

SOLUTIONS  $\Rightarrow$  GENERAL/STANDARD/TRANSFORMATIONAL FORM

1.  $2y - 16x = 4x^2 + 10$   
 $2y = 4x^2 + 16x + 10$   
 $y = 2x^2 + 8x + 5$  (General Form)

①  $y - 5 = 2x^2 + 8x$   
②  $y - 5 = 2(x^2 + 4x)$   
③  $y - 5 + 8 = 2(x^2 + 4x + 4)$   
④  $y + 3 = 2(x + 2)^2$

⑤  $\frac{1}{2}(y + 3) = (x + 2)^2$  (Transformational Form)  
 $y = 2(x + 2)^2 - 3$  (Standard Form)

2.  $3y - 15x^2 = -45x - 3$   
 $3y = 15x^2 - 45x - 3$   
 $y = 5x^2 - 15x - 1$  (GF)

①  $y + 1 = 5x^2 - 15x$   
②  $y + 1 = 5(x^2 - 3x)$   
③  $y + 1 + \frac{45}{4} = 5(x^2 - 3x + \frac{9}{4})$   
④  $y + \frac{41}{4} + \frac{45}{4} = 5(x - \frac{3}{2})^2$   
 $y + \frac{49}{4} = 5(x - \frac{3}{2})^2$

⑤  $\frac{1}{5}(y + \frac{49}{4}) = (x - \frac{3}{2})^2$  (TF)  
 $y = 5(x - \frac{3}{2})^2 - \frac{49}{4}$  (SF)

$$3. \quad y+3 = x^2+2x+1$$

$$y = x^2+2x+1-3$$

$$y = x^2+2x-2 \quad (\text{GF})$$

$$\textcircled{1} \quad y+2 = x^2+2x$$

$$\textcircled{3} \quad y+2+1 = x^2+2x+1$$

$$\textcircled{4} \quad y+3 = (x+1)^2$$

$$\textcircled{5} \quad (y+3) = (x+1)^2 \quad (\text{TF})$$

$$y = (x+1)^2 - 3 \quad (\text{SF})$$

$$4. \quad y-2 = 2x^2-6x-1$$

$$y = 2x^2-6x-1+2$$

$$y = 2x^2-6x+1 \quad (\text{GF})$$

$$\textcircled{1} \quad y-1 = 2x^2-6x$$

$$\textcircled{2} \quad y-1 = 2(x^2-3x)$$

$$\textcircled{3} \quad y-1+\frac{9}{4} = 2(x^2-3x+\frac{9}{4})$$

$$y-\frac{4}{4}+\frac{18}{4} = 2(x^2-3x+\frac{9}{4})$$

$$\textcircled{4} \quad y+\frac{14}{4} = 2(x-\frac{3}{2})^2$$

$$\textcircled{5} \quad \frac{1}{2}(y+\frac{14}{4}) = (x-\frac{3}{2})^2 \quad (\text{TF})$$

$$\frac{1}{2}(y+\frac{7}{2}) = (x-\frac{3}{2})^2 \quad (\text{TF} - \text{lowest terms!})$$

$$y = 2(x-\frac{3}{2})^2 - \frac{7}{2} \quad (\text{SF})$$

$$5. 2y = x^2 + 6x - 4$$

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

$$\text{OR } y = \frac{1}{2}x^2 + 3x - 2 \text{ (GF)}$$

$$\textcircled{1} y + 2 = \frac{1}{2}x^2 + 3x$$

$$\textcircled{2} y + 2 = \frac{1}{2}(x^2 + 6x)$$

$$\textcircled{3} y + 2 + \frac{9}{2} = \frac{1}{2}(x^2 + 6x + 9)$$

$$y + \frac{4}{2} + \frac{9}{2} = \frac{1}{2}(x^2 + 6x + 9)$$

$$\textcircled{4} y + \frac{13}{2} = \frac{1}{2}(x+3)^2$$

$$\textcircled{5} 2\left(y + \frac{13}{2}\right) = (x+3)^2 \text{ (TF)}$$

$$y = \frac{1}{2}(x+3)^2 - \frac{13}{2} \text{ (SF)}$$

$$6. 3y = 6x^2 + \frac{3}{2}x + 1$$

$$y = 2x^2 + \frac{3}{6}x + \frac{1}{3} \quad \frac{3 \div 3}{2} \div 3$$

$$y = 2x^2 + \frac{1}{2}x + \frac{1}{3} \text{ (GF)} = \frac{3}{6} \text{ OR } \frac{1}{2}$$

$$\textcircled{1} y - \frac{1}{3} = 2x^2 + \frac{1}{2}x \quad \frac{1 \div 2}{2} \div 2$$

$$\textcircled{2} y - \frac{1}{3} = 2\left(x^2 + \frac{1}{4}x\right) \quad \frac{1}{2} \times \frac{1}{2} = \frac{1}{4}$$

