Answers Sheet

Solving Quadratics

1.

a) **$9x^2 + 11x + 2$**

$9x^2 + 9x + 2x + 2$

$9x (x + 1) + 2 (x + 1)$

$(x + 1) (9x + 2)$

b) **$9x^2 + 11x + 2 = 0$**

$(x + 1) (9x + 2) = 0$

$(x + 1) = 0$; $(9x + 2) = 0$

$x = -1$; $x = -2 / 9$

2.

a) **$w^2 + 2w – 3$ s**

$w^2 + 3w – w – 3$

$w (w + 3) – 1 (w + 3)$

$(w + 3) (w – 1)$

b) **$w^2 + 2w – 3 = 0$**

$(w + 3) (w – 1) = 0$

$(w + 3) = 0$; $(w – 1) = 0$

$w = -3$; $w = 1$

3.

a) **$b^2 – 17b + 63$**

$b^2 – 9b – 8b + 63$

$b (b – 9) – 8 (b – 9)$

$(b – 9) (b – 8)$

b) **$b^2 – 17b + 63 = 0$**

$(b – 9) (b – 8) = 0$

$(b – 9) = 0$; $(b – 8) = 0$

$b = 9$; $b = 8$

4.

a) **$6f^2 + 20f + 6$**

$6f^2 + 18f + 2f + 6$

$6f (f + 3) + 2 (f + 3)$

$(f + 3) (6f + 2)$

b) **$6f^2 + 20f + 6 = 0$**

$(f + 3)(6f + 2) = 0$

$(f + 3) = 0$; $(6f + 2) = 0$

$f = -3$; $f = -2 / 6 = -1 / 3$

5.

a) **$2x^2 + 10x + 12$**

$2x^2 + 4x + 6x + 12$

$2x(x + 2) + 6(x + 2)$

$(x + 2)(2x + 6)$

b) **$2x^2 + 10x + 12 = 0$**

$(x + 2)(2x + 6) = 0$

$(x + 2) = 0$; $(2x + 6) = 0$

$x = -2$; $x = -6 / 2 = -3$

6.

a) **$3y^2 + 8y - 3$**

$3y^2 + 9y - y - 3$

$3y(y + 3) - 1(y + 3)$

$(y + 3)(3y - 1)$

b) **$3y^2 + 8y - 3 = 0$**

$(y + 3)(3y - 1) = 0$

$(y + 3) = 0$; $(3y - 1) = 0$

$y = -3$; $y = 1 / 3$

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7. **$12y^2 - y - 6 = 0$**

$12y^2 - 9y + 8y - 6 = 0$

$3y(4y - 3) + 2(4y - 3) = 0$

$(4y - 3) + (3y + 2) = 0$

$4y - 3 = 0$; $3y + 2 = 0$

$y = 3 / 4$; $y = -2/ 3$

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8. **$x^2 + 2x - 15 = 0$**

$x^2 - 3x + 5x - 15 = 0$

$x(x - 3) + 5(x - 3) = 0$

$(x - 3)(x + 5) = 0$

$x - 3 = 0$; $x + 5 = 0$

$x = 3$; $x = -5$

9. $\mathbf{4y^2 - 18y + 20 = 0}$

$4y^2 - 8y - 10y + 20 = 0$

$4y\,(y - 2) - 10\,(y - 2) = 0$

$(y - 2)\,(4y - 10) = 0$

$y - 2 = 0$; $4y - 10 = 0$

$y = 2$; $y = 10 / 4 = 5 / 2$

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10. $2z^2 + z - 3 = 0$

$2z^2 + 3z - 2z - 3 = 0$

$z\,(2z + 3) - 1\,(2z + 3) = 0$

$(2z + 3)\,(z - 1) = 0$

$2z + 3 = 0$; $z - 1 = 0$

$z = -3 / 2$; $z = 1$

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11. $\mathbf{x^2 + x - 20 = 0}$

$x^2 - 4x + 5x - 20 = 0$

$x\,(x - 4) + 5\,(x - 4) = 0$

$(x - 4)\,(x + 5) = 0$

$x - 4 = 0$; $x + 5 = 0$

$x = 4$; $x = -5$

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12. $\mathbf{14y^2 - 3y - 5 = 0}$

$14y^2 - 10y + 7y - 5 = 0$

$2y\,(7y - 5) + 1\,(7y - 5) = 0$

$(7y - 5)\,(2y + 1) = 0$

$7y - 5 = 0$; $2y + 1 = 0$

$y = 5 / 7$; $y = -1 / 2$

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13. $\mathbf{21y^2 + 2y - 3 = 0}$

$21y^2 - 7y + 9y - 3 = 0$

$7y\,(3y - 1) + 3\,(3y - 1) = 0$

$(3y - 1)\,(7y + 3) = 0$

$3y - 1 = 0$; $7y + 3 = 0$

$y = 1 / 3$; $y = -3 / 7$

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14. $4 (x^2 + 10x + 16) = 0$

$4x^2 + 40x + 64 = 0$

$4x^2 + 8x + 32x + 64 = 0$

$4x (x + 2) + 32 (x + 2) = 0$

$(x + 2) (4x + 32) = 0$

$x + 2 = 0$; $4x + 32 = 0$

$x = -2$; $x = -32 / 4 = -8$

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15. $x^2 – 36 = 0$

$x^2 + 6x – 6x – 36 = 0$

$x (x + 6) – 6 (x + 6) = 0$

$(x + 6) (x – 6) = 0$

$x + 6 = 0$; $x – 6 = 0$

$x = -6$; $x = 6$

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16. $y^2 – 14y + 45 = 0$

$y^2 – 9y – 5y + 45 = 0$

$y (y – 9) – 5 (y – 9) = 0$

$(y – 9) (y – 5) = 0$

$y – 9 = 0$; $y – 5 = 0$

$y = 9$; $y = 5$

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17. $x^2 + 10x + 25 = 0$

$x^2 + 5x + 5x + 25 = 0$

$x (x + 5) + 5 (x + 5) = 0$

$(x + 5) (x + 5) = 0$

$x + 5 = 0$; $x + 5 = 0$

$x = -5$; $x = -5$

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18. $3x^2 + 7x + 2 = 0$

$3x^2 + 6x + x + 2 = 0$

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

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

$x + 2 = 0$; $3x + 1 = 0$

$x = -2$; $x = - 1 /3$
