Finite Math Section 1_2
Solutions and Hints

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for the book:
Finite Mathematics, 7th Edition
by S. T. Tan.

DO NOT PRINT THIS OUT AND TURN IT IN !!!!!!!!
This is designed to assist you in the event you get stuck.
If you do not do the work you will NOT pass the tests.

Section 1.2:

Problem 6:
Find the slope of the line through the points (4, 5) and (3, 8).

Remember rise over run: $slope = \frac{y2 - y1}{x2 - x1}$

So the answer is just: (8 – 5) / (3 – 4) = 3 / (-1) = **-3**

Problem 10:
Find the slope of the line through (-a + 1, b – 1) and (a +1, -b)

Use the same formula, rise over run: $slope = \frac{y2 - y1}{x2 - x1}$

Let y1 = (b – 1) and y2 = (-b)
Let x1 = (-a +1) and x2 = (a + 1)

So the answer is:

$$slope = \frac{-b-(b-1)}{(a+1)-(-a+1)} = \frac{-b-b+1}{a+1+a-1} = \frac{-2b+1}{2a} =$$ **(-2b+1) / 2a**

Problem 14:
Hint:
Two lines are parallel if they have the same slope.
The slope of the line through A and B is… oh, you can't divide by zero…
that means the line is a vertical line.

The slope of the line through C and D is… drat, again can't divide by zero…
so again it's a vertical line.

Hmmm… guess that means **they are parallel**.

Problem 17:
If the line passing through the points (1, a) and (4, -2) is parallel to the line passing through the points (2, 8) and (-7, a+4), what is the value of a?

For the lines to be parallel they must have equal slopes.
Set the slopes equal to each other like this:

$$\frac{-2-a}{4-1}=\frac{(a+4)-8}{-7-2}$$

And now solve for *a*:

$$\frac{-2-a}{4-1}=\frac{(a+4)-8}{-7-2} \rightarrow \frac{-2-a}{-3}=\frac{a-4}{-9} \rightarrow -9*\frac{-2-a}{-3}=\frac{a-4}{-9}*-9$$

$$\rightarrow 3*(-2-a)=a-4 \rightarrow -6-3a=a-4 \rightarrow -3a=a-4+6$$

$$\rightarrow -3a=a+2 \rightarrow -3a-a=2 \rightarrow -4a=2 \rightarrow \boldsymbol{a = -\frac{1}{2}}$$

Problem 30:
Find an equation that passes through (1,2) with a slope of m = -½

For this just use the point-slope form for a line: (y – y1) = m*(x – x1)

So you get the line to be: y – 2 = -½ * (x – 1)

Most professors will want you to convert this into slope intercept form: y = mx + b

So you would do the following:

$y - 2 = ½ * (x - 1)$ → $y - 2 = -½*x + ½$ → **$y = -1½*x + 2½$**

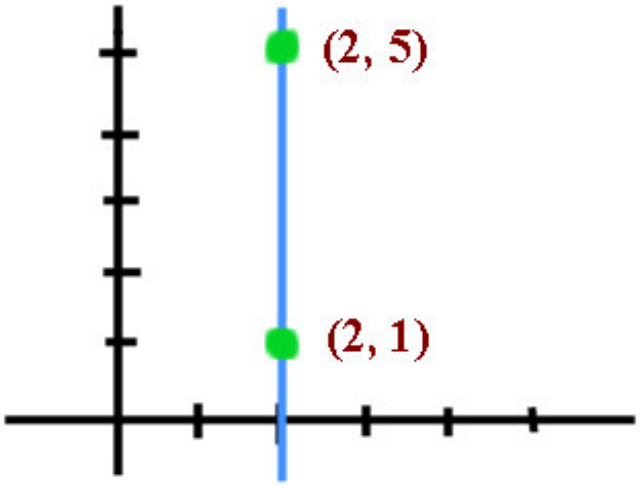
Problem 32:

Find an equation of the line that passes through (2,1) and (2, 5).

First we find the slope (recall rise over run):

$$slope = \frac{y2 - y1}{x2 - x1} = \frac{5 - 1}{2 - 2}$$ Oh no! We can't divide by zero!

Don't panic this just means it's a vertical line.
Consider its graph:



So it would appear the equation **$x = 2$** would be correct.
And it is.

Problem 34:

Find an equation of the line that passes through (-1, -2) and (3, 4).

First we find the slope (recall rise over run):

$$slope = \frac{y2 - y1}{x2 - x1} = \frac{4 - (-2)}{3 - (-1)} = \frac{6}{4} = \frac{3}{4}$$

And now we use the point-slope form for a line: $(y - y1) = m*(x - x1)$

And we will pick (3, 4) to be our point (i.e. x1 = 3 and y1 = 4).
(Notice we could use (-1, -2) and we would get the same answer)

So we have: $y - 4 = (3/4)*(x - 3)$ as our equation.

Most professors will want that in slope-intercept form so we will simplify:

$y - 4 = (3/4)*(x - 3)$ → $y - 4 = (3/4)*x - (9/4)$
$y = (3/4)*x - (9/4) + 4$
$y = (3/4)*x - (9/4) + (16/4)$

$y = (3/4)*x + (7/4)$

Problem 46:
Find an equation of the line that passes through the point (2, 4) and is perpendicular to the line $3x + 4y - 22 = 0$.

First find the slope of the line: $3x + 4y - 22 = 0$
We will do this by putting it into slope-intercept form (i.e. $y = mx + b$)

$3x + 4y - 22 = 0$ → $3x + 4y = 22$
$4y = 22 - 3x$
$4y = -3x + 22$
$y = (-3x + 22) / 4$
$y = (-3/4)x + 22/4$

So m = -3/4 and b = 22/4

So the slope of the line: $3x + 4y - 22$ is –3/4.
The line we must find must be perpendicular to that line so our desired line will have a slope equal to the negative reciprocal of –3/4 which is 4/3.

So our desired line has slope = m = 4/3 and goes through the point (2, 4).
To find the equation of our desired line,
we will use point-slope form (i.e. $y - y_1 = m(x - x_1)$)

From what we know $x_1 = 2$, $y_1 = 4$ and m = 4/3.
So we will plug that in and see the equation of our desired line is:
$y - y_1 = m(x - x_1)$ → $y - 4 = 4/3(x - 2)$ (and we simplify to slope-intercept form)
$y - 4 = (4/3)x - 8/3$

$y = (4/3)x + 4/3$

Problem 51:
Find an equation of the line passing through (-5, -4) and parallel to the line passing through (-3, 2) and (6, 8).

So find the slope of the line going through (-3, 2) and (6, 8).
You should get (8-2) / (6 +3) = 6/9 = 2/3

Now use the point-slope form for a line: $(y - y1) = m*(x - x1)$
with x1 = -5 and y1 = -4

$y - (-4) = (2/3)*(x - (-5))$ or rather **$y + 4 = (2/3)*(x + 5)$**

You may wish to simplify that to slope-intercept form.