Intermediate Algebra Ch 3-4 Review Name: KEY

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1. Solve the system of equations:

$$\begin{cases} 3x - 6y = 6 \\ 9x - 3y = 8 \end{cases}$$

$(3x - 6y = 6) \cdot (-3) \Rightarrow -9x + 18y = -18$

$+ \quad 9x - 3y = 8$

$15y = -10$

$y = \frac{-10}{15} = \frac{-2}{3}$

$3x = 6 + 6y$

$x = 2 + 2y$

$= 2 + 2\left(-\frac{2}{3}\right)$

$= \frac{6}{3} - \frac{4}{3} = \frac{2}{3}$

$\boxed{\left(\frac{2}{3}, \frac{-2}{3}\right)}$

2. Evaluate $f(-2)$ when $f(x) = -3x^2 - 2x + 5$.

$f(-2) = -3(-2)^2 - 2(-2) + 5$

$= -3(4) + 4 + 5$

$= -12 + 9 = \boxed{-3}$

3. State the formula for the distance between two points (x_1, y_1) and (x_2, y_2).

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

4. Find the distance between the points $P_1(3, -5)$ and $P_2(6,0)$.

$d = \sqrt{(6-3)^2 + (0-(-5))^2} = \sqrt{3^2 + 5^2} = \sqrt{9+25} = \boxed{\sqrt{34}}$

5. Find the midpoint of the line segment between the points $P_1(-3,5)$ and $P_2(2, -4)$.

$m = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right) = \left(\frac{-3+2}{2}, \frac{5+(-4)}{2}\right) = \boxed{\left(-\frac{1}{2}, \frac{1}{2}\right)}$

6. Are the following relations functions? (yes or no)
   a. $\{(-1,3), (2,4), (5,-3), (6,2), (3,-1), (-2,4)\}$ yes (each x maps to at most one y)
   b. $\{(1,2), (2,3), (3,4), (4,5), (5,1), (1,5), (4,2)\}$ no (1 maps to both 2 and 5)

7. What value(s), if any, are excluded from the domain of the function?

   a. $f(x) = \frac{x+1}{x-3}$ f(3) is undefined, therefore 3 must be excluded from the domain of f.

Note: the actual domain of f is therefore $(-\infty, 3) \cup (3, \infty)$

8. Find the range of the function for the given domain (list using the roster method).

   a. $f(x) = \frac{4}{1-x}$; $domain = \{-3, 0, 3\}$

$f(-3) = \frac{4}{1-(-3)} = \frac{4}{4} = 1$

$f(0) = \frac{4}{1-0} = \frac{4}{1} = 4$

$f(3) = \frac{4}{1-3} = \frac{4}{-2} = -2$

range = $\{-2, 1, 4\}$

Match the form of the equation of a line with its name:

9. B Standard form
10. C Slope-intercept form
11. A Point-slope form

A. $y - y_1 = m(x - x_1)$

B. $Ax + By = C$

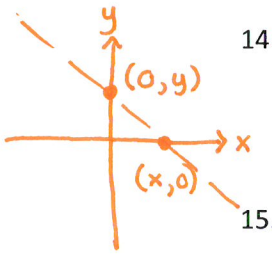
C. $y = mx + b$

12. Find the slope of the line that passes the points $(-3, 7)$ and $(5, -1)$.

$m = \frac{\Delta y}{\Delta x} = \frac{7-(-1)}{-3-5} = \frac{8}{-8} = -1$

13. Given the line $y = \frac{1}{5}x + 7$, what is the slope of a line perpendicular to it?

perpendicular lines have negative reciprocal slope, so -5



14. What is the x-intercept of the line represented by the equation $2x + 3y = 6$?

y-coordinate @ x-intercept is 0, so

$2x + 3(0) = 6$

$2x = 6$

$x = 3$

(3,0)

15. What is the y-intercept of the line represented by the equation $2x + 3y = 6$?

x-coordinate @ y-intercept is 0

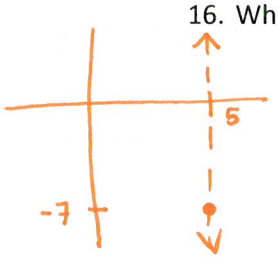
$2(0) + 3y = 6$

$3y = 6$

$y = 2$

(0,2)

16. What is the equation of the line passing through the point (5,-7) whose slope is undefined?



x = 5

Kevin is 2 times as old as Gabriela. 12 years ago, Kevin was 6 times as old as Gabriela.

How old is Kevin now?

30

K = Kevin's age
g = gabriel a's age

$K = 2g$

$K-12 = 6(g-12)$

Sterre charges $\$35$ to file tax returns, but files for free if she only needs the easiest form. Then she donates $\$2$ to clean water projects per tax return she files. Sterre charged $\$7{,}245$ and made a donation of $\$1{,}242$ this year for the tax returns she filed.

How many tax returns did Sterre file at each price?

