Algebra Test 2 Review

1. $m = \frac{rise}{run} = \frac{4}{2} = \boxed{2}$

2. $m = \frac{rise}{run} = \frac{-6}{3} = \boxed{-2}$

3. $m = \frac{rise}{run} = \frac{0}{12} = \boxed{0}$

4. $m = \frac{rise}{run} = \frac{12}{0} = \boxed{\text{undefined}}$

5. $m = \frac{rise}{run} = \frac{6-2}{12-6} = \boxed{\frac{4}{6} = \frac{2}{3}}$

6. $(x_1, y_1) = (2, 3)$ $(x_2, y_2) = (5, 15)$

$m = \frac{15-3}{5-2} = \frac{12}{3} = \boxed{4}$

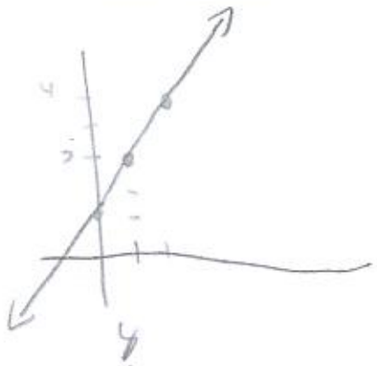
7. a) Negative

b) 0

c) undefined

d) Negative

8.



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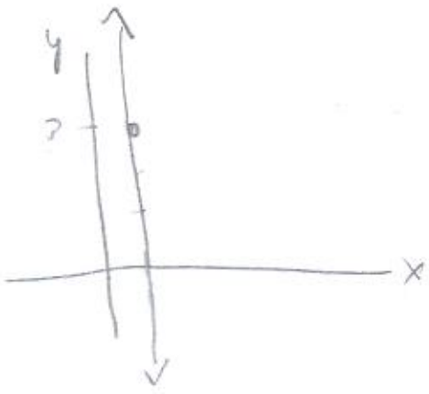

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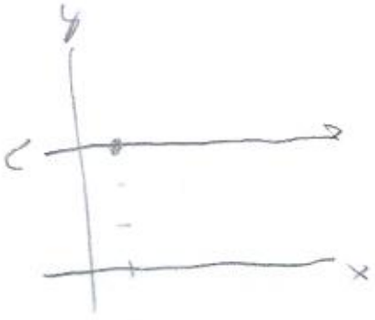


11. a) $m = 3$ y-int $= b = -2$

Equation $y = 3x + -2$

or $y = 3x - 2$

b) $m = 4$ through $(\overset{x}{1}, \overset{y}{2})$

$y = mx + b$

$y = 4x + b$ now plug m

$2 = 4 \cdot 1 + b$

$2 = 4 + b$

$-4 \quad -4$

$-2 = b$

So the equation is $\boxed{y = 4x - 2}$

c) $(\overset{x_1}{1}, \overset{y_1}{2})$ and $(\overset{x_2}{5}, \overset{y_2}{14})$

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{14 - 2}{5 - 1} = \frac{12}{4} = 3$$

$y = mx + b$ or $y = 3x + b$

Plug in $(1, 2)$ and solve for b

$2 = 3 \cdot 1 + b$

$2 = 3 + b$

$-3 \quad -3$

$-1 = b$

So the equation is $\boxed{y = 3x - 1}$

12. $y = 3x - 5$ has slope 3

Our parallel line has the same slope $m = 3$ through $(-1, 4)$

Line: $y = 3x + b$ plug in $(-1, 4)$ and solve for b.

$4 = 3 \cdot (-1) + b$

$4 = -3 + b$

$+3 \quad +3$

$7 = b$

Equation: $\boxed{y = 3x + 7}$

13. $y = 3x - 5$ has slope 3

Our perpendicular line has slope $m = -1/3$ through $(-1, 4)$

Line: $y = -\frac{1}{3}x + b$ plug in $(-1, 4)$ and solve for b.

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

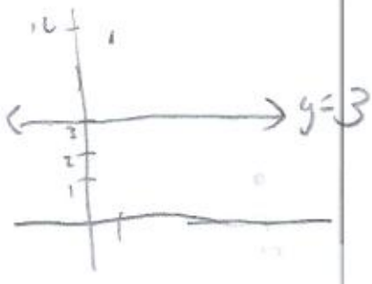
$4 = \frac{1}{3} + b$

$-\frac{1}{3} \quad -\frac{1}{3}$

$3\frac{2}{3} = b$

Equation: $\boxed{y = -\frac{1}{3}x + 3\frac{2}{3}}$

14.

