4-4 HW Answer Key

1. $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

2. $b^2 - 4ac$

3. 2 complex solutions

4. 1 real solution

5. 2 real solutions

6. discriminant = -324; 2 complex solutions; $x = \pm 9i$

7. discriminant = -104; 2 complex solutions; $x = \frac{2}{3} \pm \frac{i\sqrt{26}}{3}$

8. discriminant = 16; 2 real solutions; $x = 3, -1$

9. discriminant = 0; 1 real solution; $x = 2$

10. discriminant = -56; 2 complex solutions; $x = \frac{2}{5} \pm \frac{i\sqrt{14}}{10}$

Jun 30-12:43 PM

Name Key

Alg 2 Homework 4-4

Castle Learning Unit 4 Review available for extra practice.

Extra review questions (30) with a key are at the very end of your homework packet.

In Class Review is the first one w/ 25 questions. Key will be online.

1. Write the quadratic formula: $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$
2. What is the discriminant? $b^2 - 4ac$
3. If discriminant is negative, what kind of solutions do you have? 2 complex solutions
4. If discriminant is zero, what kind of solutions do you have? 1 real solution
5. If discriminant is positive, what kind of solutions do you have? 2 real solutions

For 6 - 10 do the following:

1. Compute the value of the discriminant of the quadratic equation.
2. Use the value of the discriminant to predict the number and type of solutions.
3. Find all real and complex solutions.

6. $x^2 + 81 = 0$

1. $b^2 - 4ac = 0 - 4(1)(81) = -324$
2. 2 complex solutions
3. $x = \frac{0 \pm \sqrt{-324}}{2(1)} = \frac{\pm 18i}{2} = \pm 9i$ $\{\pm 9i\}$

7. $3x^2 - 4x + 10 = 0$

1. $b^2 - 4ac = 16 - 4(3)(10) = -104$
2. 2 complex solutions
3. $x = \frac{4 \pm \sqrt{-104}}{2(3)} = \frac{4 \pm i\sqrt{4}\sqrt{26}}{6} = \frac{2 \pm i\sqrt{26}}{3}$ $\left\{\frac{2}{3} \pm \frac{i\sqrt{26}}{3}\right\}$

(Continued on next page→)

Sep 1-1:47 PM

8. $x^2 - 2x - 3 = 0$

1. $b^2-4ac = 4-4(1)(-3)$
$= 16$
2. 2 real solutions
3. $x = \frac{2 \pm \sqrt{16}}{2(1)}$
$= \frac{2 \pm 4}{2} = 1 \pm 2 \to 3, -1$ $\{3, -1\}$

9. $x^2 + 4 = 4x$ $x^2 - 4x + 4 = 0$

1. $b^2-4ac = 16-4(1)(4)$
$= 0$
2. 1 real solution
3. $x = \frac{4 \pm \sqrt{0}}{2(1)}$
$= 2$ $\{2\}$

10. $9x - 9x^2 = 3 + x + x^2$
$0 = 10x^2 - 8x + 3$

1. $b^2-4ac = 64-4(10)(3)$
$= -56$
2. 2 complex solutions
3. $x = \frac{8 \pm \sqrt{-56}}{2(10)}$
$= \frac{8 \pm i\sqrt{4}\sqrt{14}}{20} = \frac{8 \pm 2i\sqrt{14}}{20} = \frac{4 \pm i\sqrt{14}}{10}$ $\left\{\frac{2}{5} \pm \frac{i\sqrt{14}}{10}\right\}$

Aug 12-3:56 PM

Go to the extra review at
the end of the HW Packet.
Do #s 1, 8, 20.

1) $\sqrt{-18} + \sqrt{-2} - \sqrt{-32}$

8) $(5+\sqrt{-16})(2-\sqrt{-9})$

20) $(1-3i)^2 + 6i$

Oct 31-6:56 AM

Go to the extra review at the end of the HW Packet.
Do #s 1, 8, 20

1) $\sqrt{-18}+\sqrt{-2}-\sqrt{-32}$ $= i\sqrt{9}\sqrt{2}+i\sqrt{2}-i\sqrt{16}\sqrt{2}$
$= 3i\sqrt{2}+i\sqrt{2}-4i\sqrt{2}$
$= 0$

8) $(5+\sqrt{-16})(2-\sqrt{-9})$ $=(5+4i)(2-3i)$
$= 10-15i+8i-12i^2$
$= 10-7i+12$
$= 22-7i$

20) $(1-3i)^2+6i$ $=(1-3i)(1-3i)+6i$
$= 1-3i-3i+9i^2+6i$
$= 1-6i-9+6i$
$= -8$

Oct 31-6:56 AM

Go to the In Class review at the end of the Notes Packet. Do #20.

