



MATH 150 - WEEK-IN-REVIEW 2

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PROBLEM STATEMENTS

You should attempt the problems yourself first. The next section contains the solutions.

1. Consider the complex numbers $z_1 = 4 + \sqrt{-18}$ and $z_2 = 2 + \sqrt{-50}$.
 - (a) Write z_1 and z_2 in standard form.
 - (b) Find $z_1 + z_2$, $z_1 - z_2$, and $z_1 z_2$.
 - (c) Find the conjugate of z_2 .
2. Solve the equation by using the quadratic formula. $4x^2 = 4x - 3$
3. Solve the equation $3x^2 + 2x - 3 = 0$ by completing the square.
4. Solve the polynomial equation. $x^3 - 3x^2 - x = -3$
5. Solve the equation $\sqrt{x+7} + \sqrt{3-2x} = 5$ and check your solution(s).
6. Solve the equation $\frac{7}{2x+1} - \frac{8x}{2x-1} = -4$ and check your solution(s).
7. Determine whether each equation represents y as a function of x .
 - (a) $y - 1 = 4x$
 - (b) $x = |2y - 1|$
 - (c) $2x^3 + y^2 = 4$
 - (d) $y^3 - 4x = 6$

8. Consider the function

$$h(x) = \begin{cases} -2x + 4 & , \text{ if } x \leq -1 \\ (x - 2)^2 & , \text{ if } x > -1. \end{cases}$$

Find $h(-2)$, $h(-1)$, and $h(2)$.



9. Find the domain of the following functions.

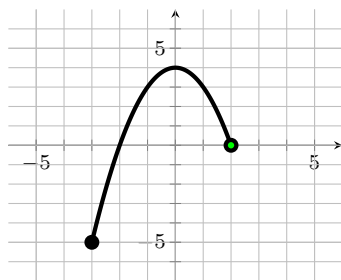
(a) $f(x) = -3x^2 + 5$

(b) $g(x) = \sqrt{4 - 3x}$

(c) $p(x) = \frac{x - 1}{\sqrt{x + 4}}$

(d) $q(x) = \sqrt[3]{4 - 3x}$

10. Use the graph of the function f below to find its domain and range, then find the function values $f(-1)$, $f(2)$, and $f(4)$.



11. Determine whether the function is even, odd, or neither. Then describe the symmetry.

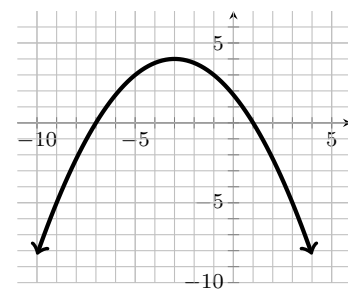
(a) $f(x) = x\sqrt[3]{x^4 + 1}$

(b) $g(x) = \frac{x^4 - 9}{x^2 + 9}$

(c) $h(x) = x^3 - 3x^2$

12. The graph of a function g is given to the right.

- Identify the parent function f .
- Describe the sequence of transformations from f to g .
- Find the function g .
- Use function notation to write g in terms of f .



13. Consider the function $g(x) = 2\sqrt{-x + 3} - 4$.

- Identify the parent function f .
- Describe the sequence of transformations from f to g .
- Use function notation to write g in terms of f .
- Sketch the graph of g .



SOLUTIONS

Click the boxed answer (also in red) to watch the video solution. You can also see them all by viewing the [Week 2 playlist \(clickable link\)](#). You can turn on closed captions by clicking “CC” inside YouTube as well as adjust the video speed inside of “Settings” by clicking the cog in the bottom right of the player.

1. Consider the complex numbers $z_1 = 4 + \sqrt{-18}$ and $z_2 = 2 + \sqrt{-50}$.

(a) Write z_1 and z_2 in standard form.

$$z_1 = 4 + 3\sqrt{2}i, z_2 = 2 + 5\sqrt{2}i$$

(b) Find $z_1 + z_2$, $z_1 - z_2$, and $z_1 z_2$.

$$z_1 + z_2 = 6 + 8\sqrt{2}i, z_1 - z_2 = 2 - 2\sqrt{2}i, \text{ and } z_1 \cdot z_2 = -22 + 26\sqrt{2}i$$

Video errata: On $z_1 + z_2$, $3\sqrt{2} + 5\sqrt{2} = 8\sqrt{2}$ not 7.

