Algebra 2 Quadratics and Complex Numbers Workbook

4 lessons · printable · answer key at the back

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Completing the Square

WORKED EXAMPLE

$x^2 - 2x - 8$

$-2 \div 2 = -1$

$(x - 1)^2 = x^2 - 2x + 1$

$= (x - 1)^2 - 9$

1. Completing the square

Write each expression as $(x + p)^2 + q$.

1 $x^2 + 2x - 2$

2 $x^2 - 12x + 33$

3 $x^2 + 14x + 61$

4 $x^2 + 10x + 33$

5 $x^2 - 12x + 40$

6 $x^2 + 10x + 9$

7 $x^2 + 10x + 18$

8 $x^2 - 4x - 12$

9 $x^2 + 18x + 41$

10 $x^2 - 6x + 15$

11 $x^2 + 20x + 101$

12 $x^2 + 10x + 27$

13 $x^2 + 4x + 2$

14 $x^2 + 12x + 27$

15 $x^2 + 6x + 2$

16 $x^2 - 2x + 16$

17 $x^2 + 10x$

18 $x^2 - 2x + 7$

19 $x^2 + 10x + 37$

20 $x^2 - 10x - 7$

21 $x^2 + 12x + 34$

22 $x^2 - 20x + 128$

2. Logarithms

Work out each logarithm, or find the missing number.

23 $\log_{10} \_\_\_\_\_ = 2$

24 $\log_2 \frac{1}{8} = \_\_\_\_\_$

25 $\log_5 \frac{1}{625} = \_\_\_\_\_$

26 $\log_3 \frac{1}{9} = \_\_\_\_\_$

27 $\log_7 343 = \_\_\_\_\_$

28 $\log_9 \_\_\_\_\_ = 4$

29 $\log_9 \frac{1}{81} = \_\_\_\_\_$

30 $\log_{10} \_\_\_\_\_ = 3$

31 $\log_2 \frac{1}{2048} = \_\_\_\_\_$

32 $\log_7 \frac{1}{49} = \_\_\_\_\_$

How Many Real Solutions

WORKED EXAMPLE

$x^2 + 24x + 144 = 0$

$a = 1, b = 24, c = 144$

$b^2 - 4ac = 24^2 - 4(1)(144)$

$= 0 \rightarrow$ one

3. How many real solutions?

How many real solutions does each equation have? Circle one.

1 $x^2 + 22x + 149 = 0$

2 $x^2 + 12x - 160 = 0$

3 $x^2 - 3x + 98 = 0$

4 $x^2 + 18x + 107 = 0$

5 $x^2 + 2x + 1 = 0$

6 $x^2 + 16x + 65 = 0$

3. How many real solutions? (continued)

How many real solutions does each equation have? Circle one.

7 $x^2 - 34x - 34 = 0$

8 $x^2 - 28x - 147 = 0$

9 $x^2 - 9x - 178 = 0$

10 $x^2 - 20x + 86 = 0$

11 $x^2 - 18x + 81 = 0$

12 $x^2 + 34x + 56 = 0$

13 $x^2 + 15x + 151 = 0$

14 $x^2 + 102 = 0$

15 $x^2 - 9x + 42 = 0$

3. How many real solutions? (continued)

How many real solutions does each equation have? Circle one.

16 $x^2 + 23x - 48 = 0$

17 $x^2 - 6x + 9 = 0$

18 $x^2 - 8x + 72 = 0$

19 $x^2 - 21x - 137 = 0$

20 $x^2 + 24x - 18 = 0$

21 $x^2 - 4x + 4 = 0$

22 $x^2 - 7x + 152 = 0$

23 $x^2 + 17x + 172 = 0$

24 $x^2 + 26x + 90 = 0$

4. Laws of logarithms

Write each of these as one logarithm.