Oct 31-7:05 AM

Day 5 Review Answer Key

1. a) 4 + 9i b) 20 + 3i c) 3 + 10i d) 5 + 3i

2. a) 11 + 41i b) 6 + 22i c) -17 - 17i

3. 26, which is a real number

4. 13i, which is an imaginary number

5. a) 20i b) 8 c) 8 + 20i

6. i ; $\sqrt{-1}$

7. $i^4 = 1$ and $i^{\text{any mult. of 4}} = 1$, so $i^{\text{any power}}$ = i, -1, -i, or 1

8. -1, -i, 1, i, -1

9. $i\sqrt{r}$

10. 10i

11. -12i

12. $4i\sqrt{5}$

13. $15i\sqrt{6}$

14. -42

15. $-2\sqrt{30}$

16. $-3i\sqrt{10}$

17. -19

18. 30 - 4i

19. -6 + 29i

20. 51 + 18i

21. $x^2 + 25$

22. See diagram in slide

23. x = 6, y = 9

24. Discriminant = -80

Answer = $\left\{-\frac{1}{4} \pm \frac{i\sqrt{5}}{4}\right\}$

Sep 1-1:48 PM

Review Algebra 2 Unit 4 Day 5

1. Find each of the following sums and differences.

a) (-2 + 7i) + (6 + 2i) b) (8 + 4i) + (12 - i)

c) (5 + 3i) - (2 - 7i) d) (-3 + 5i) - (-8 + 2i)

2. Find the following products. Write each of your answers as a complex number in the form a+bi.

a) (3 + 5i)(7 + 2i) b) (-2 + 6i)(3 - 2i) c) (4 + i)(-5 - 3i)

Sep 1-1:48 PM

3. Show that the product of (2+3i) and (4-6i) results in a purely real number.

4. Show that the product of (2+3i) and (3+2i) results in a purely imaginary number.

5. Give an example of each number:
   a) Pure imaginary _____
   b) Pure real_____
   c) Complex (not pure imaginary or pure real) _____

Aug 3-11:18 AM

6. The imaginary number _____ is equal to _____.
7. Explain the 'cycle' of i.

8. What are the values of: i^2 = _____ i^3 = _____ i^4 = _____ i^5 = _____ i^{30} = _____

9. How do you simplify $\sqrt{-r}$?_____

Aug 3-11:18 AM

Simplify:

10. $\sqrt{-100}$ = _____

11. $-\sqrt{-144}$ = _____

12. $\sqrt{-80}$ = _____

13. $5\sqrt{-54}$ = _____

14. $\sqrt{-49} \bullet \sqrt{-36}$ = _____

15. $\sqrt{-5} \bullet \sqrt{-24}$ = _____

16. $-\sqrt{-18} \bullet \sqrt{5}$ = _____

17. $(\sqrt{-19})^2$ = _____

Aug 3-11:19 AM

Add or subtract the following complex numbers.

18. $(22 + 7i) + (8 - 11i)$ = _____

19. $(2 + 16i) - (8 - 13i)$ = _____

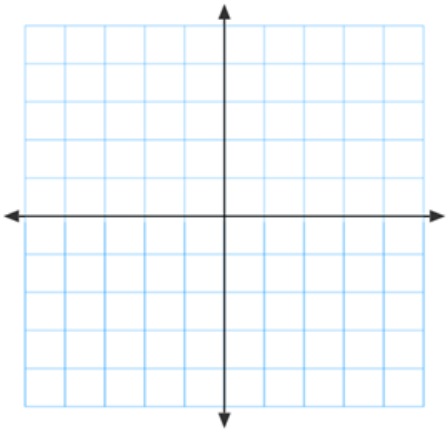
Multiply the following complex numbers.

