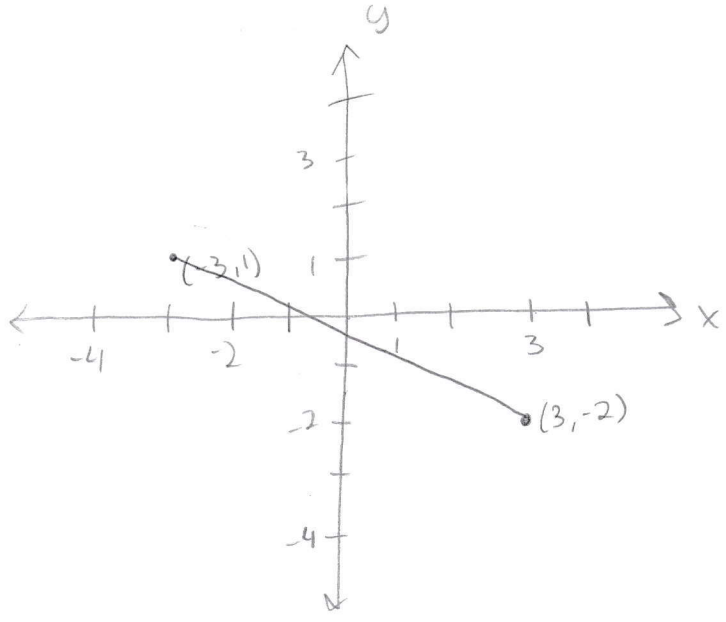
Mid Chapter Quiz

Plot, find distance, find midpoint.

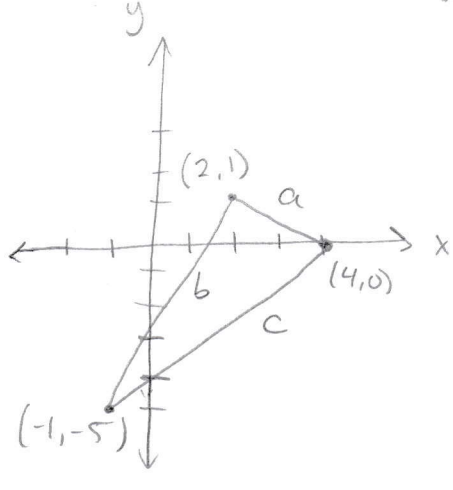
1) $(3,-2)$ and $(-3,1)$



$$d = \sqrt{(x_2-x_1)^2 + (y_2-y_1)^2}$$
$$= \sqrt{(-3-3)^2 + (1--2)^2}$$
$$= \sqrt{(-6)^2 + 3^2}$$
$$= \sqrt{36+9}$$
$$= \sqrt{45} \approx 6.708$$

$$\text{Mid} = \left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right) = \left(\frac{3-3}{2}, \frac{-2+1}{2}\right) = \left(0, -\frac{1}{2}\right)$$

4) Show that $(4,0)$, $(2,1)$, and $(-1,-5)$ are vertices of a right triangle.



$$a = \sqrt{(4-2)^2 + (0-1)^2}$$
$$= \sqrt{4+1}$$
$$= \sqrt{5}$$

$$b = \sqrt{(-5-1)^2 + (-1-2)^2}$$
$$= \sqrt{36+9}$$
$$= \sqrt{45}$$

$$c = \sqrt{(-5-0)^2 + (-1-4)^2}$$
$$= \sqrt{25+25}$$
$$= \sqrt{50}$$

Right triangle?

$a^2 + b^2$

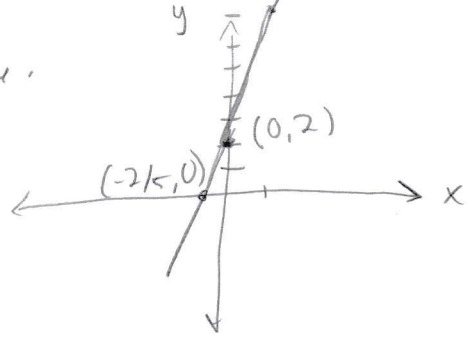
$= (\sqrt{5})^2 + (\sqrt{45})^2$

$= 5 + 45$

$= 50.$

$c^2 = 50$

6.



