

1) Sketch and label the following functions on the same graph.

$$y = x^2$$

$$y = x^2 + 4$$

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

$$y = (x + 5)^2 - 4$$

$$y = (x - 2) + 5$$

2) Sketch and label the function.  $y = \begin{cases} 3 & x < 0 \\ x & 0 \leq x < 2 \\ x^2 - 2 & 2 \leq x \end{cases}$

3) What is the slope of the line through the points (5, -2) and (7, 9) ?

4) What is the equation of the line through the points (1, -2) (5, 7) ?

5) What is the slope of the line  $3x + 7y = 19$  ?

6) What is the equation of the line through the point (2,8) parallel to the line  $y = -2x + 7$  ?

7) What is the equation of the line through the point (-3, 5) perpendicular to the line  $5x + 6y = 11$  ?

8) The IRS allows "straight line depreciation" for certain things when filing taxes and computing business expenses. The value  $V$  of a new car is \$24,000, and the value is zero in 7 years. Write an equation in which the value  $V$  of the car is a function of time  $T$  in years past the purchase year.

9) Find the equation of the line through the points (2.34, -5.92) (16.1, 2.13).

10) In a certain state, the tax rate is zero for income less than \$10,000, 5% for income greater than or equal to \$10,000 yet less than \$60,000, and the rate is 7% for income greater than or equal to \$60,000. Express Tax  $T$  as a function of income  $x$  using a piecewise defined function. Adjust the formula so that this function is continuous. For example, tax is \$0 for an income of \$9,999.99, but one penny more of income results in a tax of 5% on \$10,000 which is \$500. Thus, instead of taxing income at  $.05x$  for  $10000 \leq x < 60000$ , we tax this range of incomes at  $.05x - 500$ .