$$\textcircled{3} y - \frac{1}{3} + \frac{2}{64} = 2\left(x^2 + \frac{1}{4}x + \frac{1}{64}\right)$$

$$y - \frac{1}{3} + \frac{1}{32} = 2\left(x^2 + \frac{1}{4}x + \frac{1}{64}\right)$$

$$y - \frac{32}{96} + \frac{3}{96} = 2\left(x^2 + \frac{1}{4}x + \frac{1}{64}\right)$$

$$\textcircled{4} y - \frac{29}{96} = 2\left(x + \frac{1}{8}\right)^2$$

$$\textcircled{5} \frac{1}{2}\left(y - \frac{29}{96}\right) = \left(x + \frac{1}{8}\right)^2 \text{ (TF)}$$

$$y = 2\left(x + \frac{1}{8}\right)^2 + \frac{29}{96} \text{ (SF)}$$

$$7. \quad y - 5x^2 = -15x - 1$$

$$y = 5x^2 - 15x - 1 \quad (\text{GF})$$

$$\textcircled{1} \quad y + 1 = 5x^2 - 15x$$

$$\textcircled{2} \quad y + 1 = 5(x^2 - 3x)$$

$$\textcircled{3} \quad y + 1 + \frac{45}{4} = 5\left(x^2 - 3x + \frac{9}{4}\right)$$

$$y + \frac{4}{4} + \frac{45}{4} = 5\left(x^2 - 3x + \frac{9}{4}\right)$$

$$\textcircled{4} \quad y + \frac{49}{4} = 5\left(x - \frac{3}{2}\right)^2$$

$$\textcircled{5} \quad \frac{1}{5}\left(y + \frac{49}{4}\right) = \left(x - \frac{3}{2}\right)^2 \quad (\text{TF})$$

$$y = 5\left(x - \frac{3}{2}\right)^2 - \frac{49}{4} \quad (\text{SF})$$

$$8. \quad y = x^2 - \frac{3}{5}x \quad (\text{GF})$$

$$\textcircled{3} \quad y + \frac{9}{100} = \left(x^2 - \frac{3}{5}x + \frac{9}{100}\right)$$

$$\begin{aligned} \frac{3}{5} \times \frac{1}{2} &= \frac{3}{10} \\ \Rightarrow \left(\frac{3}{10}\right)^2 &= \frac{9}{100} \end{aligned}$$

$$\textcircled{4} \quad y + \frac{9}{100} = \left(x - \frac{3}{10}\right)^2$$

$$\textcircled{5} \quad \left(y + \frac{9}{100}\right) = \left(x - \frac{3}{10}\right)^2 \quad (\text{TF})$$

$$y = \left(x - \frac{3}{10}\right)^2 - \frac{9}{100} \quad (\text{SF})$$

$$9. \quad 7y - 7x^2 + 21x = 0$$

$$7y = 7x^2 - 21x$$

$$y = x^2 - 3x \quad (\text{GF})$$

$$\textcircled{3} \quad y + \frac{9}{4} = \left(x^2 - 3x + \frac{9}{4}\right)$$

$$\textcircled{4} \quad y + \frac{9}{4} = \left(x - \frac{3}{2}\right)^2$$

$$\textcircled{5} \quad \left(y + \frac{9}{4}\right) = \left(x - \frac{3}{2}\right)^2 \quad (\text{TF})$$

$$y = \left(x - \frac{3}{2}\right)^2 - \frac{9}{4} \quad (\text{SF})$$

$$10. \quad y - 4 = x^2 - \frac{2}{3}x + 8$$

$$y = x^2 - \frac{2}{3}x + 8 + 4$$

$$y = x^2 - \frac{2}{3}x + 12 \quad (\text{GF})$$

$$\textcircled{1} \quad y - 12 = x^2 - \frac{2}{3}x$$

$$\textcircled{3} \quad y - 12 + \frac{4}{36} = \left(x^2 - \frac{2}{3}x + \frac{4}{36}\right) \quad \begin{array}{l} \rightarrow \frac{2}{3} \times \frac{1}{2} = \frac{2}{6} \\ \Rightarrow \left(\frac{2}{6}\right)^2 = \frac{4}{36} \end{array}$$

$$y - \frac{432}{36} + \frac{4}{36} = \left(x - \frac{2}{3}x + \frac{4}{36}\right)$$

$$\textcircled{4} \quad y - \frac{428}{36} = \left(x - \frac{2}{6}\right)^2$$

$$y - \frac{107}{9} = \left(x - \frac{1}{3}\right)^2 \quad \text{LOWEST TERMS!}$$

$$\textcircled{5} \quad \left(y - \frac{107}{9}\right) = \left(x - \frac{1}{3}\right)^2 \quad (\text{TF})$$

$$y = \left(x - \frac{1}{3}\right)^2 + \frac{107}{9} \quad (\text{SF})$$