

SECTION 5.4

#10, 11, 14, 20, 22, 24, 25

Ben Wilson

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PER 3

10) $y = 2x - 2$

$y = 2x + 9$

No Solutions

INSPECTION: I CAN SEE THEY HAVE THE SAME SLOPE & DIFFERENT VERTICAL INTERCEPTS.

11) $y = 3x + 1$

$-x + 2y = -3$

$-x + 2(3x + 1) = -3$

$-x + 6x + 2 = -3$

$5x + 2 = -3$

$$\begin{array}{r} -2 \quad -2 \\ \hline 5x = -5 \\ \hline 5 \quad 5 \end{array}$$

$x = -1$

$y = 3(-1) + 1$

$y = -3 + 1$

$y = -2$

 $(-1, -2)$

SUBSTITUTION:
ONE EQUATION WAS IN SLOPE-INTERCEPT FORM & THE OTHER WAS IN STANDARD FORM.

14) $\frac{1}{3}x + y = (1)(-6)$

$$\begin{array}{r} 2x + 6y = 6 \\ + \quad -2x - 6y = -6 \\ \hline 0 = 0 \end{array}$$

$0 = 0$

INFINITELY MANY SOLUTIONS

ELIMINATION B/C BOTH EQUATIONS WERE IN STANDARD FORM.

20) MY PIQ: $y = 2x + 3$

FRIEND'S PIQ: $y = 2x$

NO, MY FRIEND'S PIQ WILL NEVER CATCH UP BECAUSE IT RUNS AT THE SAME EXACT SPEED, BUT MINE HAD A HEAD-START.

$$\begin{array}{r} 2x = 2x + 3 \\ -2x \quad -2x \\ \hline 0 = 3 \end{array}$$

FALSE STATEMENT

$0 = 3 \leftarrow$ NO SOLUTIONS; THE LINES NEVER INTERSECT; MY FRIEND'S PIQ NEVER CATCHES UP.

22) IF THE SLOPES ARE DIFFERENT, ONE MUST BE LARGER. AT SOME POINT, THE LARGER ONE OVERTAKES THE SMALLER ONE & THE SMALLER ONE NEVER CATCHES UP AGAIN (THUS 1 INTERSECTION).

IF BOTH SLOPES RISE & RUN AT THE SAME RATE, THE VERTICAL INTERCEPTS NEED TO BE INSPECTED. IF THE VERTICAL INTERCEPTS ARE THE SAME, THE LINES ARE THE SAME (THUS INFINITELY MANY SOLUTIONS). IF THE VERTICAL INTERCEPTS ARE DIFFERENT THE LINES WILL NEVER INTERSECT (THUS NO SOLUTIONS).

24) LET x = THE # OF INDIVIDUAL SONGS DOWNLOADED.
(V) LET y = THE TOTAL COST (IN \$).

(E) ME: $y = 0.99x + 10$

FRIEND: $y = 0.99x$

NO, WE WON'T SPEND THE SAME AMOUNT OF MONEY, BECAUSE I DOWNLOADED THE DIGITAL ALBUM, & WE BUY SONGS AT THE SAME RATE, I WILL ALWAYS HAVE SPENT \$10⁰⁰ MORE THAN MY FRIEND.

#25

	TELESCOPE USE	SUPERCOMPUTER USE	TOTAL COST
STUDENT 1	5 HOURS	3 HOURS	*70.50
STUDENT 2	6 HOURS	2 HOURS	*67.00

(V) LET x = COST OF TELESCOPE (IN \$/HR),
 LET y = COST OF SUPERCOMPUTER (IN \$/HR).

$$\begin{aligned} \textcircled{E} \quad & 2(5x + 3y) = (70.50)2 \\ & -3(6x + 2y) = (67.00)(-3) \end{aligned}$$

$$\begin{aligned} \textcircled{S} \quad & 10x + 6y = 141.00 \\ + \quad & -18x - 6y = -201.00 \\ \hline & -8x = -60 \\ & \frac{-8x}{-8} = \frac{-60}{-8} \\ & x = 7.50 \end{aligned}$$

$$\begin{aligned} 5(7.50) + 3y &= 70.50 \\ 37.50 + 3y &= 70.50 \\ -37.50 & \quad -37.50 \\ \hline 3y &= 33 \\ \frac{3y}{3} &= \frac{33}{3} \\ y &= 11 \end{aligned}$$

I IT COSTS \$7.50/HR TO USE
 THE TELESCOPE & \$11.00/HR
 TO USE THE SUPERCOMPUTER.