

TMT V5 First 20 Algebra Prep

1. Multiply  $(x-4)^2$  [63]  
 $(x-4)(x-4)$   
 $x^2 - 4x - 4x + 16 = x^2 - 8x + 16$

2. Find the slope if given two points, (-8, 7) and (2, 8) [210]

$$\frac{y_2 - y_1}{x_2 - x_1} = \frac{8 - 7}{2 - (-8)} = \frac{1}{10}$$

3. Solve  $|x - 9| = 24$  [84]

$$\begin{array}{l} x - 9 = 24 \\ +9 \quad +9 \\ \hline x = 33 \end{array} \qquad \begin{array}{l} x - 9 = -24 \\ +9 \quad +9 \\ \hline x = -15 \end{array}$$

4. Evaluate  $f(x) = -2x^2 - x + 2$  if  $x = -1$

[110]  $-2(-1)^2 - (-1) + 2$   
 $-2 \cdot 1 + 1 + 2$   
 $-2 + 1 + 2 = -1 + 2 = 1$

5. Simplify  $\frac{2}{15} \cdot \frac{5}{7}$  [42]

$$\frac{2}{3 \cdot 5} \cdot \frac{5}{7} = \frac{2}{21}$$

6. Simplify  $\frac{-6 \pm 6\sqrt{2}}{4}$  [214]

Factor  
 $\frac{6(-1 \pm \sqrt{2})}{4} = \frac{3 \cdot 2(-1 \pm \sqrt{2})}{2 \cdot 2} = \frac{3(-1 \pm \sqrt{2})}{2}$   
 OR  
 $\frac{-3 \pm 3\sqrt{2}}{2}$

7. Multiply  $(2x - 10)(x + 1)$  [60]

$$2x^2 + 2x - 10x - 10 = 2x^2 - 8x - 10$$

8. Solve. Show 3+ steps of work [89]

$$\begin{array}{r} -5 - (x + 1) = 9x + 5 \\ -5 - x - 1 = 9x + 5 \\ -x - 6 = 9x + 5 \\ +x \qquad \quad +x \\ \hline -6 = 10x + 5 \\ -5 \qquad \quad -5 \\ \hline -11 = 10x \end{array}$$

$$\frac{-11}{10} = \frac{10x}{10} \rightarrow x = \frac{-11}{10}$$

9. Simplify  $\frac{2}{5} \cdot \frac{7}{3}$  [50]

$$\frac{2 \cdot 7}{5 \cdot 3} = \frac{14}{15}$$

10. Factor out a GCF  $2x^2 - 14x + 2ax$  [58]

$$2x(x - 7 + a)$$

11. Simplify  $(2a^3b^7)^2 \cdot b^9$  [206]

$$4a^6b^{14} \cdot b^9 = 4a^6b^{23}$$

12. Find the following:  $8y = \frac{4x}{8} - \frac{8}{8}$  [135]

Slope:  $\frac{1}{2}$   
 Y-Intercept: (0, -1)

13. Solve  $(5x + 1)(x - 9) = 0$  [85]

$$\begin{array}{l} 5x + 1 = 0 \\ -1 \quad -1 \\ \hline 5x = -1 \\ \frac{5x}{5} = \frac{-1}{5} \end{array} \qquad \begin{array}{l} x - 9 = 0 \\ +9 \quad +9 \\ \hline x = 9 \end{array}$$

14. Solve  $-2n - 4 < -7$  [82]

$$\begin{array}{l} -2n - 4 < -7 \\ +4 \quad +4 \\ \hline -2n < -3 \\ \text{Divide by } -2 \\ \text{neg. sign switches} \\ \hline n > \frac{3}{2} = 1.5 \end{array}$$

15. Solve  $x^2 - 9x - 1 = 1$  [88]

$$\begin{array}{l} x^2 - 9x - 1 = 1 \\ -1 \quad -1 \\ \hline x^2 - 9x - 2 = 0 \\ a=1 \quad b=-9 \quad c=-2 \\ x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \\ = \frac{-(-9) \pm \sqrt{81 - 4(1)(-2)}}{2(1)} \\ = \frac{9 \pm \sqrt{89}}{2} \end{array}$$

16. Simplify  $\frac{(x-5)(x+12)}{x^2-25}$  [209]

$$\frac{(x-5)(x+12)}{(x-5)(x+5)} = \frac{x+12}{x+5}$$

17. Simplify  $\frac{2}{11} + \frac{5}{2}$  [39]

$$\frac{2 \cdot 2}{2 \cdot 11} + \frac{5 \cdot 11}{2 \cdot 11} = \frac{4}{22} + \frac{55}{22} = \frac{59}{22}$$

18. Factor  $x^2 + 8x - 9$  [53]

$$(x+9)(x-1)$$

19. Simplify (PEMDAS)  $5(3 - 2(x+3))$  [212]

$$\begin{array}{l} 5(3 - 2x - 6) \\ 5(-3 - 2x) \\ -15 - 10x = -10x - 15 \text{ or } 5(-2x - 3) \end{array}$$

20. Simplify  $\frac{6x^2}{40x^3}$  [74]

$$\frac{2 \cdot 3 \cdot x^2}{2 \cdot 20 \cdot x^3} = \frac{3}{20x}$$