

Review

1. Evaluate each expression without using a calculator:

(a) $(-3)^4$

(c) 3^{-4}

(e) $(\frac{2}{3})^{-2}$

(b) -3^4

(d) $\frac{5^{23}}{5^{21}}$

(f) $16^{-3/4}$

2. Simplify each rational expression:

(a) $\frac{x^2+3x+2}{x^2-x-2}$

(c) $\frac{x^2}{x^2-4} - \frac{x+1}{x+2}$

(b) $\frac{2x^2-x-1}{x^2-9} \cdot \frac{x+3}{2x+1}$

(d) $\frac{\frac{y-x}{x-y}}{\frac{1}{y}-\frac{1}{x}}$

3. Solve each inequality. Write your answer using interval notation.

(a) $-4 < 5 - 3x \leq 17$

(c) $x(x-1)(x+2) > 0$

(e) $\frac{2x-3}{x+1} \leq 1$

(b) $x^2 < 2x + 8$

(d) $|x - 4| < 3$

4. Find an equation for the line that passes through the point (2, -5) and

(a) has slope -3

(c) is parallel to the y-axis

(b) is parallel to the x-axis

(d) is parallel to the line $2x - 4y = 3$.

5. Find the center and radius of the circle with equation $x^2 + y^2 - 6x + 10y + 9 = 0$.

6. Let $A(-7, 4)$ and $B(5, -12)$ be points in the plane.

(a) Find the slope of the line that contains A and B .

(b) Find an equation of the line that passes through A and B . What are the intercepts?

(c) Find the midpoint of the segment AB .

(d) Find the length of the segment AB .

(e) Find an equation of the perpendicular bisector of AB .

(f) Find an equation of the circle for which AB is a diameter.

7. Find the domain of the function.

(a) $f(x) = \frac{2x+1}{x^2+x-2}$

(b) $g(x) = \frac{\sqrt[3]{x}}{x^2+1}$

(c) $h(x) = \sqrt{4-x} + \sqrt{x^2-1}$

8. Without using a calculator, make a rough sketch of the graph.

(a) $y = x^3$

(d) $y = 4 - x^2$

(g) $y = -2^x$

(b) $y = (x+1)^3$

(e) $y = \sqrt{x}$

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

(f) $y = 2\sqrt{x}$

(h) $y = 1 + x^{-1}$

9. If $\sin(x) = \frac{1}{3}$ and $\sec(y) = \frac{5}{4}$, where x and y lie between 0 and $\pi/2$, evaluate $\sin(x+y)$.

10. Prove the identities:

(a) $\tan(\theta) \sin(\theta) + \cos(\theta) = \sec(\theta)$

(b) $\frac{2 \tan(x)}{1 + \tan^2(x)} = \sin(2x)$