

Algebra 1

Unit 3 Pre-Test

Name: Key  
Block: \_\_\_\_\_

Make sure to show all work for all problems. Circle final answers.

1. Find the sum.

$$(6y^3 + 5y^2 - 3y - 2) + (9y^4 - 3y^2 - 5y - 1)$$

$$\boxed{9y^4 + 6y^3 + 2y^2 - 8y - 3}$$

2. Find the difference.

$$(5x^3 + 6x^2 + 1) - (7x^2 - 9)$$

$$\boxed{5x^3 - x^2 + 10}$$

3. Use the FOIL method to find the product.

$$(3y + 7)(2y - 4)$$

$$6y^2 - 12y + 14y - 28$$

$$\boxed{6y^2 + 2y - 28}$$

4. Solve the equation.

$$\begin{array}{r} n^2 + 144 = 24n \\ -24n \quad -24n \\ \hline \end{array}$$

$$\boxed{n=12}$$

$$\begin{array}{l} n^2 - 24n + 144 = 0 \\ (n-12)(n-12) = 0 \end{array}$$

5. Solve the equation.

$$8t^2 + 4t = 0$$

$$4t(2t + 1) = 0$$

$$4t = 0 \quad 2t + 1 = 0$$

$$\boxed{t=0, \quad t=-\frac{1}{2}}$$

6. Find the degree of the monomial.

$$-4t^7s^5x^4y$$

$$\boxed{17}$$

7. Factor the polynomial.

$$x^2 + 3x - 18$$

$$(x+6)(x-3) \quad \boxed{x=-6; x=3}$$

8. Factor the polynomial.

$$8r^2 + 16r - 64$$

$$8(r^2 + 2r - 8)$$
$$\boxed{8(r+4)(r-2)}$$

9. Factor the polynomial.

$$16y^2 + 48y + 36$$

$$\boxed{(4y+6)^2}$$

10. Find the zeros of the function.

$$y = -x^2 + 100$$

$$-100 = -x^2$$

$$100 = x^2$$

$$\boxed{x = \pm 10}$$

11. Solve the equation by finding the zeros.

$$-y^2 - y + 12 = 0$$

$$y^2 + y - 12 = 0$$

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

$$\boxed{y = -4; y = 3}$$

12. Solve the following real-life application problem.

The height (in feet) of an underhand volleyball serve can be modeled by

$h = -16t^2 + 30t + 4$ , where  $t$  is the time in seconds. After how many seconds is the ball 16 feet above the ground?

$$\begin{array}{r} 16 \\ -16t^2 + 30t + 4 \\ \hline -16t^2 + 30t - 12 \end{array}$$

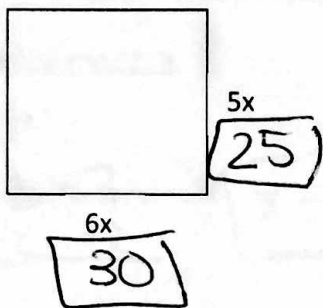
$$-16t^2 + 30t - 12$$

\* calculator

~0.6 seconds  
~1.3 seconds

13. Use the given area  $A$  to find the dimensions of the figure.

$$A = 750\text{cm}^2$$



$$\begin{aligned} 5x(6x) &= 750 \\ \cancel{30}x^2 &= \frac{750}{\cancel{30}} \\ x^2 &= 25 \\ x &= 5 \end{aligned}$$

14. Find the value of  $c$  that completes the square.

$$x^2 + 4x + c$$

4

15. Solve the equation by completing the square.

$$x^2 + 16x = 36$$

$$\begin{aligned} x^2 + 16x + 64 &= 36 + 64 \\ \sqrt{(x+8)^2} &= \sqrt{100} \end{aligned}$$

$$x+8 = \pm 10$$

$$x = -8 \pm 10$$

$x = 2; x = -18$

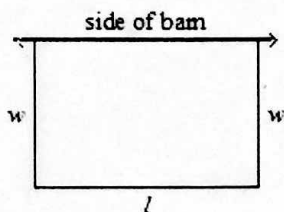
16. Simplify the expression.

$$\frac{\sqrt{17} \cdot \sqrt{27}}{\sqrt{27} \cdot \sqrt{27}} = \frac{\sqrt{459}}{27}$$

$\frac{3\sqrt{51}}{9}$

17. Solve the following real-life application problem.

A farmer built a rectangular pigpen on the side of his barn. He enclosed 3 sides of the pigpen with 80 feet of fencing. The total area of the pigpen was 575 square feet.



$$2w + l = 80 \quad l = 80 - 2w$$

$$wl = 575$$

$$w(80 - 2w) = 575$$

$$80w - 2w^2 = 575 \Rightarrow 2w^2 - 80w + 575 = 0$$

Find the possible dimensions of the pigpen.

$$\boxed{w \sim 30.6 \quad w \sim 9.39}$$

$$\boxed{l \sim 18.8 \quad l \sim 61.2}$$

$$0 = \frac{80 \pm \sqrt{-80^2 - 4(2)(575)}}{2(2)}$$

$$= \frac{80 \pm \sqrt{6400 - 4600}}{4}$$

18. Solve the equation.

$$3^{x+2} = 3^7$$

$$\begin{array}{r} x+2=7 \\ -2 \quad -2 \end{array}$$

$$\boxed{x=5}$$

19. Solve the equation.

$$3^{4x-9} = \frac{1}{243}$$

$$3^{4x-9} = 3^{-5}$$

$$\begin{array}{r} 4x-9 = -5 \\ +9 \quad +9 \end{array}$$

$$4x = 4$$

$$\boxed{x=1}$$

20. Write the next three terms of the geometric sequence:

4, 8, 16, ....

$$\boxed{32, 64, 128}$$

21. Write an equation for the following geometric sequence: 2, 12, 72, 432...

$$a_n = a_1 \cdot r^{n-1}$$

$$\boxed{= 2(6)^{n-1}}$$

22. Write the first 4 terms of the following sequence:  $a_1 = 2, a_n = a_{n-1} + 3$

$$\boxed{2; 5; 8; 11}$$