25 $\log_5 2 + \log_5 12 = \log_5 \_\_\_\_$

26 $\log_3 48 - \log_3 6 = \log_3 \_\_\_\_$

27 $\log_2 4 + \log_2 5 = \log_2 \_\_\_\_$

28 $\log_3 14 - \log_3 2 = \log_3 \_\_\_\_$

29 $\log_5 8 + \log_5 9 = \log_5 \_\_\_\_$

30 $2 \log_3 6 = \log_3 \_\_\_\_$

31 $\log_{10} 2 + \log_{10} 6 = \log_{10} \_\_\_\_$

32 $\log_3 24 - \log_3 3 = \log_3 \_\_\_\_$

33 $\log_3 50 - \log_3 5 = \log_3 \_\_\_\_$

34 $4 \log_2 3 = \log_2 \_\_\_\_$

Adding and Subtracting Complex Numbers

WORKED EXAMPLE

(2 − 5i) − (−1 − 3i)

2 − (−1) = 3
−5 − (−3) = −2
= 3 − 2i

5. Complex numbers

Add or subtract each pair of complex numbers.

1 **(1 + 6i) + (1 − 4i)**

2 **(4 + 4i) + (−5 − i)**

3 **(2 + i) + (3 + 2i)**

4 **(2 − 3i) + (5 − 6i)**

5 **(−6 − 3i) + (−2 − 3i)**

6 **(2 + i) + (−4 + 5i)**

7 **(6 + i) + (−4 + 5i)**

8 **(−5 + 5i) + (1 + 3i)**

9 **(2 + 2i) + (−4 − 2i)**

10 **(6 − 6i) − (−1 + 4i)**

11 **(4 + i) + (−4 + 5i)**

12 **(−2 + i) + (−4 + 5i)**

13 **(2 + 3i) + (−5 + 6i)**

14 **(4 − 4i) + (−2 + 4i)**

15 **(5 − 6i) + (−1 + 4i)**

16 **(−2 + 3i) + (2 + 3i)**

17 **(−2 − 5i) − (6 − 6i)**

18 **(−1 − 3i) − (5 − 6i)**

19 **(1 − 6i) + (−1 + 4i)**

20 **(−3 − 6i) + (6 + i)**

21 **(−5 + 2i) − (−4 − 2i)**

22 **(5 − 3i) − (5 − 6i)**

6. Evaluate exponential functions

Evaluate each exponential function at the value given.

23 $f(x) = 3 \cdot 7^x$ **f(0) =** _____

24 $f(x) = 4 \cdot 8^x$ **f(2) =** _____

25 $f(x) = 2 \cdot 4^x$ **f(2) =** _____

26 $f(x) = 8 \cdot 6^x$ **f(3) =** _____

27 $f(x) = 3 \cdot 3^x$ **f(4) =** _____

28 $f(x) = 12 \cdot 3^x$ **f(0) =** _____

29 $f(x) = 4 \cdot 2^x$ **f(5) =** _____

30 $f(x) = 12 \cdot 4^x$ **f(3) =** _____

31 $f(x) = 3 \cdot 4^x$ **f(0) =** _____

32 $f(x) = 5 \cdot 8^x$ **f(2) =** _____

Multiplying Complex Numbers

WORKED EXAMPLE

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

$= 4 - 8i + 8i - 16i^2$

$= 4 + 16 - 8i + 8i$

$= 20$

7. Complex numbers

Multiply each pair of complex numbers.