$y = 5x + 2$

$x = 0 \rightarrow y = 2$

$y = 0 \rightarrow 0 = 5x + 2$

$-2 = 5x$

$x = -2/5$

Write eqn of the circle

a) $37 = (x+1)^2 + y^2$ $\quad \langle (x-h)^2 + (y-k)^2 = r^2 \rangle$

11) $x^2 + y^2 + 8x - 6y + 16 = 0$

$(x^2 + 8x + \_\_\_) + (y^2 - 6y + \_\_\_) = -16$

$[x^2 + 8x + 4^2] + [y^2 - 6y + (-3)^2] = -16 + 16 + 9$

$(x+4)^2 + (y-3)^2 = 9$

Circle w/ center $(-4, 3)$ and radius 3.

14) $(1, -1), (-4, 5)$

$$m = \frac{\Delta y}{\Delta x} = \frac{5-(-1)}{-4-1} = \frac{6}{-5} = -1.2$$

point slope form:

$y - (-1) = -1.2(x-1)$

$y + 1 = -1.2x + 1.2$

$y = -1.2x + 0.2$

17) $(3, -5)$

a) parallel to $x + 4y = -2$

$4y = -x - 2$

$y = -\frac{1}{4}x - \frac{1}{2}$

a) $m = -\frac{1}{4}$

$y - (-5) = -\frac{1}{4}(x-3)$

$y = -\frac{1}{4}x + 3/4 - 5$

$y = -\frac{1}{4}x - 2\,1/4$

b) perp. to $x + 4y = -2$

b) $m = +4$

$y - (-5) = 4(x-3)$

$y = 4x - 12 - 5$

$y = 4x - 17.$

18. At depth = 0 pressure = 1 atm
At d = 132 p = 5 atm

a) Eqn:

$$m = \frac{\Delta y}{\Delta x} = \frac{\Delta p}{\Delta d} = \frac{5-1}{132-0} = \frac{4}{132} = \frac{1}{33}$$

$$p - p_1 = m(d - d_1)$$

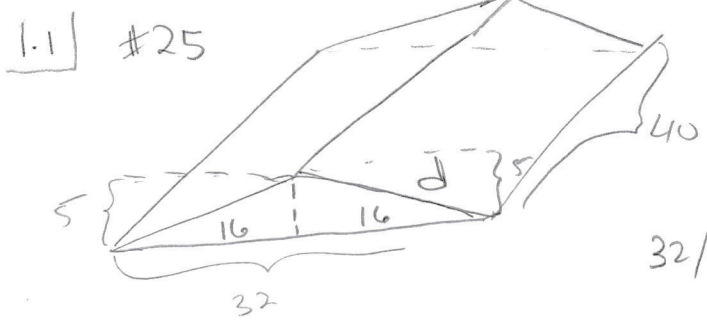
$$p - 1 = \frac{1}{33}(d - 0)$$

$$p = \frac{1}{33}d + 1$$

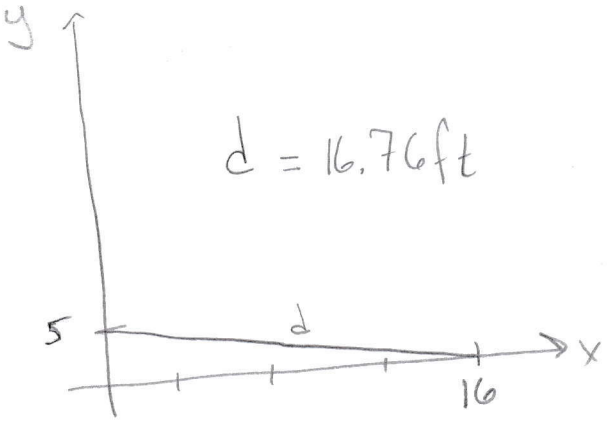
b) $\frac{1}{33} \approx 0.03$ atmosphere / feet

$$\frac{x}{1} = (x)f \qquad \left(\frac{x}{1} = (x)b \right.$$

1.1 #25



$32/2 = 16$



x_1, y_1 $\quad$ x_2, y_2

$(0,5)$ to $(16,0)$

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

$$= \sqrt{(16-0)^2 + (0-5)^2}$$

$$= \sqrt{256 + 25}$$

$$= 16.76 \text{ ft}$$

#35 Wine

Year	2001	2003	2005
Value (millions)	2348		3096

Midpoint formula $\quad$ Midpoint $= \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$

(2001, 2348) and (2005, 3096)

$$\text{Midpoint} = \left(\frac{2001 + 2005}{2}, \frac{2348 + 3096}{2}\right)$$

$$= (2003, 3006.5)$$

\$ 3006.5 million.

1.2 63.

