2.4 Representing Functions

1) The variable cost is the part of the total cost that *varies*, just as its name implies. If the total cost is a function, the variable cost is determined by the value of the independent variable. The fixed cost is the part of the total cost that remains *constant*, or *fixed*. If the total cost represents a function, the fixed cost is not affected by the value of the independent variable.

3) Answers will vary. Here is an example: A lawn care company charges $20 for every lawn mowed plus $10 for every hour they spend working. The variable cost = 10 number of hours worked. The fixed cost = $20.

5)

a) Let C = total cost (in $).
Let b be the number of boxes delivered.
$C = 10b + 25$

b) Independent variable = b
Dependent variable = C

c)

No. Boxes	Total Cost ($)
0	25
2	45
4	65
6	85
8	105

d)

No. Boxes	Total Cost ($)
10	125
20	225
30	325
40	425
50	525
60	625
70	725

7)

a) $Y_1 = 10X + 25$

b) The purpose of a “friendly” window is to: one, find a screen that shows all our data and two, provide a screen that traces with minimal decimals. In choosing your own “friendly” window, as is often required for real life problems, you can use figure 4 to find Xmin, Xmax, and Xscl. Then choose Ymin and Ymax outside your *y* data limits.

Xmin = 0　　Xmax = 94　　Xscl = 10
Ymin = 0　　Ymax = 80　　Yscl = 10

c) If X = 35, then Y = 375, which means a shipment of 35 boxes cost $375.

d) The graph appears different (it appears to be steeper) because our view of the portion of the x-axis has doubled, thus causing the location of the y-values for these x-values—on our original graph—to shift closer to the y-axis.

9)

a) PIXELWIDTH = $\frac{X\max - X\min}{158}$

b) PIXELHEIGHT = $\frac{Y\max - Y\min}{98}$

c) Xmin = 0
Xmax = 474

PIXELWIDTH = $\frac{474-0}{158} = \frac{474}{158} = 3$

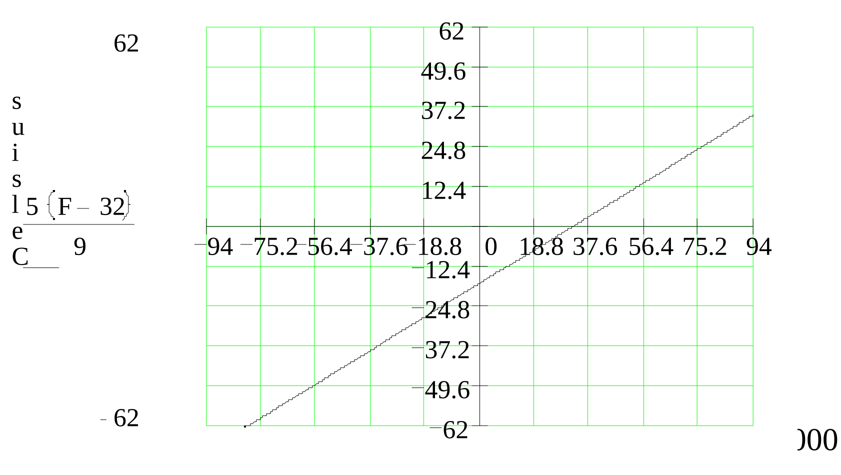
11)

a)

°Fahrenheit	°Celsius
10	¯12.2
30	¯1.1
50	10
70	21.1
90	32.2

b) There are many friendly window settings. Here is one of them:
Xmin = 0 Xmax = 94 Xscl = 10
Ymin = ¯20 Ymax = 40 Yscl = 10

c)



13) Let G be the number of gallons of paint required to paint the wall [dependent variable]. Let A be the area of the wall (in ft ^{2}) [independent variable].

