

Secondary Math II

Unit 7 Review

Solution Guide

Expand the following

1. $(2x-7)(3x+9)$

$$6x^2 + 18x - 21x - 63$$

$$\boxed{6x^2 - 3x - 63}$$

2. $(3x+4)^2$

$$(3x+4)(3x+4)$$

OR

$$(a+b)^2 = a^2 + 2ab + b^2$$

$$= \boxed{9x^2 + 24x + 16}$$

Expand the following

$$3. (x-11)^2$$

$$(a-b)^2 = a^2 - 2ab + b^2$$

$$\boxed{x^2 - 22x + 121}$$

$$4. (5x-6)(5x+6)$$

$$(a+b)(a-b) = a^2 - b^2$$

$$\boxed{25x^2 - 36}$$

Factor the following

$$5. \frac{3m^5n^2}{3m^3n} - \frac{12m^3n}{3m^3n}$$

$$\boxed{3m^3n(m^2n - 4)}$$

$$6. 6x(x-2) + 5(x-2)$$

$$\boxed{(x-2)(6x+5)}$$

Factor the following

7. $x^2 + 6x + 8$

$1 \cdot 8 = 8$
 $\begin{array}{r} 1 \ 8 \\ \hline 2 \ 4 \end{array} = 6$

$x^2 + 2x + 4x + 8$

$x(x+2) + 4(x+2)$

$(x+2)(x+4)$

8. $a^2 - b^2 = (a+b)(a-b)$

$x^4 - 16$

$(x^2 + 4)(x^2 - 4)$

$(x^2 + 4)(x+2)(x-2)$

Factor the following

9. $3x^2 + 4x - 7$

$3 \cdot -7 = -21$
 $\begin{array}{r} + \ - \\ \hline -3 \ +7 \end{array} = 4$

$3x^2 - 3x + 7x - 7$

$3x(x-1) + 7(x-1)$

$(x-1)(3x+7)$

10. $5x^2 - 8x + 3$

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

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

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

$5 \cdot 3 = 15$
 $\begin{array}{r} 1 \ 15 \\ \hline -8 \ -3 \ -5 \end{array}$

Solve for x. Give EXACT answers.

$$11. \frac{3x^2}{3} = \frac{75}{3}$$

$$\sqrt{x^2} = \sqrt{25}$$

$$x = \pm 5$$

$$12. x^2 - 16 = 4$$

$$+16 \quad +16$$

$$\sqrt{x^2} = \sqrt{20}$$

$$x = \pm 2\sqrt{5}$$

Solve for x. Give EXACT answers.

$$13. x^2 + 6x = -9$$

$$+9 \quad +9$$

$$x^2 + 6x + 9 = 0$$

Special factoring

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

$$2ab = 2 \cdot x \cdot 3 = 6x \checkmark$$

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

$$x+3=0 \quad x+3=0$$

$$-3 \quad -3 \quad -3 \quad -3$$

$$x = -3 \quad x = -3$$

$$14. 2x^2 + 23x = -11$$

$$+11 \quad +11$$

$$2x^2 + 23x + 11 = 0$$

$$2 \cdot 11 = 22$$

$$23 \quad \begin{matrix} 1 & 22 \\ 2 & 11 \end{matrix}$$

$$2x^2 + x + 22x + 11 = 0$$

$$x(2x+1) + 11(2x+1) = 0$$

$$(2x+1)(x+11) = 0$$

$$2x+1=0 \quad x+11=0$$

$$-1 \quad -1 \quad -11 \quad -11$$

$$\frac{2x}{2} = \frac{-1}{2} \quad x = -11$$

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

Find the zeros of each functions by factoring:

5. $y = 3x^2 + 17x + 22$ $3 \cdot 22 = 66$ 16. $f(x) = x^2 - 10x - 11$

$0 = 3x^2 + 17x + 22$ $\begin{matrix} 1 & 66 \\ 6 & 11 \end{matrix}$ $0 = x^2 - 10x - 11$

$0 = 3x^2 + 6x + 11x + 22$ $0 = x^2 - 11x + x - 11$

$0 = 3x(x+2) + 11(x+2)$ $0 = x(x-11) + 1(x-11)$

$0 = (x+2)(3x+11)$ $0 = (x-11)(x+1)$

$x+2=0$ $3x+11=0$

$-2 \quad -2$ $-11 \quad -11$

$x = -2$ $\frac{3x}{3} = \frac{-11}{3}$

$x = -11/3$

$x-11=0$ $x+1=0$

$+11 \quad +11$ $-1 \quad -1$

$x = 11$ $x = -1$

What constant must be added to the polynomial to make it a perfect square?

17. $x^2 + 12x + \underline{36}$ 18. $x^2 + 7x + \underline{\frac{49}{4}}$

$$\frac{12}{2} = 6^2 = 36$$

$$\left(\frac{7}{2}\right)^2 = \frac{7^2}{2^2} = \frac{49}{4}$$

Write the following in vertex form by completing the square.

$$19. f(x) = x^2 - 8x - 8$$

$$f(x) = (x^2 - 8x + 16) - 16 - 8$$

$$\frac{-8}{2} = (-4)^2 = 16$$

$$f(x) = (x - 4)^2 - 24$$

Write the following in vertex form by completing the square.

$$20. y = x^2 + 6x - 1$$

$$y = (x^2 + 6x + 9) - 9 - 1$$

$$\frac{6}{2} = 3^2$$

$$y = (x + 3)^2 - 10$$

Write the following in vertex form by completing the square.

