

IM2 - Quadratics Study Guide

1. What is i^{82} equal to?
- $-i$
 - i
 - -1
 - 1

2. What is i^{31} equal to?
- $-i$
 - i
 - -1
 - 1

Simplify the expression.

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

.

4. $(-2 + 4i) + (-1 + 4i)$

.

5. Simplify $\sqrt{-125}$ using the imaginary number i .

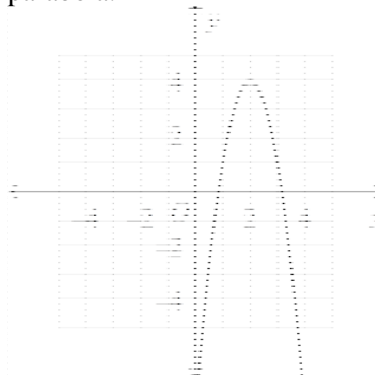
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6. Simplify $\sqrt{-48}$ using the imaginary number i .

.

7. Identify the vertex and the y -intercept of the graph of the function $y = -3(x + 2)^2 + 5$.

8. Use vertex form to write the equation of the parabola.



Write the equation of the parabola in vertex form.

9. vertex $(-3, -2)$, point $(-4, -3)$
- .

Rewrite the equation in vertex form.

10. $y = x^2 + 10x + 16$

.

11. $y = 2(x + 7)(x + 3)$

.

Factor the expression.

12. $3k^2 - 20k - 32$

.

13. $25x^2 - 36$

.

14. Solve by factoring.
 $4x^2 + 28x - 32 = 0$

.

Write the number in the form $a + bi$.

15. $\sqrt{-4} + 10$

.

16. **Write the quadratic formula without looking it up.**

Use the Quadratic Formula to solve the equation. SHOW WORK!!

17. $2x^2 + 5x + 4 = 0$

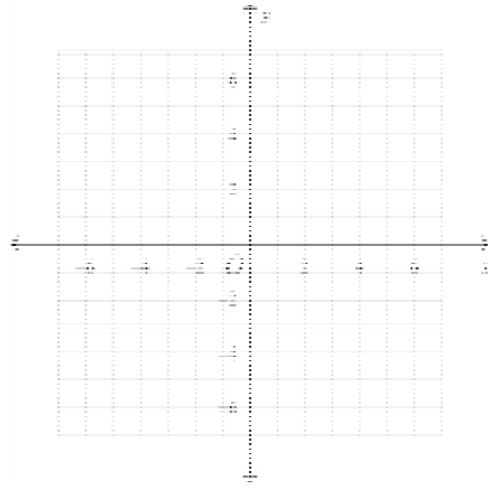
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18. $5x^2 + 9x - 2 = 0$

.

19. $-2x^2 + x + 8 = 0$

20. Graph $y = (x - 5)^2 - 4$.



21. Find the roots of the function $f(x) = 3(x - 4)(x + 7)$

Find the discriminant for the quadratic equations. Then state whether the equation has one real solution, two real solutions, or two imaginary solutions.

22. $x^2 - 6x + 9 = 0$

.

23. $x^2 + 5x + 7 = 0$

.

For each function below, decide which form it's in, whether it opens up or down, and one other piece of information about the graph.

24. $f(x) = -3(x - 5)^2 + 2$

form:

opens:

other:

25. $f(x) = \frac{1}{2}x^2 - 7x + 11$

form:

opens:

other:

26. $f(x) = -15(x - 13)(x + 17)$

form:

opens:

other:

Use the quadratic formula to solve the equation embedded in the word problem. If necessary, round to the nearest hundredth.

27. A rocket is launched from atop a 101-foot cliff with an initial velocity of 116 ft/s.

a. Substitute the values into the vertical motion formula $h = -16t^2 + vt + c$. Let $h = 0$.

.

b. Use the quadratic formula find out how long the rocket will take to hit the ground after it is launched. Round to the nearest tenth of a second.

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28. A landscaper is designing a flower garden in the shape of a trapezoid. She wants the shorter base to be 3 yards greater than the height and the longer base to be 7 yards greater than the height. She wants the area to be 155 square yards. The situation is modeled by the equation
- $h^2 + 5h = 155$
- . Use the Quadratic Formula to find the height that will give the desired area. Round to the nearest hundredth of a yard.

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