1 $(3 + 4i)(-5 - i)$

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

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

4 $(6 - 3i)(-2 - 3i)$

5 $(6 - 2i)(-3 + 5i)$

6 $(-5 + 2i)(3 - 5i)$

7 $(-2 - 6i)(-6 - 6i)$

8 $(4 - 3i)(-2 - 3i)$

9 $(-6 - 5i)(6 - 6i)$

10 $(-3 - 4i)(5 + i)$

11 $(-5 - 5i)(6 - 6i)$

12 $(-5 - 6i)(6 + i)$

13 $(4 - 4i)(5 + i)$

14 $(3 + 5i)(-6 + 6i)$

15 $(1 + 3i)(2 + 3i)$

16 $(-4 - 6i)(6 + i)$

17 $(4 - 4i)(-2 + 4i)$

18 $(4 - 6i)(-6 - 6i)$

19 $(-5 + 5i)(1 + 3i)$

20 $(3 - 3i)(5 - 6i)$

21 $(-6 - 3i)(5 - 6i)$

22 $(5 - 5i)(-1 - 3i)$

23 $(-4 + 3i)(-5 + 6i)$

8. Completing the square

Write each expression as $(x + p)^2 + q$.

24 $x^2 + 10x - 15$

25 $x^2 + 8x + 14$

26 $x^2 - 18x + 61$

27 $x^2 + 14x + 57$

28 $x^2 + 24x + 150$

29 $x^2 - 20x + 97$

30 $x^2 - 22x + 119$

31 $x^2 - 4x - 21$

32 $x^2 + 20x + 68$

33 $x^2 + 18x + 81$

Answer Key (1 of 2)

Completing the Square

Completing the square

1. $x^2 + 2x - 2 = (x + 1)^2 - 3$
2. $x^2 - 12x + 33 = (x - 6)^2 - 3$
3. $x^2 + 14x + 61 = (x + 7)^2 + 12$
4. $x^2 + 10x + 33 = (x + 5)^2 + 8$
5. $x^2 - 12x + 40 = (x - 6)^2 + 4$
6. $x^2 + 10x + 9 = (x + 5)^2 - 16$
7. $x^2 + 10x + 18 = (x + 5)^2 - 7$
8. $x^2 - 4x - 12 = (x - 2)^2 - 16$
9. $x^2 + 18x + 41 = (x + 9)^2 - 40$
10. $x^2 - 6x + 15 = (x - 3)^2 + 6$
11. $x^2 + 20x + 101 = (x + 10)^2 + 1$
12. $x^2 + 10x + 27 = (x + 5)^2 + 2$
13. $x^2 + 4x + 2 = (x + 2)^2 - 2$
14. $x^2 + 12x + 27 = (x + 6)^2 - 9$
15. $x^2 + 6x + 2 = (x + 3)^2 - 7$
16. $x^2 - 2x + 16 = (x - 1)^2 + 15$
17. $x^2 + 10x = (x + 5)^2 - 25$
18. $x^2 - 2x + 7 = (x - 1)^2 + 6$
19. $x^2 + 10x + 37 = (x + 5)^2 + 12$
20. $x^2 - 10x - 7 = (x - 5)^2 - 32$
21. $x^2 + 12x + 34 = (x + 6)^2 - 2$
22. $x^2 - 20x + 128 = (x - 10)^2 + 28$

Logarithms

23. $\log_{10} 100 = 2$
24. $\log_2 1/8 = -3$
25. $\log_5 1/625 = -4$
26. $\log_3 1/9 = -2$
27. $\log_7 343 = 3$
28. $\log_9 6561 = 4$
29. $\log_9 1/81 = -2$
30. $\log_{10} 1000 = 3$
31. $\log_2 1/2048 = -11$
32. $\log_7 1/49 = -2$

How Many Real Solutions

How many real solutions?