$$21. f(x) = 2x^2 + 12x + 16$$

$$f(x) = (2x^2 + 12x + \underline{\quad}) - \underline{\quad} + 16$$

$$\frac{b}{2} = 3^2 = 9 \quad f(x) = 2(x^2 + 6x + \underline{9}) - \underline{18} + 16$$

$+18 - 18$

$$f(x) = 2(x+3)^2 - 2$$

22. Write a quadratic function given the zeros of -11 and 3

$$x = -11 \quad x = 3$$

$$+11 \quad +11 \quad -3 \quad -3$$

$$(x+11) = 0 \quad (x-3) = 0$$

$$(x+11)(x-3) = 0$$

$$x^2 - 3x + 11x - 33$$

$$f(x) = x^2 + 8x - 33$$

23. Write a quadratic function given the zeros of -4 and -7

$$\begin{array}{cc}
 X = -4 & X = -7 \\
 +4 \quad +4 & +7 \quad +7 \\
 (X+4) = 0 & (X+7) = 0 \\
 (X+4)(X+7) = 0 \\
 X^2 + 7X + 4X + 28
 \end{array}$$

$$f(x) = X^2 + 11X + 28$$

24. Given $f(x) = 2(x-3)^2 - 5$

a. Write the vertex

$$(3, -5)$$

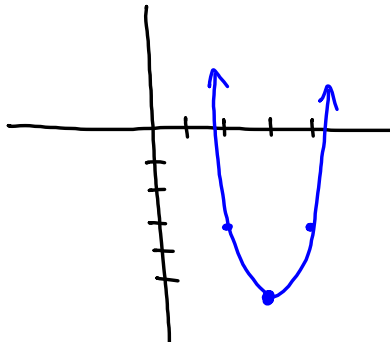
b. Write the equation for the axis of symmetry

$$X = 3$$

c. Describe any transformations

- Vertical stretch by 2
- Shift right 3
- Shift down 5

d. Graph $f(x)$ on the right



25. The length of a rectangular plot of land is 6 miles less than its width. If the area of the rectangle is 135 square miles, what are the dimensions of the land?

$$W(W-6) = 135$$

$$W^2 - 6W = 135$$

$$-135 \quad -135$$

$$1 \cdot -135 = -135 \quad W^2 - 6W - 135 = 0$$

$$l = 15 - 6 = 9 \quad W^2 + 9W - 15W - 135 = 0$$

$$W(W+9) - 15(W+9) = 0$$

$$(W+9)(W-15) = 0$$

$$W+9=0 \quad W-15=0$$

$$-9 \quad -9 \quad +15 \quad +15$$

$$\cancel{W = -9} \quad W = 15$$

$$W = 15 \text{ mi}$$

$$l = 9 \text{ mi}$$

26. The product of numbers who have a difference of five is 84. Write an equation and use factoring to find the two numbers.

$$X(X-5) = 84$$

$$X^2 - 5X = 84$$

$$-84 \quad -84$$

$$1 \cdot -84 = -84 \quad X^2 - 5X - 84 = 0$$

$$\begin{array}{r} 1 \ 84 \\ 2 \ 42 \\ 4 \ 21 \\ +7 \ -12 \end{array}$$

$$(X+7)(X-12) = 0$$

$$X+7=0 \quad X-12=0$$

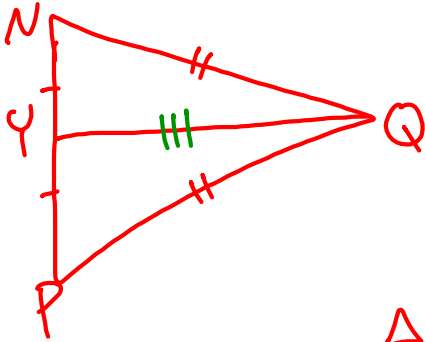
$$-7 \quad -7 \quad +12 \quad +12$$

$$X = -7 \quad X = 12$$

$$12 - 5 = 7$$

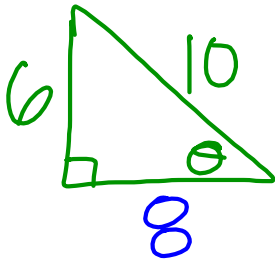
$$12 \cdot 7 = 84 \checkmark$$

27.



Statement	Reason
$\overline{NY} \cong \overline{YP}$	given
$\overline{NQ} \cong \overline{PQ}$	given
$\overline{YQ} \cong \overline{YQ}$	reflexive
$\triangle NYQ \cong \triangle PYQ$	SSS

28.



$$\cos \theta = \frac{8}{10}$$

$$\tan \theta = \frac{6}{8}$$

$$\sin \theta = \frac{6}{10} = \frac{3}{5}$$

$$a^2 + b^2 = c^2$$

$$a^2 + 6^2 = 10^2$$

$$a^2 + 36 = 100$$

$$-36 \quad -36$$

$$\sqrt{a^2} = \sqrt{64}$$

$$a = 8$$

29. Simplify

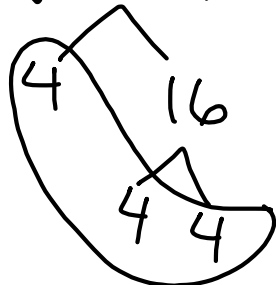
$$\frac{3x^{-2}y}{6x^3y^{-1}} = \frac{1y^2}{2x^5}$$

$$\frac{x^{-2}}{x^3} = \frac{1}{x^2 x^3} = \frac{1}{x^5}$$

$$\frac{y}{y^{-1}} = \frac{y \cdot y}{1} = \frac{y^2}{1}$$

30. Simplify $64^{2/3}$

$$(\sqrt[3]{64})^2$$



$$(4)^2 = \boxed{16}$$