

4. Describe the transformation of the parent function $y = |x|$ in the equation $y = -2|x + 4| - 3$. (Sec. 2.7)

horizontal shift 4 units left
vertical shift 3 units down
stretch factor of 2

reflected
over x-axis

5. Identify the vertex, axis of symmetry, domain, and range for the function. (Sec. 4.1)

$$y = 4(x + 2)^2 - 6$$

$$V: (-2, -6)$$

$$\text{axis: } x = -2$$

$$D: x = \mathbb{R}$$

$$R: y \geq -6$$

6. Solve by factoring: (Sec. 4.5)

a. $x^2 - 8x = -12$

$$x^2 - 8x + 12 = 0$$

$$(x - 6)(x - 2) = 0$$

$$x = 6 \text{ or } x = 2$$

b. $3x^2 + 11x - 20 = 0$

$$(3x - 4)(x + 5) = 0$$

$$x = \frac{4}{3} \text{ or } x = -5$$

7. Write the expression in standard form. State the degree of the polynomial. (Sec. 5.1)

$$y = 2x^3 - 6x + 3x^2 - x^4 + 12$$

$$y = -x^4 + 2x^3 + 3x^2 - 6x + 12$$

4th degree: quartic

8. State the zeros and their multiplicities of the following polynomial. (Sec. 5.2)

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

$$x = 0$$

$$x = 4$$

$$x = -\frac{3}{2}$$

mult. 1

mult 1

mult 2

9. Determine the equation of the cubic function obtained from the parent function $y = x^3$ after a translation 1 unit up and 2 units right. (Sec. 5.9)

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

10. Simplify: (Sec. 6.4)

a. $27^{\frac{2}{3}}$
 $(27^{\frac{1}{3}})^2$
 $(3)^2$
 9

b. $(8y)^{\frac{1}{3}}$
 $8^{\frac{1}{3}}y^{\frac{1}{3}}$
 $2y^{\frac{1}{3}}$

c. $(x^{\frac{1}{3}})^{-18}$
 x^{-6}
 $\frac{1}{x^6}$

11. Determine whether the equations represent exponential growth or exponential decay. (Sec. 7.1)

a. $y = 0.2(3.8)^x$

growth

b. $y = 100(0.5)^x$

decay

12. Write in logarithmic form: $6^4 = 1296$ *$\log_6 1296 = 4$* (Sec. 7.3)

Write in exponential form: $\log_2 16 = 4$ *$2^4 = 16$*

13. Evaluate each logarithm. (Sec. 7.3)

a. $\log_4 64$

3

b. $\log 10,000$

4

c. $\log_2 32$

5

d. $\log_3 \frac{1}{27}$

-3

14. Express each as a single logarithm. (Sec. 7.4)

a. $4 \log x + \log 7$

*$\log x^4 + \log 7$
 $\log 7x^4$*

b. $\log 5 - 3 \log x$

*$\log 5 - \log x^3$
 $\log \frac{5}{x^3}$*

15. Determine any vertical asymptotes or holes in the given equations. (Sec. 8.3)

a. $y = \frac{x^2+x-6}{x^2-x-2}$ *$\frac{(x+3)(x-2)}{(x-2)(x+1)}$*

*hole: $x=2$
v.a.: $x=-1$*

b. $y = \frac{x^2-4}{x+2}$ *$\frac{(x+2)(x-2)}{x+2}$*

hole: $x=-2$

16. Find the horizontal asymptotes (if any) of the graph of each rational function. (Sec. 8.3)

a. $y = \frac{2x^2+3x-1}{x^2+5}$

*same degree =
coeff of ratios
 $y=2$*

b. $y = \frac{4x}{x^3-10}$

*larger degree in
denom than x-axis
 $y=0$*

c. $y = \frac{x^4+3}{x}$

*larger degree
in num than
none
NONE*

17. Simplify: (Sec. 8.5)

*$x \cdot 2 - \frac{2}{x} \cdot x$
 $x \cdot 3 - \frac{1}{x} \cdot x$* $\frac{2x-2}{3x-1} = \frac{2(x-1)}{3x-1}$