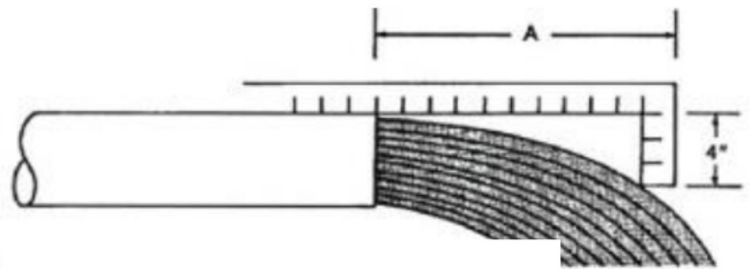


Applied Technical Math 10/11

**Warm Up
AIMS Web
with Calc 2**

I can use linear regression to find the line of best fit and to make predictions

The flow rate in gallons per minute (GPM) is shown in the table as a function of the horizontal discharge distance (A) in inches for various pipe diameters.



Round slopes and y-intercepts to 3 decimal places

- Find the equation for the trend line using the regression feature of your graphing calculator. Consider the flow rate as a function of distance (A) for the 2 inch diameter pipe.
- Use your equation to predict the flow rate for a horizontal discharge of 24 inches, accurate to 1 decimal place.
- Use your equation to predict the horizontal distance (A) for a flow rate of 120 GPM, accurate to 1 decimal place.
- Find the slope between 8 and 10 inches and explain its meaning in context.

Horizontal Distance (A) Inches	Flow Rate (GPM)			
	1"	1 1/4"	1 1/2"	2"
4	8.70	9.80	13.30	22.00
5	7.10	12.20	16.60	27.50
6	8.50	14.70	20.00	33.00
7	10.00	17.10	23.20	38.50
8	11.30	19.60	26.50	44.00
9	12.80	22.00	29.80	49.50
10	14.20	24.50	33.20	55.50
11	15.60	27.00	36.50	60.50
12	17.00	29.00	40.00	66.00
13	18.20	31.50	43.00	71.50
14	20.00	34.00	46.50	77.00
15	21.30	36.30	50.00	82.50
16	22.70	39.00	53.00	88.00
17		41.50	56.50	93.00
18			60.00	99.00

I can use linear regression to find the line of best fit and to make predictions

Round slopes and y-intercepts to 3 decimal places

- a) Find the equation for the trend line using the regression feature of your graphing calculator.
Consider the flow rate as a function of distance (A) for the 2 inch diameter pipe.

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	1"	1 1/4"	1 1/2"	2"
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15	21.30	36.30	50.00	82.50
16	22.70	39.00	53.00	88.00
17		41.50	56.50	93.00
18			60.00	99.00

$$y = 5.4875x + 0.1375$$
$$y = 5.488x + 0.138$$

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$$y = 5.488x + 0.138$$

I can use linear regression to find the line of best fit and to make predictions

- b) Use your equation to predict the flow rate for a horizontal discharge of 24 inches accurate to 1 decimal place.

$$y = 5.488x + 0.138$$

$$\begin{aligned} y &= 5.488 \cdot 24 + 0.138 \\ &= 131.712 + 0.138 \\ &= 131.850 \end{aligned}$$

$$y = 131.9 \text{ gpm}$$

Using the equation from a), substitute 24 in for x, solve for y.

$$y = 5.488 \cdot 24 + 0.138$$

$$y = 131.85$$

$$y = 131.9 \text{ GPM}$$

I can use linear regression to find the line of best fit and to make predictions

- c) Use your equation to predict the horizontal distance (A) for a flow rate of 120 GPM, accurate to 1 decimal place.

$$\downarrow y = 5.488x + 0.138$$

$$\begin{array}{r} 120 = 5.488x + 0.138 \\ -0.138 \qquad \qquad -0.138 \\ \hline 119.862 = 5.488x \end{array}$$

$$\frac{119.862}{5.488} = \frac{5.488x}{5.488}$$

$$21.84074 = x$$

$$x = 21.8''$$

Using the equation from a), substitute 120 in for y, solve for x.

$$120 = 5.488x + 0.138$$

$$x = 21.8407$$

$$x = 21.8 \text{ in}$$

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- d) Find the slope between 8 and 10 inches and explain its meaning in context.

$$(8, 44)$$

$$(10, 55.5)$$

$$\frac{55.5 - 44}{10 - 8} = \frac{11.5}{2}$$
$$= 5.75$$

for every 1" of pipe size GPM goes up by 5.75

$$(8, 44)(10, 55.5)$$

$$m = \frac{44 - 55.5}{8 - 10}$$

$$m = 5.75 \text{ GPM/in}$$

Meaning an increase of 5.75 gallons per minute for an increase of 1 inch in distance.

I can use linear regression to find the line of best fit and to make predictions

Hmwk Pg 31

#2-6