### Part I: Slope & Intercepts Practice Test

**Linear Characteristics Practice Test**

**NAME:**

1. Plot the line segment with the following endpoints:
   \( f(2,3), K(-4, -7) \)

2. What is the slope of the line segment above?
   \[ m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-7 - 3}{-4 - 2} = \frac{-10}{-6} = \frac{5}{3} \]

3. What are the coordinates of two other points on the line?
   \((5,8)\) \& \((-1, -2)\)

4. What is the slope of a line perpendicular to \(KL\)?
   \[ -\frac{3}{5} \]

5. Plot the line segment \(FG\) with endpoints at \(F(1, -1)\) and an endpoint at \(G(3,5)\).

6. What is the slope of the line segment above?
   \[ m = \frac{5 - (-1)}{3 - 1} = \frac{6}{2} = 3 \]

7. What is the slope of a line parallel to \(FG\)?
   \[ m = 3 \]

8. Plot a parallel line through \(H(0,5)\)

9. The peaked roof on a hut has a pitch of \(3/5\). If the roof has a total span of 12m, how tall is the roof?
   \[ \frac{1}{2} \times 12 = 18 \Rightarrow \text{height} = \frac{18}{\frac{1}{2}} = 36 \]

10. Find the \(x\)-intercept and \(y\)-intercept of a line that has the equation \(2x + 3y = 18\).
    \[ \frac{x}{18} = \frac{9}{6} \]
    \[ y = 6 \]

11. A line has a slope of \(\frac{5}{3}\) and an \(x\)-intercept at \((-10,0)\). Find the \(y\)-intercept.
    \[
    -\frac{3}{5} = \frac{y - 0}{0 - (-10)}
    \]
    \[
    -\frac{3}{5} \times \frac{y}{10} = -\frac{30}{5} \Rightarrow y = -6
    \]

12. A line has a slope of \(\frac{5}{3}\) and an \(y\)-intercept at \((0, -10)\). Find the \(x\)-intercept.
    \[
    \frac{5}{3} = \frac{0 - (-10)}{x - 0}
    \]
    \[
    \frac{5}{3} \times \frac{10}{x} = \frac{50}{3} \Rightarrow x = \frac{50}{3}
    \]

\[ x = 14 \]
13. Find the slope of a line segment that is parallel to $GH$ if $G(4, -3)$ and $H(3, -7)$.

$m = \frac{-7 - (-3)}{3 - 4} = \frac{-4}{-1} = 4$

14. Find the slope of a line segment that is perpendicular to $KL$ if $K(-1, -8)$ and $L(0,0)$.

$m = \frac{0 - (-8)}{0 - (-1)} = \frac{8}{1} = 8 \quad m = -\frac{1}{8}$

15. Plot the line through the point $(2,3)$ with a slope of $\frac{2}{3}$.

16. Plot the line through the point $(-3,2)$ with a slope of $\frac{5}{3}$.

17. Find the value of $k$ so that the following slopes are perpendicular.

\[-\frac{3}{5} \quad \text{and} \quad \frac{2}{3} \quad \Rightarrow \quad -\frac{3}{5} \cdot \frac{2}{3} = -\frac{k}{\frac{5}{3}}

k = \frac{21}{5}

18. Find the value of $k$ so that the following slopes are perpendicular.

\[\frac{12}{5} \quad \text{and} \quad \frac{11}{3} \quad \Rightarrow \quad \frac{12}{5} \cdot \frac{11}{3} = -\frac{3}{\frac{2}{3}}

k = \frac{15}{3}

19. Challenge yourself:
The centre of a circle is at $C(-12, -29)$ and a point is on the circumference at $(-3, -5)$. Find the length of the circumference to the nearest hundredth.

$C = 2\pi r$

1. Find $r$.

$r^2 = 9^2 + 30^2 = 81 + 900 = 981$

$r = \sqrt{981} = 31.9317$ units

2. $C = 2\pi r$

$C = 2\pi \cdot 31.9317$

$= 197.80$ units

20. Challenge yourself:

Calculate the perimeter of a triangle with vertices at $A(-2,0)$, $B(1,4)$ and $C(3,0)$ to the nearest tenth.

$AB^2 = 4^2 + 3^2$

$AB = \sqrt{25} = 5$

$AC = 3$

$BC = 4$

$AB^2 = 16 + 9$

$\sqrt{AB^2} = 5$

$\Rightarrow$ Perimeter $= 3 + 4 + 5$

$= 12$ units
### Part II: Linear Relations Practice Test

#### Answer Key

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| 10. $x: 3, \text{or } (3,0)$  
$y: \frac{12}{7}, \text{or } (0, \frac{12}{7})$ | 11. $x: 15, \text{or } (15,0)$  
$y: -5, \text{or } (0, -5)$ | 12. $x$: does not exist  
$y$: -5, or (0, -5) |
| 13. $2x - y - 5 = 0$ | 14. $y = -5x + 15$  
$15. x - 7y + 23 = 0$ | 16. $-58$  
$17. 4x + 3y - 9 = 0$  
$18. 2x + y - 16 = 0$ | 19. $x - 7 = 0$  
$20. y = -2x + 12$  
$21. (0,0)$ | 22. $k = \frac{15}{2}$  
$23. \left( -\frac{7}{2}, \frac{21}{2} \right)$  
$24. k = \frac{5}{6}$ |