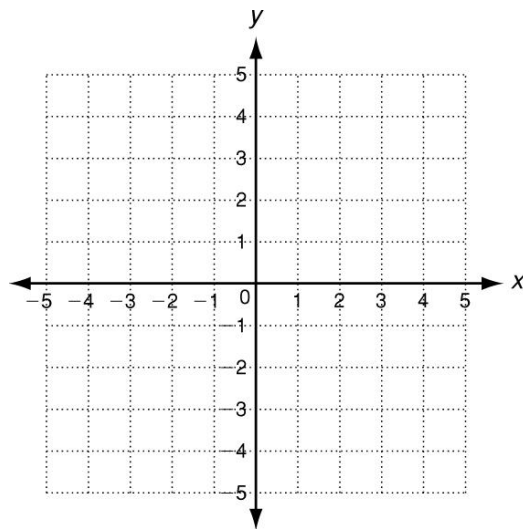


**Draw a graph of the line with the given equations.**

7.  $2x + y = 5$



8.  $x + 2y - 4 = 0$



## Sections 5: Word Problems

**Set up an equation and show all your work.**

1. The sides of a triangle are in the ratio 4 : 5 : 6. What is the length of each side if the perimeter is 45cm?
  
  
  
  
  
  
  
  
  
  
2. Find three consecutive integers whose sum is 126.
  
  
  
  
  
  
  
  
  
  
3. The height of a rocket launched upward from a 160 foot cliff is modeled by the function  $h(t) = -16t^2 + 48t + 160$ , where  $h$  is height in feet and  $t$  is time in seconds.
  - (a) What is the maximum height?
  - (b) Find the time it takes the rocket to reach the ground at the bottom of the cliff.
  
  
  
  
  
  
  
  
  
  
4. If the yearly salary for Michelle after a 5% increase is \$32, 850 what was her salary before the increase?

## Answers

### Section 1

1.  $\frac{13}{12}$

3. 54

5.  $6x\sqrt{3}$

7.  $\frac{\sqrt{10}}{2}$

9.  $-42x^5y^7$

11.  $\frac{b^6}{a^4}$

13.  $1250c^7$

15.  $\frac{15}{8}$

17. 35

19. 60

21.  $2x^3 - 7x^2 + 10x + 7$

23.  $9x^2 + 30xy + 25y^2$

2. 21

4. 5

6.  $5x^6y^{10}z^2\sqrt{6z}$

8.  $\frac{9\sqrt{3}-9}{2}$

10.  $125x^6y^3$

12.  $\frac{-8a^7b^9}{5}$

14.  $\frac{4a+3b^2}{b^2}$

16. Integers: -4, 0, 23;  
Irrational numbers:  $\sqrt{3}, \pi$

18.  $\frac{33}{7}$

20.  $\frac{3}{11}$

22.  $-6p^2 + 4q^2 - 9pq$

24.  $\frac{16}{3}a + \frac{31}{3}b$

### Section 2

1.  $t = 11$

3.  $t = -\frac{1}{2}$

5.  $x = -6$

7.  $l = \frac{p-2w}{2}$

9.  $R = \frac{ST}{S-T}$

11.  $x \leq 2$  or  $x \geq 4$

2.  $y = -5$

4.  $x = -20$

6.  $x = -4$

8.  $x = \frac{3t+7}{t-u}$

10.  $x > -\frac{11}{4}$

12.  $x > \frac{18}{5}$  or  $x < \frac{16}{15}$

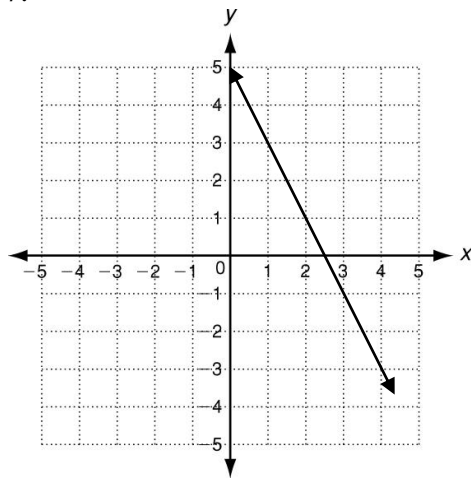
### Section 3

1.  $(x - 12)(x + 12)$
2.  $-6(x - 10)(x + 10)$
3.  $(3x + 4)(x + 9)$
4.  $(2xy - 3)(xy - 8)$
5.  $(3x - 4)(3x + 4)(7x + 6)$
6.  $(x - 3)(x - 2)$
7.  $4(9x - 5)(9x + 5)$
8.  $8xy^2(2xy^3 + 3)$
9.  $x = -3 \pm \sqrt{6}$
10.  $x = \frac{-5 \pm \sqrt{29}}{2}$
11.  $x = -3, 9$
12.  $x = -2, 5$
13.  $x = -4, 6$
14.  $x = \frac{5}{2}$
15.  $x = 10 \pm \sqrt{105}$
16.  $x = 1 \pm \frac{2\sqrt{6}}{3}$
17.  $\text{length} = (n - 70) \text{ feet}$
18. axis:  $x = \frac{3}{2}$   
vertex:  $(\frac{3}{2}, -\frac{9}{2})$   
zeros:  $x = 0, 3$
19. axis:  $x = -2$   
vertex:  $(-2, 1)$   
zeros:  $x = -3, -1$

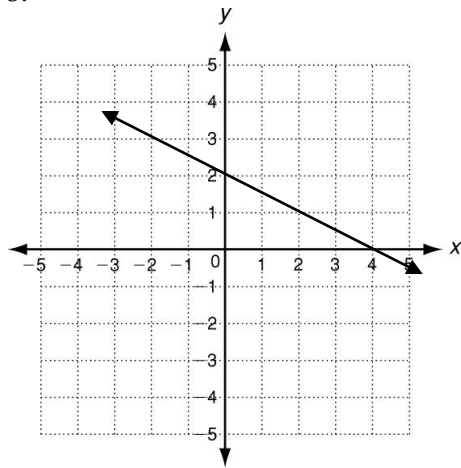
### Section 4

1.  $y = -\frac{3}{2}x + \frac{3}{2}$
2.  $x = 9$
3.  $y = -\frac{2}{3}x + 10$
4.  $y = \frac{1}{4}x + 2$
5.  $y = 3x - 2$
6.  $y = -\frac{3}{4}x - 1$

7.



8.



## Section 5

1. Lengths of each side of the triangle are 12cm, 15cm and 18cm.
2. The three consecutive integers are 41, 42 and 43.
3.
  - a) Maximum height is 96 ft when time is 1.5 s.
  - b) It takes 5 seconds for the rocket to reach the ground at the bottom of the cliff.
4. Michelle was earning \$31,285.71 before her salary increase.