Answers, Math Assessment, PPPA 6007

A. Two Equations and Two Unknowns, 5 questions

1. You are given equations $x = 5y - 3$ and $y = 2$. Plug $y = 2$ into the first equation: $x = 5(2) - 3 = 10 - 3 = 7$.

2. To solve for x and y, you can set the two equations equal (there are other equally valid ways to arrive at this same answer). Because $y = y$, I can set $400x - 8000 = 52\,000 - 200x$. I can re-write this equation as $600x = 60\,000$, and conclude that $x = 100$.

3. I can then plug this x into either equation. Plugging into the first, I find that $y = 400x - 8000 = 400(100) - 8000 = 40\,000 - 8\,000 = 32\,000$. You can check this answer by plugging the same x into the second equation. The (x, y) that satisfies both equations is therefore $(100, 32\,000)$

4. To find the intersection of these two lines, set the two equations equal. On way to do this is to rewrite $x = \frac{y}{100}$ as $y = 100x$. Since $y = y$, we can re-write as $10\,000 - 100x = 100x$. This simplifies to $200x = 10\,000$, and then $x = 50$.

5. Plugging this value of x in, we find $y = 100x = 100(50) = 5\,000$. (You can double-check this answer by plugging x into the first equation, which should yield the same answer.) Therefore, the lines intersect at $(x, y) = (50, 5\,000)$.

B. Graphing and Triangles, 4 questions

1. The area of a triangle is $\frac{1}{2}bh$, where b is the base of the triangle and h is the height. For this triangle, the base is 4 ($= 5 - 1$) units wide, and the height is 4 ($= 5 - 1$) units. The area of this particular triangle is therefore $\frac{1}{2}(4)(4) = 8$. See the picture of the vertices at `https://www.desmos.com/calculator/rsazdekrfr`.

2. You can re-write $y - 2 = 5x$ as $y = 5x + 2$. In general, you can write a linear equation as $y = mx + b$, where m is the slope, and b is the y-intercept. Therefore, for this equation the slope is $m = 5$.

3. The y-intercept is $b = 2$. See the picture of this line at `https://www.desmos.com/calculator/78smtkuvch`.

4. See the graph at `https://www.desmos.com/calculator/j5oi8uxvjs` for points A and B. Relative to A, is B is to the right and above.

C. Exponents, 2 questions

1. The ratio $\frac{a^3}{a^1} = a^{3-1} = a^2$.

2. The ratio $\frac{b^{2/3}}{b^{5/3}} = b^{2/3-5/3} = b^{-3/3} = b^{-1} = \frac{1}{b}$.