

**Algebra 2**  
**Worksheet 3.1**  
**Simplify**

Name \_\_\_\_\_

1.  $i^{34}$

2.  $i^{69}$

3.  $\sqrt{108}$

4.  $\sqrt{-100}$

5.  $\sqrt{-120}$

6.  $-3\sqrt{36y^5}$

7.  $-5x\sqrt{-24x^2}$

8.  $-4i \cdot 12i$

9.  $\sqrt{-36} \cdot \sqrt{-25}$

10.  $2\sqrt{6} \cdot 3\sqrt{18}$

11.  $-2k\sqrt{8k} \cdot \sqrt{4k}$

12.  $12\sqrt{-7} \cdot \sqrt{-35}$

13.  $2\sqrt{20} \cdot 7\sqrt{-8}$

14.  $9i \cdot 7i^3$

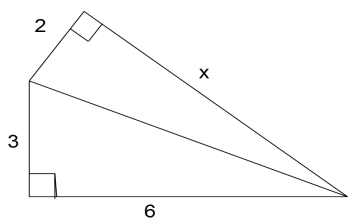
15. Factor  $x^2 - 225$

16. Simplify  $(x + 9)^2$

17. Simplify  $(2x - 1)^2$

18. Factor  $3x^2 - x - 2$

19. Use the figure below. (Recall that for right triangles you can use  $a^2 + b^2 = c^2$ )



What is the value of  $x$ ?

Selected Answers: 1)  $-1$     7)  $-10ix^2\sqrt{6}$     10)  $36\sqrt{3}$     11)  $-8k^2\sqrt{2}$

Algebra 2  
Worksheet 3.2

Name \_\_\_\_\_

Simplify. Rationalize, if needed.

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

2.  $\frac{\sqrt{-49}}{\sqrt{-169}}$

3.  $\frac{\sqrt{-20}}{\sqrt{2}}$

4.  $\frac{9i}{45i}$

5.  $\frac{\sqrt{-108}}{\sqrt{12}}$

6.  $\frac{4}{\sqrt{11}}$

7.  $\frac{2}{\sqrt{-15}}$

8.  $\frac{6}{7i}$

9.  $\frac{-8}{3i}$

10.  $\frac{\sqrt{7}}{\sqrt{-21}}$

11.  $\frac{\sqrt{6}}{\sqrt{-5}}$

12.  $\frac{\sqrt{12}}{3i}$

13.  $\sqrt{-4} \cdot \sqrt{-6}$

14.  $\sqrt{49y^9}$

15.  $\sqrt{-150}$

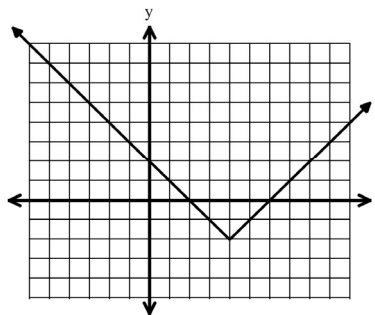
16. Factor  $3x^2 + 19x - 14$

17. Subtract  $(4x^2 + 18) - (-2x^2 + 12)$

18. Add  $(11y^3 + 2y^2 - 4) + (7y^2 - 3y - 9)$

19. Which equation is obtained after the translation of the graph up 2 units and left 6 units?

- A.  $f(x) = |x - 2|$
- B.  $f(x) = |x| - 2$
- C.  $f(x) = |x + 2|$
- D.  $f(x) = |x| + 2$



20. The formula for the volume  $V$  of a rectangular pyramid is shown below, where  $h$  is the height and  $B$  is the area of the rectangular base.

$$V = \frac{1}{3}Bh$$

When the volume of a rectangular pyramid is 18 cubic inches, its height is 9 inches, and the length of the base is 3 inches, what is the width of the base?

