

Name: _____

1. Read each question carefully.
2. Please write legibly.
3. TO ENSURE FULL CREDIT, EXPLAIN YOUR WORK FULLY.
4. This exam has **6** pages.
5. The total number of points on this exam is 50.
6. Books and notes are not allowed in this exam.
7. Independent work is expected.

No partial credits from Problem 1 to 5.

(3pts) 1. (i) Find the distance between the two points $(-4, 13)$ and $(2, 11)$:

Answer _____

(ii) Find the midpoint of the line segment with two ends given by the above points:

Answer _____

(iii) Find the equation for the circle with a diameter with two endpoints $(-4, 13)$ and $(2, 11)$.

Answer _____

(4pts) 2. The point $(-2, 3)$ is on the graph of $y = g(x)$.

(i) Find a point on the graph of $h(x) = -2g(x)$. Answer (_____)

(ii) Find a point on the graph of $h(x) = g(x - 1) + 3$. Answer (_____)

(1pts) 3. Solve for b_2 given $A = \frac{1}{2}h(b_1 + b_2)$ (Area of a trapezoid).

The solution $b_2 =$ _____

(2pts) 4. (a) Multiply $(3 + 5i)^2$ and put your answer in the form of $a + bi$

Answer _____

(b) Rewrite the fraction $\frac{2+2i}{3-i}$ in the form of $a + bi$.

Answer _____

(2pts) 5. Consider $f(x) = 2x(x - 1)^2(x + 4)^3$. Then the zeros are _____, and their multiplicities are _____, respectively.

(3pts) 6. Find a linear function $h(x)$ given $h(3) = 4$ and $h(-1) = 2$.

The linear function $h(x) =$ _____

7. Consider the function $f(x) = -x^2 + 6x + 7$

(3pts) (i). Find the vertex, the axis of symmetry,

The vertex _____; the axis _____

(1pts) (ii). Determine any maxima or minima of the function and find the value.

Answer _____

(1pts) (iii). Determine where the function is increasing and where it is decreasing.

(3pts) (iv). Sketch the graph of $f(x)$. (Remember: label x - and y - intercepts (if any))

(19pts) 8. Solve the following equations:

(1). $x^2 - 2x - 8 = 0$

(2). $x^{2/3} - 2x^{1/3} - 8 = 0$

(3). $x - 11\sqrt{x} + 18 = 0$

(4). $\frac{2x}{x+8} = \frac{4}{-x+12}$

(5). $5 + \sqrt{x+7} = x$

(6). $-5 < 3 - 2x \leq 8$ (write the solution set in intervals)

(7). $|\frac{2x+1}{3}| > 5$

(8). $x^2 + x + 2 = 0$

(3pts) 9. Use the **substitution method** to solve the system: (Other method receives zero credit)

$$2x - 3y = -2,$$

$$x + y = 9$$

(5pts) 10. Use the **elimination method** to solve the system: (Other method receives zero credit)

$$x + 2y - z = 5,$$

$$2x - 4y + z = 0,$$

$$3x + 2y + 2z = 3$$

(4pts) 11. Sketch the graph of $f(x) = (x - 2)^2(x + 1)^3$