A1 Evaluate each expression without using a calculator:

$$\text{(a) } (-3)^4 \qquad \text{(b) } -3^4 \qquad \text{(c) } 3^{-4}$$

$$\text{(d) } \frac{5^{23}}{5^{21}} \qquad \text{(e) } \left(\frac{2}{3}\right)^{-2} \qquad \text{(f) } 16^{-3/4}$$

A5 Simplify each rational expression.

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

$$\text{(c) } \frac{x^2}{x^2-4} - \frac{x+1}{x+2} \qquad \text{(d) } \frac{\frac{y}{x}-\frac{x}{y}}{\frac{1}{y}-\frac{1}{x}}$$

A9 Solve each inequality. Write your answer using interval notation.

$$\text{(a) } -4 < 5-3x \le 17 \qquad \text{(b) } x^2 < 2x+8$$

$$\text{(c) } x(x-1)(x+2) > 0 \qquad \text{(d) } |x-4| < 3$$

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

B1 Find an equation for the line that passes through the point $(2,-5)$ and...

1. ...has slope -3.
2. ...is parallel to the x-axis.
3. ...is parallel to the y-axis.
4. ...is parallel to the line $2x-4y=3$.

B3 Find the center and radius of the circle with equation $x^2+y^2-6x+10y+9=0$.

B4 Let $A(-7,4)$ and $B(5,-12)$ be points in the plane.

1. Find the slope of the line that contains A and B.
2. Find an equation of the line that passes through A and B. What are the intercepts?
3. Find the midpoint of the segment AB.
4. Find the length of the segment AB.
5. Find an equation for the perpendicular bisector of AB.
6. Find an equation of the circle for which AB is a diameter.

C3 Find the domain of the function

$$\text{(a) } f(x) = \frac{2x+1}{x^2+x-2} \qquad \text{(b) } g(x) = \frac{\sqrt[3]{x}}{x^2+1} \qquad \text{(c) } h(x) = \sqrt{4-x} + \sqrt{x^2-1}$$

C5 Without using a calculator, make a rough sketch of the graph.

$$\text{(a) } y = x^3 \qquad \text{(b) } y = (x+1)^3 \qquad \text{(c) } y = (x-2)^3 + 3$$

$$\text{(d) } y = 4 - x^2 \qquad \text{(e) } y = \sqrt{x} \qquad \text{(f) } y = 2\sqrt{x}$$

$$\text{(g) } y = -2^x \qquad \text{(h) } y = 1 + x^{-1}$$

D6 If $\sin x = \frac{1}{3}$ and $\sec y = \frac{5}{4}$, where x and y lie between 0 and $\pi/2$, evaluate $\sin(x+y)$.

D7 Prove the identities.

1. $\tan\theta \sin\theta + \cos\theta = \sec\theta$
2. $\frac{2\tan x}{1+\tan^2 x} = \sin 2x$

These problems are from pages xxiv-xxviii of the textbook.