Selected Answers: 1)  $\frac{4}{5}$

3)  $i\sqrt{10}$

6)  $\frac{4\sqrt{11}}{11}$

8)  $-\frac{6i}{7}$

**Algebra 2**  
**Worksheet 3.3**

Name \_\_\_\_\_

**Perform the indicated operation.**

1.  $(-49 + \sqrt{7}) - (17 + 3\sqrt{7})$

2.  $(53 + 13i) + (7 - 2i)$

3.  $(6 - 3\sqrt{15}) + (-39 + 8\sqrt{15})$

4.  $(10 - 4i) - (11 + 9i)$

5.  $(5 - 2\sqrt{11})(8 + 3\sqrt{11})$

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

7.  $(2 + 7i)(2 - 7i)$

8.  $(3 - 12i)(8 + 2i)$

9.  $(6 - 3i)^2$

10.  $(4 + 2\sqrt{7})^2$

**Simplify. Rationalize if needed.**

11.  $\frac{\sqrt{-14}}{\sqrt{2}}$

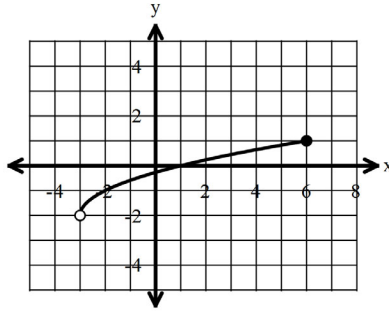
12.  $\frac{\sqrt{49}}{\sqrt{-144}}$

13.  $\frac{\sqrt{8}}{\sqrt{5}}$

14.  $\frac{\sqrt{3}}{\sqrt{-7}}$

15.  $\frac{12}{4i}$

16. Which of the following is a proper description of the range of the function shown:



A.  $R: \{y | -3 < y \leq 6\}$

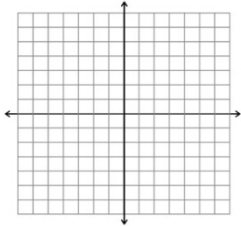
C.  $R: \{y | -2 \leq y \leq 1\}$

B.  $R: \{y | -3 < y < 6\}$

D.  $R: \{y | -2 < y \leq 1\}$

17. Graph  $y = \frac{1}{2}|x - 3| - 4$

18. Multiply  $(2x + 7)(x - 1)$



19. Multiply  $-7i \cdot 11i$

20. If  $z = 1 + i$ , then what is  $z^2 + z + 1$  written as a single complex number?

Algebra 2  
Worksheet 3.4

Name \_\_\_\_\_

Simplify. Rationalize, if needed.

1.  $\frac{2}{4-\sqrt{3}}$

2.  $\frac{1}{6+2i}$

3.  $\frac{\sqrt{13}}{9+\sqrt{2}}$

4.  $\frac{2+\sqrt{7}}{6-\sqrt{7}}$

5.  $\frac{18i}{1-2i}$

6.  $\frac{3+4i}{9+3i}$

7.  $\frac{3i}{7-12i}$

8.  $\frac{3\sqrt{5}}{6+\sqrt{5}}$

9.  $\frac{1+i}{10-i}$

10.  $(2 + 12i) - (7 + 8i)$

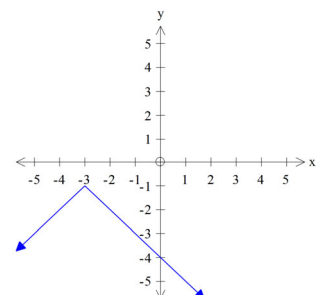
11.  $(7 + 2\sqrt{3}) + (-3 + 3\sqrt{3})$

12.  $(7 - 2i)^2$

13.  $(8 - 3\sqrt{7})(1 + 4\sqrt{7})$

14. Which equation is represented by the graph shown?

- A.  $y = -|x + 3| - 1$
- B.  $y = |x + 3| - 1$
- C.  $y = -|x - 3| + 1$
- D.  $y = |x - 3| + 1$



15. The graph of  $f(x) = x^2$  is vertically compressed by a factor of  $\frac{1}{2}$  and translated to the right three units and down one unit to produce the function  $g(x)$ . Which of the following equations represents  $g(x)$ ?

