

## SEW Review 2

1. Find all values of  $x$  that are NOT in the domain of the following functions.

$$f(x) = \frac{3x}{2x - 10}$$

$$g(x) = \frac{x^2 + 2x - 63}{x^2 - 49}$$

2. Simplify.

$$\frac{7(2w + 5)(w + 6)}{21(w + 4)(2w + 5)}$$

$$\frac{x - 8}{x^2 - 64}$$

$$\frac{4u^2 - 100}{u^2 - 8u + 15}$$

3. Perform the operation and simplify.

$$\frac{2y}{3a} \cdot \frac{9ay}{10y^5}$$

$$\frac{4x - 20}{45x - 40} \cdot \frac{9x - 8}{2x - 10}$$

$$\frac{x - 1}{x^2 - x - 6} \cdot \frac{4x + 8}{x - 2}$$

$$\frac{x^2 - 3x + 2}{x^2 + 5x + 6} \div \frac{4x - 8}{x + 2}$$

$$\frac{c^2 - 9c}{c^2 - c - 12} + \frac{3c + 8}{c^2 - c - 12}$$

$$\frac{5}{6y} - \frac{9}{8y^2}$$

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

$$\frac{4}{3x^2 + 2x - 1} + \frac{2}{3x^2 - 4x + 1}$$

$$\frac{15s^4}{3t^5u^3} \cdot \frac{5rs^2}{9t^2u}$$

$$7 - \frac{2}{5y} - \left(3 - \frac{2}{5y}\right)$$

$$\frac{1 - \frac{3}{x + 6}}{\frac{9}{x + 6} + x}$$

$$\frac{1}{u^{-1} - v^2}$$

4. Evaluate

$$256^{\frac{1}{4}}$$

$$27^{\frac{1}{3}}$$

$$(-8)^{\frac{1}{3}}$$

$$81^{-\frac{1}{4}}$$

5. Simplify.

$$w^{\frac{5}{7}} \cdot w^{\frac{3}{4}}$$

$$\frac{u^{\frac{1}{2}}}{u^{\frac{6}{7}}}$$

$$\sqrt{27u^{14}}$$

$$\sqrt{54x^{13}}$$

$$\sqrt{8t^5y^8}$$

$$\sqrt[3]{40t^8w^3}$$

$$\sqrt{75} - 3\sqrt{27}$$

$$4z\sqrt{32z} + \sqrt{18z^3}$$

$$\sqrt{5z} \cdot \sqrt{7z}$$

$$\sqrt[3]{12u^2} \cdot \sqrt[3]{9u^5}$$

$$(\sqrt{x} - \sqrt{2})(\sqrt{x} + \sqrt{2})$$

$$(x + 2\sqrt{2})^2$$

$$\sqrt[4]{y} \cdot \sqrt[3]{y^2}$$

6. Solve. Remember to check your solutions.

$$\sqrt{3y+18} + 2 = 5$$

$$\sqrt{5x+10} = \sqrt{7x-12}$$

$$\sqrt{11y-30} = y$$

$$u - 5 = \sqrt{49 - 8u}$$

7. Perform the operation and simplify. Write your solution in  $a + bi$  form.

$$(6 - 2i) + (4 + 3i)$$

$$(3 - 7i) - (5 + 4i)$$

$$(-3 + 6i)(-4 + 3i)$$

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

8. Solve. You may need to use the quadratic formula.

$$(v - 7)^2 - 32 = 0$$

$$(w + 9)^2 - 45 = 0$$

$$2x^2 + 5x - 1$$

$$4x^2 - 9x + 3 = 0$$

$$3x^2 + 5x = 3$$

$$2x^2 - 3x + 6 = 0$$

9. A model rocket is launched with an initial upward velocity of  $235 \frac{ft}{sec}$ . The rocket's height  $h$  (in feet) after  $t$  seconds is given by  $h = 235t - 16t^2$ .

Find all values of  $t$  for which the rocket's height is 151 ft.

10. Graph the following functions. Make sure to label the vertex.

$$g(x) = -2x^2$$

$$h(x) = 3x^2 - 1$$

$$y = (x - 1)^2 - 3$$

11. State the vertex and  $x$ -intercepts of the following functions, then use them to graph the function.

$$y = x^2 - 4x - 21$$

$$y = x^2 - 8x + 12$$

12. Given  $f(x) = -2x^2 + 16x - 34$ , answer the following.

Does the function have a minimum or a maximum value?

At what  $x$  value does the min/max occur?

What is the min/max value?

13. A supply company manufactures copy machines. The unit cost  $C$  (cost in dollars to make each copy machine) depends on the number of machines made. If  $x$  machines are made, then the unit cost is given by  $C(x) = 0.5x^2 - 170x + 25,850$ . What is the minimum unit cost?

$$14. \quad s(x) = 3x + 6 \qquad t(x) = 4x \qquad u(x) = x^2 + 7 \qquad w(x) = \sqrt{x + 8}$$

Given the functions defined above, find the following expressions.

$$(s + t)(x) \qquad (s \cdot t)(x) \qquad (s - t)(4)$$

$$w(u(x)) \qquad w(u(1)) \qquad u(w(1))$$

15. For each pair of functions below, find  $f(g(x))$  and  $g(f(x))$ . Then determine whether  $f$  and  $g$  are inverses of each other.

$$f(x) = \frac{6}{x} \qquad f(x) = 2x + 3 \qquad f(x) = \frac{x + 7}{5}$$

$$g(x) = \frac{6}{x} \qquad g(x) = 2x - 3 \qquad g(x) = 5x - 7$$

16.  $h$  is a one-to-one function. Find  $h^{-1}(x)$ .

$$h(x) = 4x + 3 \qquad h(x) = 5x^3 + 7 \qquad h(x) = \sqrt[3]{2x + 5}$$

17.  $f$  is a one-to-one function,  $f(x) = \sqrt{x + 5} + 4$ .

Find the domain and range of  $f(x)$ . Then find  $f^{-1}(x)$  and its domain.