

TMT V3 Top 20 Algebra Prep

1. Simplify $1\frac{1}{2} + \frac{2}{7}$ [222]

$$\frac{7 \cdot 3}{7 \cdot 2} + \frac{2 \cdot 2}{7 \cdot 2} = \frac{21}{14} + \frac{4}{14} = \frac{25}{14}$$

2. Solve $6x^2 - 10x - 4 = 0$ [85]

$$2(3x^2 - 5x - 2) = 0$$

$$2(3x+1)(x-2) = 0$$

$$3x+1=0 \quad x-2=0$$

$$\frac{3x}{3} = \frac{-1}{3} \quad x = 2$$

$$x = -\frac{1}{3}$$

3. Find the midpoint given (1,4) & (3,8) [218]

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

$$\left(\frac{1+3}{2}, \frac{4+8}{2} \right) \Rightarrow (2, 6)$$

4. Solve $A = \frac{1}{2}b \cdot h$ for b [205]

$$\frac{2A}{h} = \frac{b \cdot h}{h}$$

$$b = \frac{2A}{h}$$

5. Simplify $\frac{15x^9y}{25x^2y}$ [24]

$$\frac{5 \cdot 3 \cdot x^7 \cdot x^2 \cdot y}{5 \cdot 5 \cdot x^2 \cdot y} = \frac{3x^7}{5}$$

6. Simplify $(3a+7n)^2$ [211]

$$(3a+7n)(3a+7n)$$

$$9a^2 + 21an + 21an + 49n^2$$

7. Simplify $\frac{8}{7} \cdot \frac{7}{2}$ [50]

$$\frac{1}{8} \cdot \frac{7}{2} = \frac{7}{16}$$

$$9a^2 + 42an + 49n^2$$

8. Simplify (PEMDAS) $-1(x+5)^2 + 3$ [212]

$$-1(x+5)(x+5) + 3$$

$$-1(x^2 + 5x + 5x + 25) + 3$$

$$-x^2 - 10x - 25 + 3 = -x^2 - 10x - 22$$

9. Clear fractions, solve $\frac{3}{7}a + 2 = \frac{1}{3}$ [207]

$$7 \cdot 3 \cdot \frac{3}{7}a + 2 \cdot 3 \cdot 7 = \frac{1}{3} \cdot 3 \cdot 7$$

$$9a + 42 = 7$$

$$9a = -35$$

$$-x^2 - 10x - 22$$

$$a = -\frac{35}{9}$$

10. Simplify $(3a^3b^2)^2 \cdot 2(a^1b^2)$ [206]

$$9a^6b^4 \cdot 2a^1b^2$$

$$18a^7b^6$$

11. Simplify $\frac{2 \pm \sqrt{32}}{2}$ [214]

$$\frac{2 \pm \sqrt{16} \cdot \sqrt{2}}{2} = \frac{2 \pm 4\sqrt{2}}{2}$$

12. Multiply $(x^2 + 2x - 3)(x - 5)$ [213]

$$x^3 - 5x^2 + 2x^2 - 10x - 3x + 15$$

13. Solve $(x+4)^2 = 15$ [208]

$$\sqrt{(x+4)^2} = \sqrt{15}$$

$$|x+4| = \sqrt{15}$$

$$x+4 = \sqrt{15} \quad x+4 = -\sqrt{15}$$

$$-4 \quad -4 \quad -4 \quad -4$$

$$x = -4 + \sqrt{15} \quad x = -4 - \sqrt{15}$$

14. Simplify $\frac{2x^2 + 10x + 12}{x^2 - 4}$ [209]

$$\frac{2(x^2 + 5x + 6)}{(x+2)(x-2)} = \frac{2(x+2)(x+3)}{(x+2)(x-2)} = \frac{2(x+3)}{(x-2)}$$

15. Given $f(x) = -x^2 - 3x - 2$, find $f(-1)$ [231]

$$f(-1) = -(-1)^2 - 3(-1) - 2$$

$$f(-1) = -1 + 3 - 2$$

$$f(-1) = 0$$

16. Write an equation using (-1,8) & (-2,-1) [210]

$$\text{slope} = m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-1 - 8}{-2 - (-1)} = \frac{-9}{-1} = 9$$

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

$$y + 1 = 9(x + 2) \text{ or } y - 8 = 9(x + 1)$$

$$\text{or } y = 9x + 17$$

17. Simplify $\frac{2}{9} \cdot \frac{1}{6}$ [42]

$$\frac{2}{54} = \frac{1}{27}$$

18. Find the distance between (2,10) & (6,1) [217]

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

$$d = \sqrt{(6-2)^2 + (1-10)^2}$$

$$d = \sqrt{16 + 81} = \sqrt{97}$$

19. Find 3 points on $f(x) = x^2 - 3x + 1$ [271]

X	Y
0	1
1	-1
2	-1

$$(0)^2 - 3(0) + 1$$

$$(1)^2 - 3(1) + 1$$

$$(2)^2 - 3(2) + 1$$

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

$$-(2x+2) - 2(x-3) = 9x+1$$

$$-2x - 2 - 2x + 6 = 9x + 1$$

$$-4x + 4 = 9x + 1$$

$$+4x \quad +4x$$

$$4 = 13x + 1$$

$$-1 \quad -1$$

$$\frac{3}{13} = \frac{13x}{13}$$

$$x = \frac{3}{13}$$