A.  $g(x) = -\frac{1}{2}(x + 3)^2 + 1$

C.  $g(x) = \frac{1}{2}(x - 3)^2 - 1$

B.  $g(x) = -\frac{1}{2}(x + 1)^2 + 3$

D.  $g(x) = \frac{1}{2}(x - 1)^2 - 3$

16. Simplify:  $\frac{6+2i}{2-i}$

A.  $2 + 2i$

C.  $\frac{6 + 2i}{2 - i}$

B.  $2 + 3i$

D.  $10 + 10i$

17. Factor  $x^2 + 7x + 12$

18. Factor  $x^2 - 4$

19. Solve the following equation for  $y$ :  $-3x + 2y + x = 5y - 6(x + 2)$

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

C.  $y = -\frac{8}{7}x - \frac{12}{7}$

B.  $y = \frac{4}{3}x + 4$

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

Selected Answers: 1)  $\frac{8+2\sqrt{3}}{13}$

5)  $\frac{-36+18i}{5}$

9)  $\frac{9+11i}{101}$

17)  $(x + 3)(x + 4)$



**Algebra 2**

Name \_\_\_\_\_

**Worksheet 3.5****Solve for all real or complex solutions.**

1.  $x^2 + 10 = 74$

2.  $x^2 - 10 = -74$

3.  $(x + 5)^2 = 100$

4.  $-x^2 + 20 = 69$

5.  $2x^2 + 13 = 15$

6.  $5x^2 + 6 = -54$

7.  $(x + 3)^2 + 20 = -100$

8.  $-x^2 + 15 = 7$

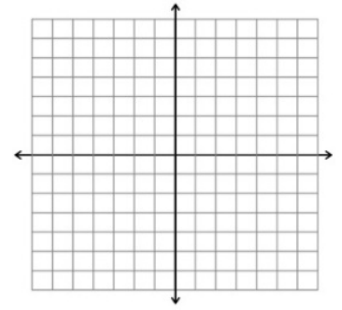
9.  $-3(x - 2)^2 + 1 = -20$

10.  $-5(x + 6)^2 - 10 = -30$

11.  $\frac{-3(x-4)^2-60}{5} = 3$

12. Simplify:  $\frac{5i}{2-3i}$

13. Graph  $y = -3|x + 4| + 1$



14. Factor  $x^2 - 8x - 20$

15. Factor  $4x^2 - 169$

16. Factor  $2x^2 + x - 3$

17. Simplify:  $3i(6 - 5i) - 4(2 + 3i)$

A.  $23 + 6i$

C.  $8 - 9i$

B.  $-8 - 9i$

D.  $7 + 6i$

18. Simplify:  $\sqrt{-25} \cdot \sqrt{-36}$

A.  $30i$

C.  $30$

B.  $-30$

D.  $900$

Selected Answers: 2.  $x = \pm 8i$

7.  $x = -3 \pm 2i\sqrt{30}$

11.  $x = 4 \pm 5i$

12.  $\frac{-15+10i}{13}$

1. Which complex conjugates multiply to 25? (Choose all that apply)

A.  $(4 - 2i)(4 + 2i)$

C.  $(1 + 6i)(1 - 6i)$

B.  $(3 - 4i)(3 + 4i)$

D.  $(4 + 3i)(4 - 3i)$

For #2 – 19, simplify completely:

2.  $\sqrt{40b^2}$

3.  $\sqrt{-27}$

4.  $7\sqrt{-48x^3}$

5.  $4x\sqrt{72x^2y^5}$

6.  $5\sqrt{20} \cdot 3\sqrt{-2}$

7.  $\sqrt{-9} \cdot \sqrt{-25}$

8.  $i^{43}$

9.  $7i \cdot 9i$

10.  $4\sqrt{24x^3y} \cdot 3\sqrt{-2x^2}$

11.  $-4i \cdot 7i$

12.  $i^{30}$

13.  $3\sqrt{28} \cdot \sqrt{-21}$

14.  $\frac{\sqrt{64}}{\sqrt{25}}$

15.  $\frac{\sqrt{-22}}{\sqrt{2}}$

16.  $\frac{4}{\sqrt{7}}$

17.  $\frac{\sqrt{10}}{\sqrt{-3}}$

18.  $\frac{\sqrt{24}}{\sqrt{18}}$

19.  $\frac{6}{7i}$

20. Given  $a = 2 + i$ , what is  $a^2 - a + 2$  written as a single complex number?

**For # 21 - 26 , perform the indicated operation:**

21.  $(5 + 4i)^2$

22.  $(3 + 2\sqrt{5}) + (-5 + 6\sqrt{5})$

23.  $(6 - 3i)(6 + 3i)$

24.  $(12 + 5i) - (7 - 9i)$

25.  $(8 - 2\sqrt{3})(1 + 6\sqrt{3})$

26.  $5i(2 + 3i) + 4(7 - i)$

**For # 27 - 30 , simplify completely:**

27.  $\frac{1}{5-\sqrt{3}}$

28.  $\frac{7}{4+3i}$

29.  $\frac{3i}{11-10i}$

30.  $\frac{2}{3+\sqrt{7}}$

**For # 31 - 36 , solve for x. Simplify answers fully.**

31.  $-5x^2 + 10 = 15$

32.  $-2x^2 + 10 = -16$

33.  $(x - 1)^2 - 8 = 8$

34.  $6(x + 5)^2 - 14 = -20$

35.  $2(x - 3)^2 + 5 = 15$

36.  $-4(x + 10)^2 - 25 = 7$

Alg 2 Unit 3 Practice Test KEY

1. B and D
2.  $2b\sqrt{10}$
3.  $3i\sqrt{3}$
4.  $28xi\sqrt{3x}$
5.  $24x^2y^2\sqrt{2y}$
6.  $30i\sqrt{10}$
7.  $-15$
8.  $-i$
9.  $-63$
10.  $48x^2i\sqrt{3xy}$
11. 28
12.  $-1$
13.  $42i\sqrt{3}$
14.  $\frac{8}{5}$
15.  $i\sqrt{11}$
16.  $\frac{4\sqrt{7}}{7}$
17.  $\frac{-i\sqrt{30}}{3}$
18.  $\frac{2\sqrt{3}}{3}$
19.  $\frac{-6i}{7}$
20.  $3+3i$
21.  $9 + 40i$
22.  $-2 + 8\sqrt{5}$
23. 45
24.  $5 + 14i$
25.  $-28 + 46\sqrt{3}$
26.  $6i + 13$
27.  $\frac{5+\sqrt{3}}{22}$
28.  $\frac{28-21i}{25}$
29.  $\frac{-30+33i}{221}$
30.  $3 - \sqrt{7}$
31.  $x = \pm i$
32.  $x = \pm\sqrt{13}$
33.  $x = 5, -3$
34.  $x = -5 \pm i$
35.  $x = 3 \pm \sqrt{5}$
36.  $x = -10 \pm 2i\sqrt{2}$