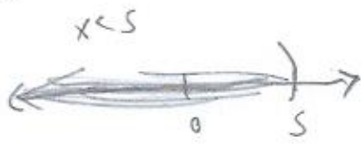


- Perpendicular to $y = 3$ has undefined slope.
- So it is a vertical line through $(1, 12)$
- $\boxed{x = 1}$

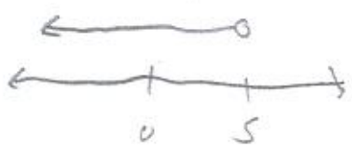
15. a) Neither
b) Neither
c) Parallel

16. a) True
b) False
c) True

17. a) $x < 5$



or

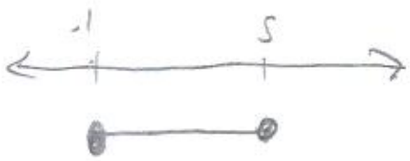


b) $x \geq 2$

or

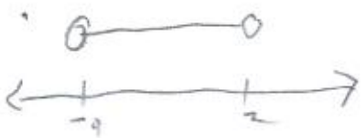
c) $-1 \leq x \leq 5$

or



d) $x < 2$ and $x > -4$

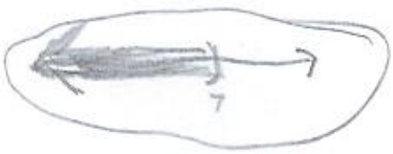
or

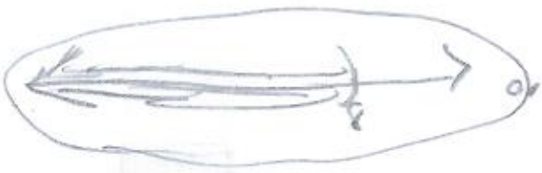


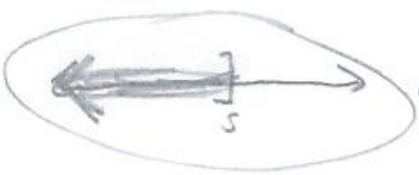
e) $x < 2$ and $x > -4$

or

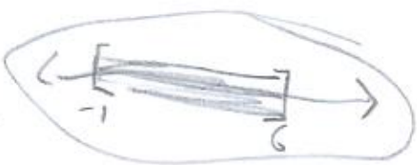
All real numbers

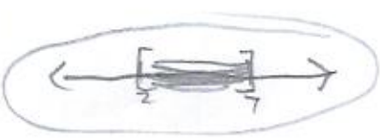
18. a) $x + 5 < 12$
$\quad -5 \quad -5$
$x < 7$ or  or $(-\infty, 7)$

b) $\frac{2x}{2} < \frac{16}{2}$
$x < 8$ or  or $(-\infty, 8)$

c) $3x + 1 \leq 16$
$\quad -1 \quad -1$
$\frac{3x}{3} \leq \frac{15}{3}$
$x \leq 5$ or  or $(-\infty, 8]$

d) $\frac{-2x}{-2} \leq \frac{16}{-2}$
$x \geq 8$ or or $[8, \infty)$

e) $-1 \leq 2x + 1 \leq 13$
$\quad -1 \quad -1 \quad -1$
$\frac{-2}{2} \leq \frac{2x}{2} \leq \frac{12}{2}$
$-1 \leq x \leq 6$ or  $[-1, 6]$

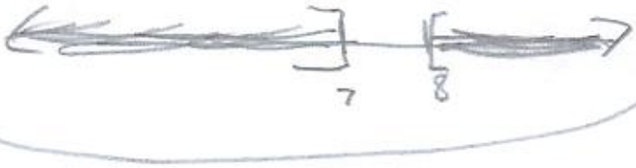
f) $2x + 5 \geq 1$ and $3x - 7 \leq 14$
$\quad -5 \quad -5$ $\quad +7 \quad +7$
$\frac{2x}{2} \geq \frac{-4}{2}$ $\quad \frac{3x}{3} \leq \frac{21}{3}$
$x \geq 2$ and $x \leq 7$
$2 \leq x \leq 7$  $[2, 7]$

18 s) $\frac{1}{2}x+1 \geq 5$ or $2x-3 \leq 11$

$-1 \quad -1$ $\qquad$ $+3 \quad +3$

$2 \cdot \frac{1}{2}x \geq 4 \cdot 2$ or $\frac{2x}{2} \leq \frac{14}{2}$

$x \geq 8$ or $x \leq 7$



or $(-\infty, 7]$ or $[8, \infty)$

19. a) $|4-5| = |-1| = 1$

b) $|-4+7| = |+3| = 3$

c) $|5-3| = |2| = 2$

20. a) $|-2| \leq 1$ False

b) $|-2.5| \leq |-3.5|$ True

c) $|5-2| \leq |2-5|$ True

d) $|5-2| < |2-5|$ False