

MAT 012

Prof. Clayton

PRACTICE TEST 4

Will not be collected, but will help you prepare for the test.

Use complex numbers as appropriate. (All expressions are defined.)

1. Simplify $\sqrt{-144} =$

2. Add and simplify: $(12 + 5i) + (3 - i)$

3. Subtract and simplify: $(7 - 2i) - (10 - 9i)$

4. Multiply and simplify: $(3 - 4i)(2 + 3i)$

5. Simplify: Give the answer in the form $a + bi$.

$$\frac{2 + 7i}{6i}$$

6. Simplify: Give the answer in the form $a + bi$.

$$\frac{3 - 4i}{2 + 5i}$$

7. Rationalize the denominator $\frac{9\sqrt{7}}{2\sqrt{6}}$ (Make sure to give the answer in lowest terms.)

8. Rationalize the denominator

$$\frac{\sqrt{3} - \sqrt{5}}{\sqrt{5} - \sqrt{2}}$$

9. Rationalize the denominator

$$\frac{4\sqrt{6} - 2\sqrt{3}}{2\sqrt{5} + 3\sqrt{2}}$$

10. Use the **quadratic formula** to solve:

$$3x^2 = 7x - 1$$

(Give an **exact** answer, not a decimal approximation.)

11. Use the **quadratic formula** to solve:

$$5x^2 - 2 = 4x$$

(Give an **approximate** answer rounded to two decimal places)

12. a) Find the domain for the function $f(x) = \sqrt{2x+6}$

b) Solve $1 + \sqrt{2x+6} = x$

c) Show the “checks” to identify extraneous solutions.

d) List the solution(s).

13. Let $f(x) = -2x^2 - 12x - 10$

a) Calculate the vertex (Give the **point**): *Show work. Do NOT just find on your calculator.*

b) Give the **equation** of the axis of symmetry:

c) Give the **vertex-form** of the function:

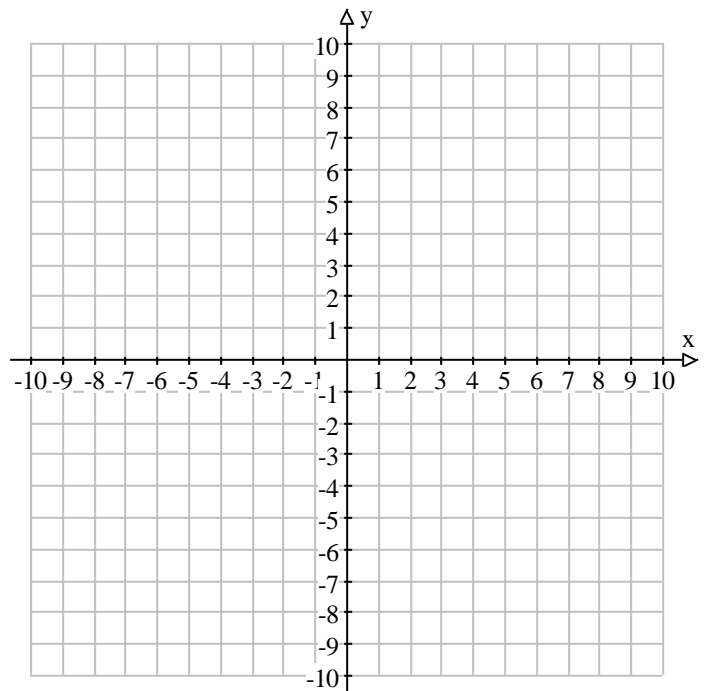
d) Give the y-intercept (give the **point**):

e) Calculate the x-intercepts (Give the **points**): *Show work!*

f) Graph as accurately as possible:

Use at least 5 key-points.

(Showing algebraic work on this part is optional.)



g) This parabola opens _____. This vertex is a _____.

To obtain this function, x^2 is _____ by the “stretch-factor” _____.

The parabola is shifted _____ units to the _____ (horizontal shift).

and _____ units _____ (vertical shift).

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14. Let $f(x) = \frac{1}{2}x^2 - x - \frac{3}{2}$

a) Calculate the vertex (Give the **point**): *Show work. Do NOT just find on your calculator.*

b) equation of the axis of symmetry:

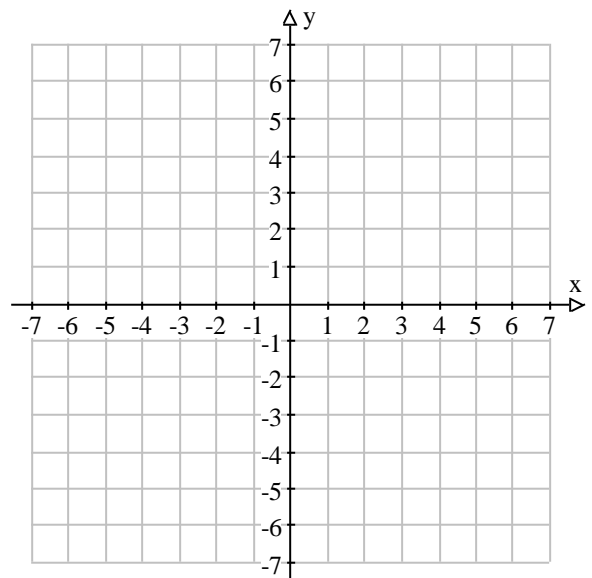
c) vertex-form:

d) y-intercept (Give the point):

e) x-intercepts (Give the points if they exist):

f) Graph as accurately as possible:

*Use at least 5 key-points.
(Showing algebraic work on this part is optional.)*



g) This parabola opens _____. This vertex is a _____.

To obtain this function, x^2 is _____ by the “stretch-factor” _____.

The parabola is shifted _____ units to the _____ (horizontal shift).

and _____ units _____ (vertical shift)

15. $f(x) = 0.6(x-7)^2 + 2$

- a) This parabola opens _____. This vertex is a _____
To obtain this function, x^2 is _____ by the “stretch-factor” _____.
The parabola is shifted _____ units to the _____ (horizontal shift).
and _____ units _____ (vertical shift).
The vertex of the parabola is the point _____.

16. $f(x) = 3(x+2)^2 - 14$

- a) This parabola opens _____. This vertex is a _____
To obtain this function, x^2 is _____ by the “stretch-factor” _____.
The parabola is shifted _____ units to the _____ (horizontal shift).
and _____ units _____ (vertical shift).
The vertex of the parabola is the point _____.

- b) Convert the given vertex form to the standard form $f(x) = ax^2 + bx + c$.

17. Let $f(x) = x^2 - 5$ and $g(x) = 4x - 2$.

- (a) Find $(f \circ g)(x)$ and simplify.

Let $f(x) = x^2 - 5$ and $g(x) = 4x - 2$.

(b) Find $(g \circ f)(x)$ and simplify.

18. Let $f(x) = 2x - 7$ and $g(x) = \sqrt{3 - x}$

a) Give $(f \circ g)(-1)$ and simplify.

Let $f(x) = 2x - 7$ and $g(x) = \sqrt{3 - x}$

b) Give $(g \circ f)(x)$ and simplify.

19. Find the **inverse function** of $f(x) = 2x - 12$. Use appropriate notation to state the inverse function.