1. $x^2 + 22x + 149 = 0$: $22^2 - 4 \times 1 \times 149 = 484 - 596 = -112$ → None
2. $x^2 + 12x - 160 = 0$: $12^2 - 4 \times 1 \times -160 = 144 - -640 = 784$ → Two
3. $x^2 - 3x + 98 = 0$: $-3^2 - 4 \times 1 \times 98 = 9 - 392 = -383$ → None
4. $x^2 + 18x + 107 = 0$: $18^2 - 4 \times 1 \times 107 = 324 - 428 = -104$ → None
5. $x^2 + 2x + 1 = 0$: $2^2 - 4 \times 1 \times 1 = 4 - 4 = 0$ → One
6. $x^2 + 16x + 65 = 0$: $16^2 - 4 \times 1 \times 65 = 256 - 260 = -4$ → None
7. $x^2 - 34x - 34 = 0$: $-34^2 - 4 \times 1 \times -34 = 1156 - -136 = 1292$ → Two

How Many Real Solutions (continued)

How many real solutions? (continued)

8. $x^2 - 28x - 147 = 0$: $-28^2 - 4 \times 1 \times -147 = 784 - -588 = 1372$ → Two
9. $x^2 - 9x - 178 = 0$: $-9^2 - 4 \times 1 \times -178 = 81 - -712 = 793$ → Two
10. $x^2 - 20x + 86 = 0$: $-20^2 - 4 \times 1 \times 86 = 400 - 344 = 56$ → Two
11. $x^2 - 18x + 81 = 0$: $-18^2 - 4 \times 1 \times 81 = 324 - 324 = 0$ → One
12. $x^2 + 34x + 56 = 0$: $34^2 - 4 \times 1 \times 56 = 1156 - 224 = 932$ → Two
13. $x^2 + 15x + 151 = 0$: $15^2 - 4 \times 1 \times 151 = 225 - 604 = -379$ → None
14. $x^2 + 102 = 0$: $0^2 - 4 \times 1 \times 102 = 0 - 408 = -408$ → None
15. $x^2 - 9x + 42 = 0$: $-9^2 - 4 \times 1 \times 42 = 81 - 168 = -87$ → None
16. $x^2 + 23x - 48 = 0$: $23^2 - 4 \times 1 \times -48 = 529 - -192 = 721$ → Two
17. $x^2 - 6x + 9 = 0$: $-6^2 - 4 \times 1 \times 9 = 36 - 36 = 0$ → One
18. $x^2 - 8x + 72 = 0$: $-8^2 - 4 \times 1 \times 72 = 64 - 288 = -224$ → None
19. $x^2 - 21x - 137 = 0$: $-21^2 - 4 \times 1 \times -137 = 441 - -548 = 989$ → Two
20. $x^2 + 24x - 18 = 0$: $24^2 - 4 \times 1 \times -18 = 576 - -72 = 648$ → Two
21. $x^2 - 4x + 4 = 0$: $-4^2 - 4 \times 1 \times 4 = 16 - 16 = 0$ → One
22. $x^2 - 7x + 152 = 0$: $-7^2 - 4 \times 1 \times 152 = 49 - 608 = -559$ → None
23. $x^2 + 17x + 172 = 0$: $17^2 - 4 \times 1 \times 172 = 289 - 688 = -399$ → None
24. $x^2 + 26x + 90 = 0$: $26^2 - 4 \times 1 \times 90 = 676 - 360 = 316$ → Two

Laws of logarithms

25. $\log_5 2 + \log_5 12 = \log_5 24$
26. $\log_3 48 - \log_3 6 = \log_3 8$
27. $\log_2 4 + \log_2 5 = \log_2 20$
28. $\log_3 14 - \log_3 2 = \log_3 7$
29. $\log_5 8 + \log_5 9 = \log_5 72$
30. $2 \log_3 6 = \log_3 36$
31. $\log_{10} 2 + \log_{10} 6 = \log_{10} 12$
32. $\log_3 24 - \log_3 3 = \log_3 8$
33. $\log_3 50 - \log_3 5 = \log_3 10$
34. $4 \log_2 3 = \log_2 81$

Adding and Subtracting Complex Numbers

Complex numbers

1. $(1 + 6i) + (1 - 4i) = 2 + 2i$
2. $(4 + 4i) + (-5 - i) = -1 + 3i$
3. $(2 + i) + (3 + 2i) = 5 + 3i$
4. $(2 - 3i) + (5 - 6i) = 7 - 9i$
5. $(-6 - 3i) + (-2 - 3i) = -8 - 6i$
6. $(2 + i) + (-4 + 5i) = -2 + 6i$
7. $(6 + i) + (-4 + 5i) = 2 + 6i$