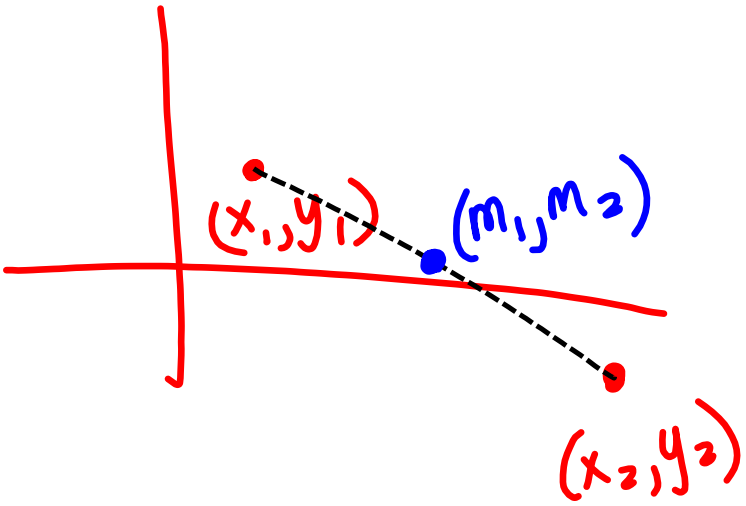
Sterre filed ____ tax returns for free and filed ____ tax returns for $\$35$ each.

f = # of free returns filed
p = # of paid $35 returns

$$\begin{cases} 7245 = (0f) + 35p \\ 1242 = 2(f+p) \end{cases}$$

midpoint

$(m_1, m_2) = \left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right)$



$(2, -6)$ is the midpoint between $(-4, 3)$ & what other point ?

(x, y)

$2 = \frac{-4+x}{2}$, $-6 = \frac{3+y}{2}$

$8 = x$ $\quad -15 = y$

$(8, -15)$

5.1 Exponential Expressions

$x^n = \underbrace{x \cdot x \cdot x \cdots x}_{n \text{ times}}$

For $m, n, p \in \mathbb{Z}$ (integers),

$x^m x^n = x^{m+n}$

$\frac{x^m}{x^n} = \frac{x^{m-n}}{1} = \frac{1}{x^{n-m}}$

$(x^m)^n = x^{mn}$

$(x^m y^n)^p = x^{mp} y^{np}$

$\left(\frac{x^m}{y^n}\right)^p = \frac{x^{mp}}{y^{np}}$

$x^0 = 1, x \neq 0$

$x^{-n} = \frac{1}{x^n}$

$\frac{1}{x^{-n}} = \frac{x^n}{1}$

$\underbrace{x \cdot x \cdot x \cdots x}_{n} \cdot \underbrace{x \cdot x \cdot x \cdots x}_{m}$

$(x^2)^3 = x^2 \cdot x^2 \cdot x^2 = x \cdot x \cdot x \cdot x \cdot x \cdot x$

$\frac{x^4}{x^3} = \frac{x \cdot x \cdot x \cdot x}{x \cdot x \cdot x}$

$\frac{x^3}{x^4} = \frac{x \cdot x \cdot x}{x \cdot x \cdot x \cdot x}$

$\underbrace{x^m \cdot x^m \cdots x^m}_{n}$

$(x^2 y^3)^3 = x^2 y^3 x^2 y^3 x^2 y^3 = x^2 x^2 x^2 y^3 y^3 y^3$

A simplified exponential expression contains:
- only one instance of each variable
- no negative exponents

4. $(-2ab^4)(-3a^2b^4) = (-2)(-3)a^1 a^2 b^4 b^4 = 6a^{1+2} b^{4+4} = \boxed{6a^3b^8}$

20. $[(3x^2y^3)^2]^2 = (3x^2y^3)^4 = 3^4 (x^2)^4 (y^3)^4 = \boxed{81x^8y^{12}}$

66. $\dfrac{6^2a^{-2}b^3}{3ab^4} = \dfrac{6^2}{3a^{1-(-2)}b^{4-3}} = \dfrac{36}{3a^3b} = \boxed{\dfrac{12}{a^3b}}$

$\dfrac{6^2}{3} = \dfrac{(3\cdot 2)^2}{3} = \dfrac{3^2\cdot 2^2}{3^1} = 3^{2-1}\cdot 2^2 = 3\cdot 4 = 12$

$= \dfrac{3\cdot 3\cdot 2^2}{3}$

72. $\left(\dfrac{x^{-3}y^{-4}}{x^{-2}y^1}\right)^{-2} = \dfrac{(x^{-3})^{-2}(y^{-4})^{-2}}{(x^{-2})^{-2}(y^1)^{-2}} = \dfrac{x^6y^8}{x^4y^{-2}}$

$= x^{6-4}y^{8-(-2)} = \boxed{x^2y^{10}}$

$\left(\dfrac{1}{x^{-2-(-3)}y^{1-(-4)}}\right)^{-2} = \left(\dfrac{1}{x^1y^5}\right)^{-2} = \dfrac{1}{(x^1)^{-2}(y^5)^{-2}} = \dfrac{1}{x^{-2}y^{-10}}$

5.1 (page 280) → due Wednesday

27-35 odd

45-55 odd

69-79 odd