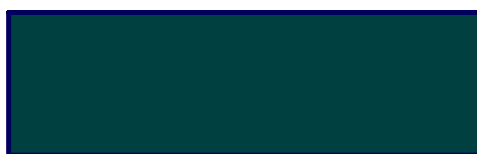


Chapter 4

Linear Relations

A little practice to start!!

$$P = 4x$$

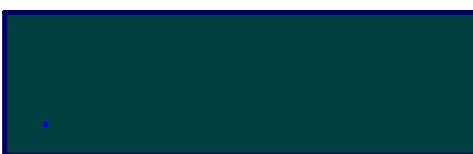


$$P = 4(5)$$

$$P = 20$$

A little more practice!! :)

$$R = 2x - 4$$



$$\begin{aligned} R &= 2(10) - 4 \\ &= 20 - 4 \\ &= 16 \end{aligned}$$

Can you see the pattern?

First

Second

Third

Can you see the pattern?

| x | y |
|---|----|
| 1 | 6 |
| 2 | 8 |
| 3 | 10 |
| 4 | 12 |

Make the equation using the pattern?

| X | Y |
|---|----|
| 1 | 10 |
| 2 | 18 |
| 3 | 26 |
| 4 | 34 |

a) Determine the pattern $+8$

b) Make the adjustment

$+2$

c) State the equation

$$y = 8x + 2$$

Make the equation using the pattern?

| x m | y h |
|------------|------------|
| 1 | 21 |
| 2 | 32 |
| 3 | 43 |
| 4 | 54 |

Handwritten notes: A blue 'x' is above the 'm' column and a blue 'y' is above the 'h' column. A blue '11' is written next to the first row. Blue arrows point from the first row to the second, and from the second to the third, with a '+11' written next to the first arrow.

a) Determine the pattern $+11$

b) Make the adjustment

$$+10$$

c) State the equation

$$y = 11x + 10$$

$$h = 11m + 10$$

Make the equation using the pattern?

| x r | y s |
|------------|------------|
| 5 | <u>56</u> |
| 6 | 70 |
| 7 | 84 |
| 8 | 98 |

(70)

a) Determine the pattern

+14

b) Make the adjustment

-14

c) State the equation

★d) Use your equation to determine

the value of "s" when $r = 200$

$$y = 14x - 14$$

$$s = 14r - 14$$

$$s = 14(200) - 14$$

$$s = 2800 - 14$$

$$s = 2786$$

Section 4.1

Writing Equations to Describe Patterns

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|--|--|--|----|--|----|--|-----|--|------|--|------|--|------|--|------|--|------|--|------|--|------|--|-----|--|----|--|----|--|---|
| | | | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | 1 | | 1 | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | 1 | | 2 | | 1 | | | | | | | | | | | | | | | | | | | | | | |
| | | | | 1 | | 3 | | 3 | | 1 | | | | | | | | | | | | | | | | | | | | |
| | | | | 1 | | 4 | | 6 | | 4 | | 1 | | | | | | | | | | | | | | | | | | |
| | | | | 1 | | 5 | | 10 | | 10 | | 5 | | 1 | | | | | | | | | | | | | | | | |
| | | | | 1 | | 6 | | 15 | | 20 | | 15 | | 6 | | 1 | | | | | | | | | | | | | | |
| | | | | 1 | | 7 | | 21 | | 35 | | 35 | | 21 | | 7 | | 1 | | | | | | | | | | | | |
| | | | | 1 | | 8 | | 28 | | 56 | | 70 | | 56 | | 28 | | 8 | | 1 | | | | | | | | | | |
| | | | | 1 | | 9 | | 36 | | 84 | | 126 | | 126 | | 84 | | 36 | | 9 | | 1 | | | | | | | | |
| | | | | 1 | | 10 | | 45 | | 120 | | 210 | | 252 | | 210 | | 120 | | 45 | | 10 | | 1 | | | | | | |
| | | | | 1 | | 11 | | 55 | | 165 | | 330 | | 462 | | 462 | | 330 | | 165 | | 55 | | 11 | | 1 | | | | |
| | | | | 1 | | 12 | | 66 | | 220 | | 495 | | 792 | | 924 | | 792 | | 495 | | 220 | | 66 | | 12 | | 1 | | |
| | | | | 1 | | 13 | | 78 | | 286 | | 715 | | 1287 | | 1716 | | 1716 | | 1287 | | 715 | | 286 | | 78 | | 13 | | 1 |
| | | | | 14 | | 91 | | 364 | | 1001 | | 2002 | | 3003 | | 3432 | | 3003 | | 2002 | | 1001 | | 364 | | 91 | | 14 | | 1 |

Look at each figure is there a pattern?

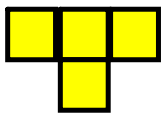


Figure 1

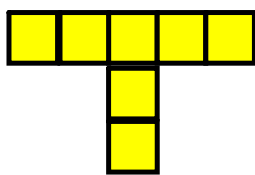


Figure 2

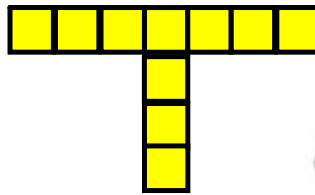


Figure 3



| x | y |
|---|----|
| 1 | 4 |
| 2 | 7 |
| 3 | 10 |

Set up a table of values...

Determine the equation.

Use the equation to determine how many blocks there will be in figure # 25.

$$y = 3x + 1$$

$$31 = 3x + 1$$

Pattern +3
Adjustment +1

$$y = 3x + 1$$

$$y = 3(25) + 1$$

$$y = 75 + 1$$

$$y = 76$$

Write an equation that relates the number of circles, c , to the figure number, f .



Set up a table of values...

| f | c |
|-----|-----|
| x | y |
| 1 | 1 |
| 2 | 3 |
| 3 | 5 |
| 4 | 7 |

Arrows indicate a constant increase of +2 in the number of circles for each subsequent figure number.

Pattern +2
Adjustment -1
 $y = 2x - 1$
 $c = 2f - 1$