Answer Key (2 of 2)

Adding and Subtracting Complex Numbers (continued)

Complex numbers (continued)

8. $(-5 + 5i) + (1 + 3i) = -4 + 8i$
9. $(2 + 2i) + (-4 - 2i) = -2$
10. $(6 - 6i) - (-1 + 4i) = 7 - 10i$
11. $(4 + i) + (-4 + 5i) = 6i$
12. $(-2 + i) + (-4 + 5i) = -6 + 6i$
13. $(2 + 3i) + (-5 + 6i) = -3 + 9i$
14. $(4 - 4i) + (-2 + 4i) = 2$
15. $(5 - 6i) + (-1 + 4i) = 4 - 2i$
16. $(-2 + 3i) + (2 + 3i) = 6i$
17. $(-2 - 5i) - (6 - 6i) = -8 + i$
18. $(-1 - 3i) - (5 - 6i) = -6 + 3i$
19. $(1 - 6i) + (-1 + 4i) = -2i$
20. $(-3 - 6i) + (6 + i) = 3 - 5i$
21. $(-5 + 2i) - (-4 - 2i) = -1 + 4i$
22. $(5 - 3i) - (5 - 6i) = 3i$

Evaluate exponential functions

23. $f(x) = 3 \cdot 7^x \rightarrow f(0) = 3$
24. $f(x) = 4 \cdot 8^x \rightarrow f(2) = 256$
25. $f(x) = 2 \cdot 4^x \rightarrow f(2) = 32$
26. $f(x) = 8 \cdot 6^x \rightarrow f(3) = 1728$
27. $f(x) = 3 \cdot 3^x \rightarrow f(4) = 243$
28. $f(x) = 12 \cdot 3^x \rightarrow f(0) = 12$
29. $f(x) = 4 \cdot 2^x \rightarrow f(5) = 128$
30. $f(x) = 12 \cdot 4^x \rightarrow f(3) = 768$
31. $f(x) = 3 \cdot 4^x \rightarrow f(0) = 3$
32. $f(x) = 5 \cdot 8^x \rightarrow f(2) = 320$

Multiplying Complex Numbers

Complex numbers

1. $(3 + 4i)(-5 - i) = -11 - 23i$
2. $(2 - 4i)(-2 + 4i) = 12 + 16i$
3. $(-6 + 6i)(-6 - i) = 42 - 30i$
4. $(6 - 3i)(-2 - 3i) = -21 - 12i$
5. $(6 - 2i)(-3 + 5i) = -8 + 36i$
6. $(-5 + 2i)(3 - 5i) = -5 + 31i$
7. $(-2 - 6i)(-6 - 6i) = -24 + 48i$
8. $(4 - 3i)(-2 - 3i) = -17 - 6i$
9. $(-6 - 5i)(6 - 6i) = -66 + 6i$
10. $(-3 - 4i)(5 + i) = -11 - 23i$
11. $(-5 - 5i)(6 - 6i) = -60$
12. $(-5 - 6i)(6 + i) = -24 - 41i$
13. $(4 - 4i)(5 + i) = 24 - 16i$
14. $(3 + 5i)(-6 + 6i) = -48 - 12i$
15. $(1 + 3i)(2 + 3i) = -7 + 9i$
16. $(-4 - 6i)(6 + i) = -18 - 40i$
17. $(4 - 4i)(-2 + 4i) = 8 + 24i$

Multiplying Complex Numbers (continued)

Complex numbers (continued)