20. $(3 + 4i)(9 - 6i)$ =

21. $(x + 5i)(x - 5i)$ =

Aug 3-11:19 AM

22. Plot and label a complex number in each quadrant and on both axes on the graph below. Be sure to label the axes.



Aug 3-11:19 AM

23. Find the real values of x and y if $11x + 8yi = 66 + 72i$. x =_____

y =_____

24. Compute the value of the discriminant of the quadratic equation, and then solve using the quadratic formula.

$8x^2 + 4x + 3 = 0$ Discriminant _____

Answer _____

25. Solve the equation $2x^2 + 5x + 8 = 0$. Express the answer in a + bi form.

Aug 3-11:20 AM

Review Algebra 2 Unit 4 Day 5

1. Find each of the following sums and differences.

a) $(-2 + 7i) + (6 + 2i) = 4 + 9i$ b) $(8 + 4i) + (12 - i) = 20 + 3i$

c) $(5 + 3i) - (2 - 7i) = 3 + 10i$ d) $(-3 + 5i) - (-8 + 2i) = 5 + 3i$

2. Find the following products. Write each of your answers as a complex number in the form a+bi.

a) $(3 + 5i)(7 + 2i)$
$= 21 + 6i + 35i + 10i^2$
$= 21 + 41i - 10$
$= 11 + 41i$

b) $(-2 + 6i)(3 - 2i)$
$= -6 + 4i + 18i - 12i^2$
$= -6 + 22i + 12$
$= 6 + 22i$

c) $(4 + i)(-5 - 3i)$
$= -20 - 12i - 5i - 3i^2$
$= -20 - 17i + 3$
$= -17 - 17i$

3. Show that the product of (2+3i) and (4-6i) results in a purely real number.
$(2+3i)(4-6i) = 8 - 12i + 12i - 18i^2$
$= 8 + 18$
$= 26 \rightarrow$ Real #

4. Show that the product of (2+3i) and (3+2i) results in a purely imaginary number.
$(2+3i)(3+2i) = 6 + 4i + 9i + 6i^2$
$= 6 + 13i - 6$
$= 13i \rightarrow$ Imag. #

5. Give an example of each number:
a) Pure imaginary $20i$
b) Pure real 8
c) Complex (not pure imaginary or pure real) $8 + 20i$

Aug 12-3:58 PM

6. The imaginary number i is equal to $\sqrt{-1}$
7. Explain the 'cycle' of i.
$i^1 = i$
$i^2 = -1$
$i^3 = -i$
$i^4 = 1$
$i^4 = 1$ and i MULT. OF 4 $= 1$
So, i any power is $i, -1, -i$ or 1

8. What are the values of: $i^4 = -1$ $i^3 = -i$ $i^4 = 1$ $i^5 = i$ $i^{30} = i^{28} \cdot i^2 = -1$

9. How do you simplify $\sqrt{-r}$? $i\sqrt{r}$

Simplify:

10. $\sqrt{-100} = 10i$
11. $-\sqrt{-144} = -12i$
12. $\sqrt{-80} = i\sqrt{16}\sqrt{5} = 4i\sqrt{5}$
13. $5\sqrt{-54} = 5i\sqrt{9}\sqrt{6} = 15i\sqrt{6}$
14. $\sqrt{-49} \cdot \sqrt{-36} = 7i(6i) = 42i^2 = -42$
15. $\sqrt{-5} \cdot \sqrt{-24} = i\sqrt{5} \cdot i\sqrt{24} = i^2\sqrt{120} = -1\sqrt{4}\sqrt{30} = -2\sqrt{30}$
16. $-\sqrt{-18} \cdot \sqrt{5} = -i\sqrt{18}\sqrt{5} = -i\sqrt{90} = -i\sqrt{9}\sqrt{10} = -3i\sqrt{10}$
17. $(\sqrt{-19})^2 = -19$

Add or subtract the following complex numbers.

18. $(22 + 7i) + (8 - 11i) = 30 - 4i$
19. $(2 + 16i) - (8 - 13i) = -6 + 29i$

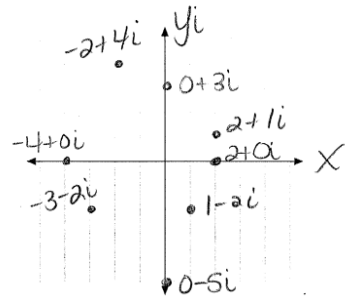
Multiply the following complex numbers.