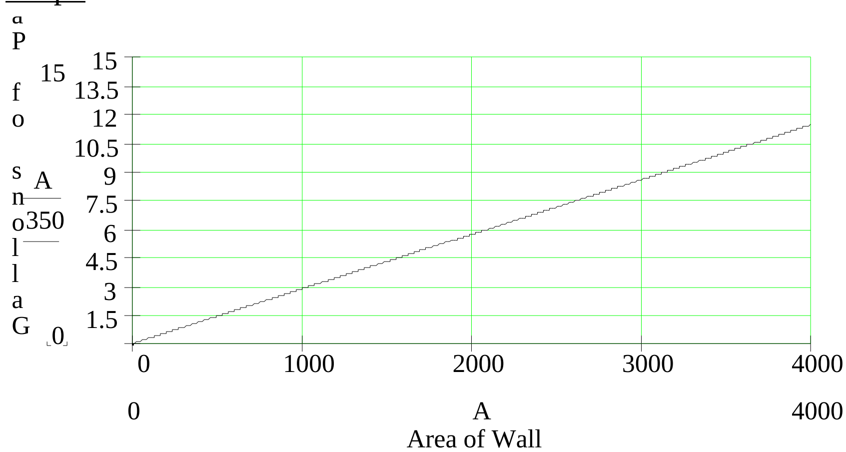
1. Formula

$$G = \frac{A}{350} = \frac{1}{350} A$$

2. Table of Values

Area of Wall (ft ^{2})	Gallons of Paint Needed
1000	2.86
2000	5.71
3000	8.57
4000	11.43

3. Graph



15)

1. Formula

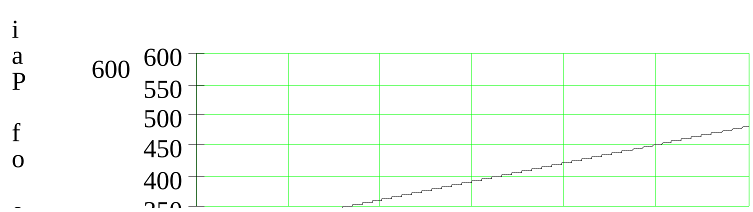
Let P be the price of the painting [dependent variable].
Let t be the age of the painting (in years) [independent variable].

$$P = 30t + 300$$

2. Table of Values

Age of Painting (yrs)	Price of Painting ($)
0	300
1	330
2	360
3	390
4	420
5	450

3. Graph



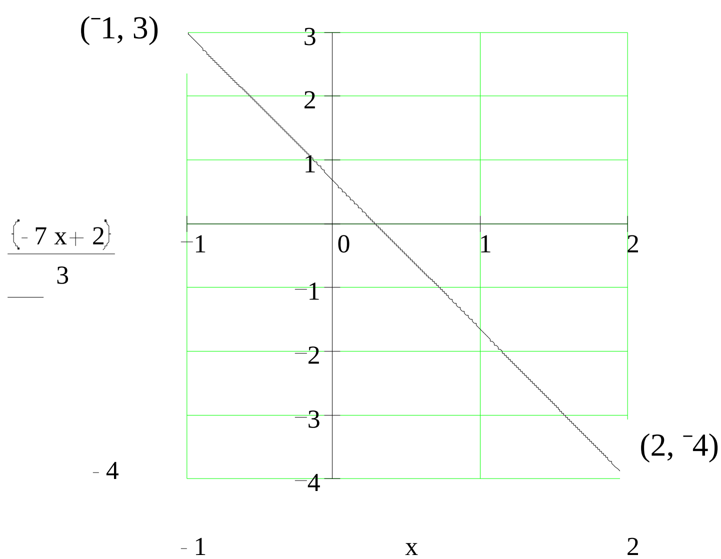
Skill and Review

17)

a) $P = 2\ (5.2\text{ in}) + 2\ (3.8\text{ in}) = 10.4\text{ in} + 7.6\text{ in} = 18\text{ in}$

b) $A = (5.2\text{ in})\ (3.8\text{ in}) = 19.76\text{ in}^2$

19)



a) Rise = $^{-}4 - 3 = {}^{-}4 + {}^{-}3 = {}^{-}7$

Run = $2 - {}^{-}1 = 2 + 1 = 3$

b) $\text{DIATANCE} = \sqrt{(\text{RISE})^2 + (\text{RUN})^2} = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

$D = \sqrt{[(-4) - 3]^2 + [2 - (-1)]^2}$

$$D = \sqrt{[-4 + (-3)]^2 + (2 + 1)^2}$$

$$D = \sqrt{(-7)^2 + (3)^2} = \sqrt{49 + 9} = \sqrt{58} \approx 7.62$$

c) $$D = \sqrt{\text{Run}^2 + \text{Rise}^2}$$