18. $(4 - 6i)(-6 - 6i) = -60 + 12i$
19. $(-5 + 5i)(1 + 3i) = -20 - 10i$
20. $(3 - 3i)(5 - 6i) = -3 - 33i$
21. $(-6 - 3i)(5 - 6i) = -48 + 21i$
22. $(5 - 5i)(-1 - 3i) = -20 - 10i$
23. $(-4 + 3i)(-5 + 6i) = 2 - 39i$

Completing the square

24. $x^2 + 10x - 15 = (x + 5)^2 - 40$
25. $x^2 + 8x + 14 = (x + 4)^2 - 2$
26. $x^2 - 18x + 61 = (x - 9)^2 - 20$
27. $x^2 + 14x + 57 = (x + 7)^2 + 8$
28. $x^2 + 24x + 150 = (x + 12)^2 + 6$
29. $x^2 - 20x + 97 = (x - 10)^2 - 3$
30. $x^2 - 22x + 119 = (x - 11)^2 - 2$
31. $x^2 - 4x - 21 = (x - 2)^2 - 25$
32. $x^2 + 20x + 68 = (x + 10)^2 - 32$
33. $x^2 + 18x + 81 = (x + 9)^2$

Solutions (1 of 5)

Completing the Square

Completing the square

1. $x^2 + 2x - 2$

$$x^2 + 2x - 2 = (x + 1)^2 - 3$$

Halve the middle coefficient. Half of 2 is 1, and that number goes straight into the bracket — sign and all.

But $(x + 1)^2$ is not the expression yet. Multiply it out and it brings a 1 along with it, and the original has -2 there instead.

So give the 1 back: $-2 - 1 = -3$. That is the number that goes after the bracket.

2. $x^2 - 12x + 33$

$$x^2 - 12x + 33 = (x - 6)^2 - 3$$

Halve the middle coefficient. Half of -12 is -6, and that number goes straight into the bracket — sign and all.

But $(x - 6)^2$ is not the expression yet. Multiply it out and it brings a 36 along with it, and the original has 33 there instead.

So give the 36 back: $33 - 36 = -3$. That is the number that goes after the bracket.

Logarithms

23. $\log_{10}$ _____ $= 2$

$$10^2 = 100$$

A logarithm names a power. $\log_{10}$ of a number is 2 when that number IS the 2nd power of 10, so there is nothing to search for — just work the power out.

Solutions (2 of 5)

Completing the Square (continued)

Logarithms (continued)

24. $\log_2 \frac{1}{8} =$ ____

$\log_2 1/8 = -3$

$\log_2 1/8$ asks a question: which power of 2 lands on 1/8? It is not an instruction to divide by 2 — that is the mistake this notation collects.

1/8 is 1 over 8, and a negative exponent is what writes a reciprocal: 2^{-3} means $1 \div 2^3$. So the power that lands on 1/8 is the same one, turned over.

So $\log_2 1/8$ is −3. A logarithm is negative exactly when the number is between 0 and 1 — nothing has gone wrong.

How Many Real Solutions

How many real solutions?

1. $x^2 + 22x + 149 = 0$

$= -112 < 0 \rightarrow$ none

You do not have to solve this to answer it. One number decides how many real solutions a quadratic has, and it is $b^2 - 4ac$ — the part that ends up under the square root sign when you do solve it.

Read off a, b and c from $x^2 + 22x + 149 = 0$: a = 1, b = 22, c = 149. Write all three in, even the a — on this sheet it is 1, and forgetting it is the mistake that only shows up when it is not 1.

Work it out: 22^2 is 484, and $4 \times 1 \times 149$ is 596. That leaves $484 - 596 = -112$.

−112 is below zero, and no real number squares to a negative, so there is nothing to take the square root of. So there are NO real solutions.

Solutions (3 of 5)

How Many Real Solutions (continued)

How many real solutions? (continued)

2. $x^2 + 12x - 160 = 0$

$= 784 > 0 \quad \rightarrow$ **two**

You do not have to solve this to answer it. One number decides how many real solutions a quadratic has, and it is $b^2 - 4ac$ — the part that ends up under the square root sign when you do solve it.