20. $(3 + 4i)(9 - 6i) = 27 - 18i + 36i - 24i^2$
$= 27 + 18i + 24$
$= 51 + 18i$

21. $(x + 5i)(x - 5i) = x^2 - 5xi + 5xi - 25i^2$
$= x^2 + 25$

Aug 12-3:59 PM

22. Plot and label a complex number in each quadrant and on both axes on the graph below. Be sure to label the axes.



23. Find the real values of x and y if 11x + 8yi = 66 + 72i.

$11x = 66$ $8y = 72$

$x = 6$ $y = 9$

x = 6

y = 9

24. Compute the value of the discriminant of the quadratic equation, and then solve using the quadratic formula.

$8x^2 + 4x + 3 = 0$

Discriminant -80

$b^2 - 4ac = 16 - 4(8)(3)$

$= -80$

$x = \frac{-4 \pm \sqrt{-80}}{2(8)}$

$= \frac{-4 \pm i\sqrt{16}\sqrt{5}}{16}$

$\frac{-4 \pm 4i\sqrt{5}}{16}$

$= \frac{-1 \pm i\sqrt{5}}{4}$

Answer $\left\{-\frac{1}{4} \pm \frac{i\sqrt{5}}{4}\right\}$

14

Aug 12-4:00 PM

25. Solve the equation $2x^2 + 5x + 8 = 0$. Express the answer in a + bi form.

$b^2 - 4ac = 25 - 4(2)(8)$

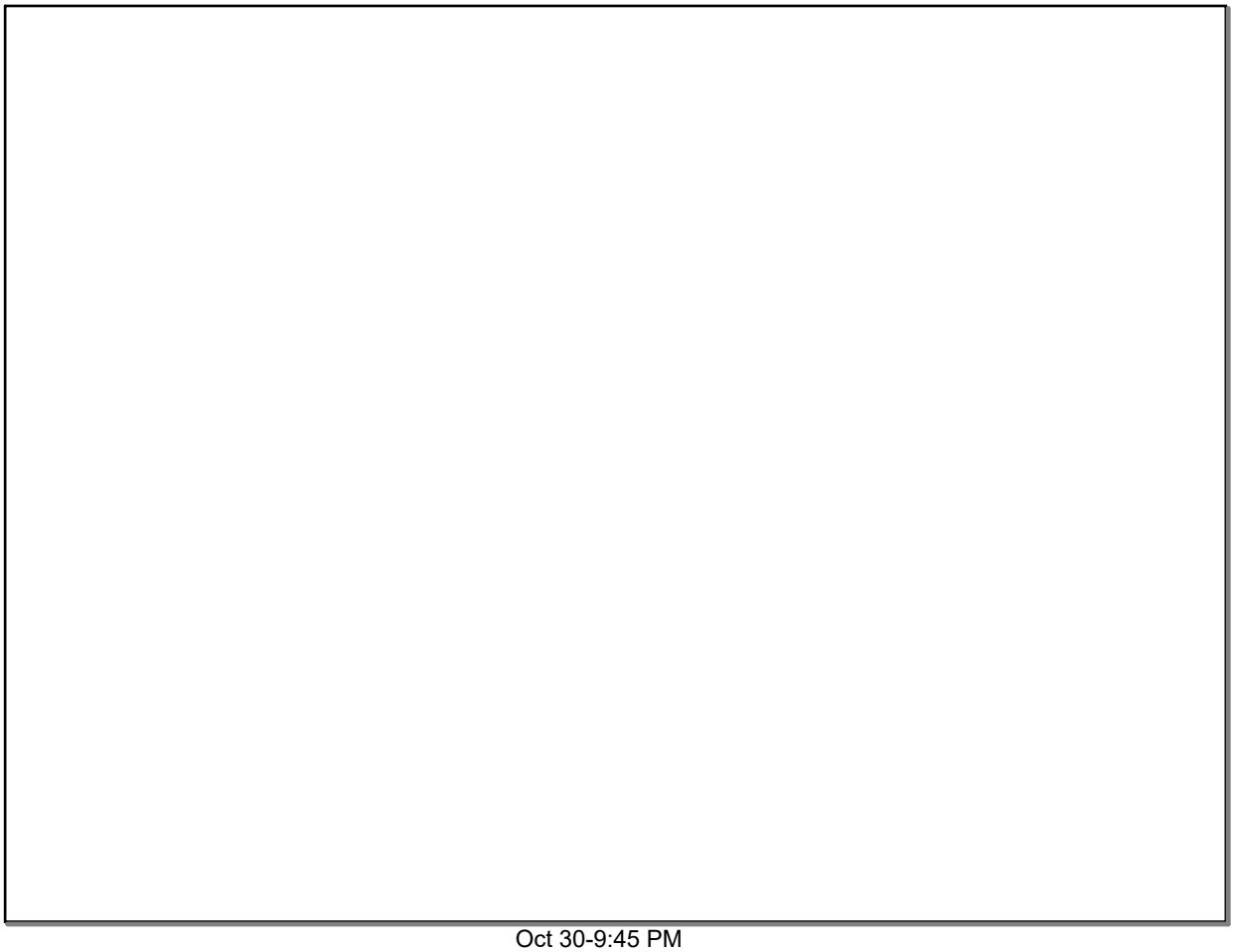
$= -39$

$$x = \frac{-5 \pm \sqrt{-39}}{2(2)}$$

$$x = \frac{-5 \pm i\sqrt{39}}{4}$$

$$x = \frac{-5}{4} \pm \frac{\sqrt{39}}{4}i$$

Jun 26-11:31 AM



Oct 30-9:45 PM