Math 80
Exam 2 Answers

1. (a) $(1.2t^2 - t + 10) \; + \; (0.25t^2 + t - 4) = \boxed{1.45t^2 + 6}$ (Combining like terms)

   (b) $(-20x^3 - 5x^2 + 7) \; - \; (2x^3 - 2x^2 + 9x) = -20x^3 - 5x^2 + 7 - 2x^3 + 2x^2 - 9x$
   $= \boxed{-22x^3 - 3x^2 - 9x + 7}$

   (c) $\frac{2}{3}x(6x^8 - 3x^2 + 4) = \boxed{4x^9 - 2x^3 + \frac{8}{3}x}$ (Distribution)

   (d) $(12m - 3)(m + 4) = 12m^2 + 48m - 3m - 12 = \boxed{12m^2 + 45m - 12}$ (FOIL)

   (e) $10x^2 \cdot (x+1)^2 = 10x^2(x+1)(x+1) = 10x^2(x^2 + 2x + 1) = \boxed{10x^4 + 20x^3 + 10x^2}$

   (Note: You cannot distribute $10x^2$ into $(x + 1)$ because of the exponent of 2 on the $(x + 1)$. Order of operations tells us that we have to take care of the exponents before multiplication.)

2. Since $28 = 2 \cdot 2 \cdot 7$ and $70 = 2 \cdot 5 \cdot 7$, the GCF of the two values is $2 \cdot 7 = \boxed{14.}$

3. (a) Solving for x in the first equation: $x = 2y + 12$ (Note: You can solve for y if you like.)

   Using this in the second equation: $4(2y+12)+3y = -7 \quad \Rightarrow \quad 11y+48 = -7 \quad \Rightarrow \quad y = -5$

   Solving for x: $x = 2(-5) + 12 = 2$

   Solution: $\boxed{(2, -5)}$

   (b) Rewriting so that both equations are in standard form: $\begin{cases} 4x - 3y = -1 \\ 6x + 2y = 5 \end{cases}$

   You can eliminate x or eliminate y. I will be eliminating y by multiplying the first equation by 2 and the second equation by 3.

   $\Rightarrow \begin{cases} 8x - 6y = -2 \\ 18x + 6y = 15 \end{cases}$ Adding both equations and eliminating y: $26x = 13$

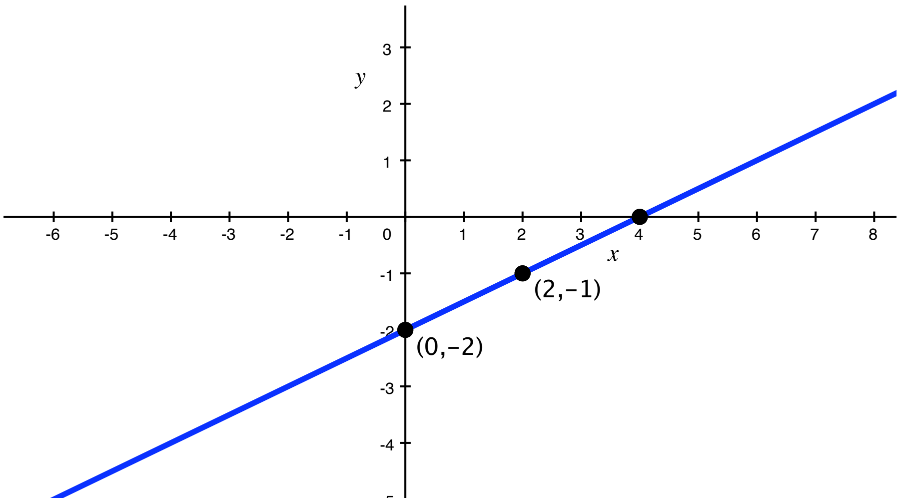
   $\Rightarrow \quad x = \frac{1}{2}$

   Solving for y by evaluating any of the equations from the system for $x = \frac{1}{2}$: $y = 1$

   Solution: $\boxed{(\frac{1}{2}, 1)}$

4. $3x - 6y = 12 \quad \Rightarrow \quad -6y = 12 - 3x \quad \Rightarrow \quad \boxed{y = -2 + \frac{1}{2}x \quad \text{OR} \quad y = \frac{1}{2}x - 2}$

Since the slope of the line is $\frac{1}{2}$ (up 1, right 2), and the y-intercept is $(0,-2)$, we have the following graph.



5. **Unknowns:** Carl's Speed $= C$ David's Speed $= D$

Note: In 3 hours at C km/hr, Carl bikes $3C$ km. In 3 hours at D km/hr, David bikes $3D$ km.

Equations: $C = D + 10$ (Carl's speed is 10 more km/hr than David's.)

$3C + 3D = 150$ (The total distance between them is 150 km.)

Using substitution or elimination on these equations: $C = 30$, $D = 20$

Carl's speed is 30 km/hr and David's speed is 20 km/hr.

6. Need: Slope $= m$, a point

To find the slope: $m = \frac{-2-4}{2-(-1)} = \frac{-6}{3} = -2$ (Note: Could also use $\frac{4-(-2)}{-1-2} = -2$)

You can use any of the given points to write a linear equation of the line:

$y - 4 = -2(x + 1)$ OR $y + 2 = -2(x - 2)$

Either way, if you isolate y (to put your answer in slope-intercept form), you will get $\boxed{y = -2x + 2.}$

7. Need: Slope $= m$, a point

To find the slope: Note that the line given has slope $-\frac{1}{6}$. ($6y = -x + 12 \quad \Rightarrow \quad y = -\frac{1}{6}x + 2$)

So, the line we are interested in has slope $m = 6$. (Since it is perpendicular to the line of slope $-\frac{1}{6}$, the slope is the negative reciprocal of $-\frac{1}{6}$.)

We can use either the point-slope form or the slope-intercept form to write this linear equation since we know the y-intercept, so I am going to use the slope-intercept form: $\boxed{y = 6x + 10}$