Read off a, b and c from $x^2 + 12x - 160 = 0$: $a = 1$, $b = 12$, $c = -160$. Write all three in, even the a — on this sheet it is 1, and forgetting it is the mistake that only shows up when it is not 1.

Work it out: 12^2 is 144, and $4 \times 1 \times -160$ is -640. That leaves $144 - -640 = 784$.

784 is above zero, and a positive number has two square roots — one either way from the ±. So there are TWO real solutions.

Laws of logarithms

25. $\log_5 2 + \log_5 12 = \log_5$ ____

$\log_5 2 + \log_5 12$

$\log_5 m + \log_5 n = \log_5 (m \times n)$

$2 \times 12 = 24$

$\log_5 2 + \log_5 12 \quad =$ **$\log_5 24$**

Both logarithms are to the same base, 5. That is what makes a law available at all — two logarithms to different bases cannot be combined, and checking the bases match is the first thing to do rather than the last.

A SUM of two logarithms with the same base is the logarithm of the two arguments MULTIPLIED. Adding the logs multiplies the numbers — that is the law, and it is the one worth saying out loud, because the operation changes.

So the two arguments become one: $2 \times 12 = 24$. The answer is $\log_5 24$.

Solutions (4 of 5)

How Many Real Solutions (continued)

Laws of logarithms (continued)

26. $\log_3 48 - \log_3 6 = \log_3$ _____

$$\log_3 48 - \log_3 6$$

$$\log_3 m - \log_3 n = \log_3 (m \div n)$$

$$48 \div 6 = 8$$

$$\log_3 48 - \log_3 6 = \log_3 8$$

Both logarithms are to the same base, 3. That is what makes a law available at all — two logarithms to different bases cannot be combined, and checking the bases match is the first thing to do rather than the last.

A DIFFERENCE of two logarithms with the same base is the logarithm of the first argument DIVIDED by the second. Subtracting the logs divides the numbers, and the order matters: it is the first over the second, never the other way round.

So the two arguments become one: $48 \div 6 = 8$. The answer is $\log_3 8$.

Adding and Subtracting Complex Numbers

Complex numbers

1. $(1 + 6i) + (1 - 4i)$

$$(1 + 6i) + (1 - 4i) = 2 + 2i$$

Add the two REAL parts, and leave the i alone. The real parts are 1 and 1.

Now the two imaginary parts, the same way — this works because i is a number like any other here, so 6 of them plus 4 of them is what it sounds like.

Put the two parts back together: $2 + 2i$.

2. $(4 + 4i) + (-5 - i)$

$$(4 + 4i) + (-5 - i) = -1 + 3i$$

Add the two REAL parts, and leave the i alone. The real parts are 4 and −5.

Now the two imaginary parts, the same way — this works because i is a number like any other here, so 4 of them plus 1 of them is what it sounds like.

Put the two parts back together: $-1 + 3i$.

Solutions (5 of 5)

Adding and Subtracting Complex Numbers (continued)

Evaluate exponential functions

23. $f(x) = 3 \cdot 7^x$ **f(0) =** ___

$$f(0) = 3 \cdot 7^0$$

$$3 \cdot 1 = 3$$

Substitute x = 0: $f(0) = 3 \cdot 7^0$.

Anything to the power 0 is 1, so $7^0 = 1$ and $f(0) = 3 \cdot 1 = 3$.

24. $f(x) = 4 \cdot 8^x$ **f(2) =** ____

$$f(2) = 4 \cdot 8^2$$

$$8^2 = 64$$

$$4 \cdot 64 = 256$$

Substitute x = 2: $f(2) = 4 \cdot 8^2$.

Do the power first: $8^2 = 64$.

Then multiply by the coefficient: $4 \cdot 64 = 256$.