(c) Find the conjugate of z_2 .

$$\text{Conjugate of } z_2 = 2 - 5\sqrt{2}i$$

2. Solve the equation by using the quadratic formula. $4x^2 = 4x - 3$

$$x = \frac{4 \pm \sqrt{16 - 48}}{8} = \frac{1 \pm \sqrt{2}}{2}$$

3. Solve the equation $3x^2 + 2x - 3 = 0$ by completing the square.

$$3 \left(x + \frac{1}{9} \right)^2 = \frac{10}{3}, \text{ so } x = \frac{1}{9} \pm \frac{\sqrt{10}}{3}$$

4. Solve the polynomial equation. $x^3 - 3x^2 - x = -3$

$$x = -1, 1, 3$$

5. Solve the equation $\frac{7}{2x+1} - \frac{8x}{2x-1} = -4$ and check your solution(s).

$$x = \frac{11}{6}$$

6. Determine whether each equation represents y as a function of x .

(a) $y - 1 = 4x$

(b) $x = |2y - 1|$

(c) $2x^3 + y^2 = 4$

(d) $y^3 - 4x = 6$

a) Yes, b) No, c) No, d) Yes



7. Consider the function

$$h(x) = \begin{cases} -2x + 4 & , \text{ if } x \leq -1 \\ (x - 2)^2 & , \text{ if } x > -1. \end{cases}$$

Find $h(-2)$, $h(-1)$, and $h(2)$.

$$h(-2) = 8$$

$$h(-1) = 6$$

$$h(2) = 0$$

8. Find the domain of the following functions.

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

(b) $g(x) = \sqrt{4 - 3x}$

(c) $p(x) = \frac{x - 1}{\sqrt{x + 4}}$

(d) $q(x) = \sqrt[3]{4 - 3x}$

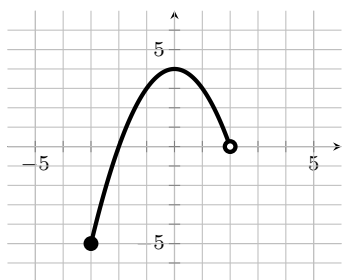
a) D: $(-\infty, \infty)$

b) D: $\left(-\infty, \frac{4}{3}\right]$

c) D: $(-4, \infty)$

d) D: $(-\infty, \infty)$

9. Use the graph of the function f below to find $f(-1)$, $f(2)$, and $f(4)$.



$$f(-1) = 3, f(2) = \text{DNE}, f(4) = \text{DNE}$$

The domain of f is $[-3, 2)$, so $f(2)$ and $f(4)$ are not defined.



10. Determine whether the function is even, odd, or neither. Then describe the symmetry.

(a) $f(x) = x\sqrt[3]{x^4 + 1}$

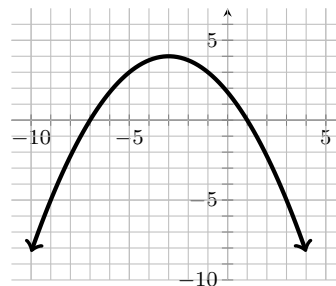
(b) $g(x) = \frac{x^4 - 9}{x^2 + 9}$

(c) $h(x) = x^3 - 3x^2$

a) Odd, b) Even, c) Neither

11. The graph of a function g is given to the right.

- Identify the parent function f .
- Describe the sequence of transformations from f to g .
- Find the function g .
- Use function notation to write g in terms of f .



Parent function: $y = x^2$

Transformations: Vertical shrink by $1/4$ (or horizontal stretch by 2), Reflect over x-axis, Left 3, Up 4

$$g(x) = -\frac{1}{4}(x + 3)^2 + 4$$

$$g(x) = -\frac{1}{4}f(x + 3) + 4$$

12. Consider the function $g(x) = 2\sqrt{-x + 3} - 4$.

- Identify the parent function f .
- Describe the sequence of transformations from f to g .
- Use function notation to write g in terms of f .
- Sketch the graph of g .

Parent function: $y = \sqrt{x}$

Transformations: Reflect over y -axis, Right 3, Vertical stretch by 2, Down 4

OR Left 3, Reflect over y -axis, Vertical stretch by 2, Down 4

$$g(x) = 2f(-x + 3) - 4$$

