

## Math142 Week In Review # 2

### The Most Important Problems to Understand - This Week

1. Which of the following represent functions:

a.  $f(x) = 3x^2 - 2x + 9$

b.  $g(x) = |2x - 1|$

c.  $x = 3y - 2$

d.  $x = y^2 + 2y + 1$

e. The pairing of each student in my class with their phone number.

2. Find the domain of each of the functions below:

a.  $y = \frac{3x + 12}{x^2 - 9}$  2a.:  $\mathcal{R}, x \neq -3, 3$

b.  $y = \sqrt[3]{x + 1}$  2b.  $\mathcal{R}$

c.  $f(x) = \begin{cases} \frac{x + 4}{x^2 - 9}, & x < 0 \\ \frac{x^2 - 16}{x - 4}, & x \geq 1 \end{cases}$  2c.  $\mathcal{R}, (-\infty, -3) \cup (-3, 0) \cup [1, 4) \cup (4, \infty)$

3. Given:  $f(x) = x^2 + 2x + 1$ ,  $g(x) = \sqrt{x - 1}$ , and  $h(x) = \frac{x + 1}{x - 2}$ , evaluate:

a.  $f(2) + g(5) - 6h(3)$  3a.  $-13$

b.  $\left(\frac{f}{h}\right)(10)$  3b.  $88$

c.  $(f \circ g)(10)$  3c.  $16$

4. Find the difference quotient when:

a.  $f(x) = 2x^2 - 3x + 4$  4a.  $4x + 2h - 3$

b.  $g(x) = \frac{x + 2}{x - 3}$  4b.  $\frac{-5}{(x + h - 3)(x - 3)}$

c.  $F(x) = \sqrt{2x + 5}$  4c.  $\frac{2}{\sqrt{2x + 2h + 5} + \sqrt{2x + 5}}$

5. The price-demand function for Helium Balloons INC is  $p = 8 - 0.5x$ . The maximum quantity one can order each day is a dozen. Find the price which maximizes daily revenue.

5. \$4/balloon

6. Describe the function:

a.  $y = 4(x + 2)^2 - 3$

6a. similar to the graph of  $y = x^2$ , shifted left 2, stretched by a factor of 4, shifted down 3

b.  $y = -2\sqrt{x - 1} + 4$

6b. similar to the graph of  $y = \sqrt{x}$ , shifted right 1, stretched by a factor of 2, reflected about the  $x$ -axis, shifted up 4

c.  $y = -|x + 5| + 3$

6c. a rigid transformation of the graph of  $y = |x|$ , shifted left 5, reflected about the  $x$ -axis, and shifted up 3

d.  $y = 4x^2 - 24x + 5$

6d. similar to the graph of  $y = x^2$ , shifted right 3, stretched by a factor of 4, and shifted down 31

7. Find all intercepts:

a.  $y = 2(x - 1)^2 + 3$

7a. (0, 5)

b.  $y = \frac{1}{2}(x + 5)^2 - 8$

7b. (0, 4.5), (-9, 0), (-1, 0)

c.  $y = 4x^2 + 8x - 12$

7c. (0, -12), (-3, 0), (1, 0)

8. Helium Balloon INC (see above) has fixed costs of \$10/day and variable costs of \$2/balloon. Find the break even point(s).

8. (2, 14), (10, 30)

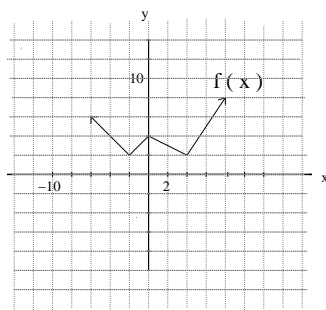
9. Using the graph of  $f(x)$  below, sketch the graph of each of the following functions.

a.  $y = -f(x - 2)$

9a. answer

b.  $y = 2f(x) + 3$

9b. answer



10. Write the equation of the parabola which opens up, passes through the point  $(-4, 8)$  and has a vertex at  $(1, -2)$ .

10.  $y = \frac{2}{5}(x - 1)^2 - 2$

11. Given  $p(x) = 105.7 - 0.89x$  and variable costs are \$80/unit and fixed costs are \$61.80.

a. Find the cost equation.

11a.  $C = 61.80 + 80x$

b. Find the revenue equation.

11b.  $R = 105.7x - 0.89x^2$

c. Find the profit equation.

11c.  $P = 25.7x - 0.89x^2 - 61.80$

d. Find the break even point.

11c.  $x \approx 2.64738 \dots, x \approx 26.22902 \dots$

12. Determine if each of the following is a polynomial:

a.  $f(x) = 5x^2 - \pi x + 4$

12a. Yes, a polynomial.

b.  $g(x) = 3x - \frac{2}{x^{-3}} + 10$

12b. Yes, a polynomial.

c.  $h(x) = \sqrt{16x^3}$

12a. No, not a polynomial.

d.  $F(x) = 3ix^2 + 9$

12a. No, not a polynomial.

e.  $G(x) = \frac{x^2 - 4x - 12}{x^2 - 6x + 9}$

12a. No, not a polynomial.