$G = 0.120t^2 + 0.64t + 7.5$

$t = 0$ corresponds to 2000

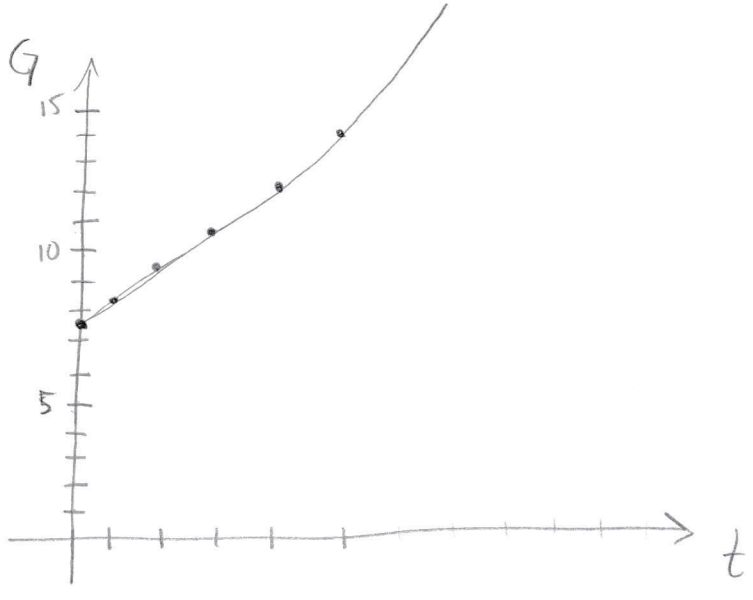
		Actual
$t = 0 \rightarrow$	$G = 7.5$	7.600
$t = 1 \rightarrow$	$G = 0.120 + 0.64 + 7.5 = 8.260$	8.270
$t = 2 \rightarrow$	$G = 0.120(4) + 0.64(2) + 7.5 = 9.260$	9.753
$t = 3 \rightarrow$	$G = 0.120(9) + 0.64(3) + 7.5 = 10.500$	11,000
$t = 4 \rightarrow$	$G = 0.120(16) + 0.64(4) + 7.5 = 11.980$	12.000
$t = 5 \rightarrow$	$G = 0.120(25) + 0.64(5) + 7.5 = 13.700$	13.600

Model fit data well.

b) $t = 13$

$G = 0.120(169) + 0.64(13) + 7.5 = 36.1$ trillion Btu

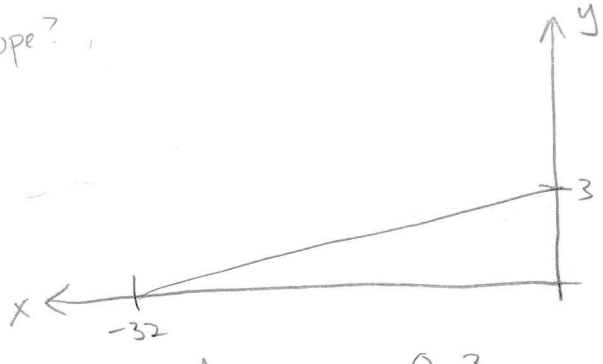
talk about extrapolation



1.3

85.

Slope?



& $m = \frac{\Delta y}{\Delta x} = \frac{0-3}{-32-0} = \frac{-3}{-32} = 0.09375 > 0.0833 = \frac{1}{12}$

So the ramp is too steep!

87. $P = 60t + 1300$

↑ year, $t=0$ is 2000

y-intercept: In the year 2000 ($t=0$), the estimated deer pop. is 1300

slope: Each year, the number of deer increases by, approx. 60.

b) In 2005, $t=5$

$P = 60(5) + 1300$

$= 300 + 1300$

$= 1600$ deer

c) Predict 2012

$P = 60(12) + 1300$

$= 2020$

} here is a good example of why extrapolation may be problematic.

Predict deer in the year 2500. ($t=500$)

$P = 60(500) + 1300$

$= 31\,300$

How many deer can this forest support?

will pop grow forever?

93). Find the Celcius to Fahrenheit conversion equation.

$F = mC + b$

(0, 32) freezing (100, 212) boiling

$m = \frac{\Delta y}{\Delta x} = \frac{212-32}{100-0} = 1.8 \left(= \frac{9}{5}\right)$

Point-slope form $y - y_1 = m(x - x_1)$

$y - 32 = 1.8(x - 0)$

$y = 1.8x + 32$