Algebra 2/Trig: Final test (Practice)

Zach,
Solutn.

(Practice)

1. The test has <u>30</u> questions. Some with multiple parts.
2. Each question is worth <u>2</u> points.
3. You have 120 minutes to complete the test (more if you have accommodations).
4. You are allowed one 3x5" index card. This is your individualized card, and you will need to attach it to your final exam (you will get it back).

Common test instructions:
5. You should SHOW YOUR WORK for <u>all</u> parts of the answer to receive full credit.
6. Write your answers using either blue or black ink or a pencil. Please don't use red pen.
7. Clearly indicate (underline/ box/highlight) your final answer. Only ONE answer per question will be considered.

The use of calculator is NOT allowed.
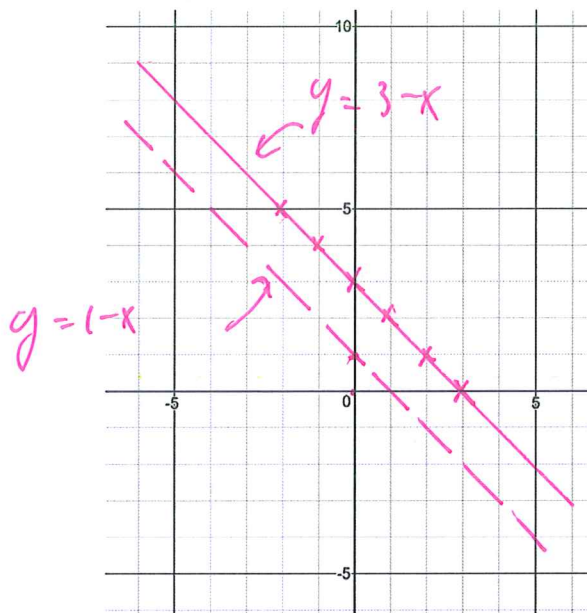

Good luck!!
 Dr. Baharav

1. Find the equation of the line going through the point $(0,1)$ and parallel to the line $y = 3 - x$. Plot the two lines below.

parallel $\Rightarrow$ same slope

$$\boxed{y = 1 - x}$$

$y = 1 - x$

$y = 3 - x$

2. Solve.

$$\begin{cases} 5x + 3y = 7 \\ 3x - 2y = 8 \end{cases}$$

$$\begin{array}{c} 2x \to \\ 3x \to \end{array} \begin{cases} 10x + 6y = 14 \\ 9x - 6y = 24 \end{cases}$$

$$\underline{\quad\quad\quad\quad}$$

$$19x + 0 = 38 \to \boxed{\begin{array}{c} x = 2 \\ y = -1 \end{array}}$$

check

$$\begin{cases} 5 \cdot 2 + 3 \cdot (-1) = 7 \checkmark \\ 3 \cdot 2 - 2(-1) = 8 \checkmark \end{cases}$$

3. Solve.

$$\begin{cases} x + 2y = 11 \\ 2x - y = 2 \end{cases}$$

$$\begin{cases} x + 2y = 11 \quad \leftarrow \times 2 \\ 2x - y = 2 \end{cases}$$

$$-\begin{cases} 2x + 4y = 22 \\ 2x - y = 2 \end{cases}$$

$$\underline{\quad\quad\quad\quad}$$

$$0 + 5y = 20$$

$$\boxed{\begin{array}{c} y = 4 \\ x = 3 \end{array}}$$

check $\begin{cases} 3 + 2 \cdot 4 = 11 \checkmark \\ 2 \cdot 3 - 4 = 2 \checkmark \end{cases}$

2

Block: _____

4. Simplify:

$$(3x - 2) \cdot (3 - 2x) - (2x^2 - 4) =$$

$$(9x - 6x^2 - 6 + 4x) - (2x^2 - 4) =$$

$$-6x^2 + 13x - 6 - 2x^2 + 4 = \boxed{-8x^2 + 13x - 2}$$

5. Simplify:

$$(3 - 2x) \cdot (2x^3 + 2x^2 + 1) - (5x^3 - 1)$$

$$6x^3 + 6x^2 + 3 - 2x^4 - 4x^3 - 2x - 5x^3 + 1$$

$$\boxed{= -2x^4 - 3x^3 + 6x^2 - 2x + 4}$$

6. Factor completely:

$$16 - 9x^2$$

$$\boxed{(4 - 3x)(4 + 3x)}$$

7. Factor completely:

$$x^2 - 4x - 12$$

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

8. Factor completely:

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

M	A	T
-24	10	12, -2

$$3x^2 + 12x - 2x - 8 =$$

$$3x(x + 4) - 2(x + 4) =$$

$$\boxed{(3x - 2)(x + 4)}$$

Name: _____

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9. Simplify:

$$\frac{3x + 3y}{(x^2 - y^2)}$$

$$\frac{3(x+y)}{(x+y)(x-y)} = \boxed{\frac{3}{x-y}}$$

10. Divide:

$$(x^5 - 6x^3 + 7x^2 - 5x - 2) \div (x - 2)$$

$$2 \begin{array}{|cccccc} 1 & 0 & -6 & 7 & -5 & -2 \\ & 2 & 4 & -4 & 6 & 2 \\ \hline 1 & 2 & -2 & 3 & 1 & 0 \end{array}$$

$$\boxed{x^4 + 2x^3 - 2x^2 + 3x + 1}$$

11. Divide:

$$(4x^3 + 2x^2 - 10x - 3) \div (2x - 3)$$

$$\boxed{2x^2 + 4x + 1}$$

$$\begin{array}{r} 2x^2 + 4x + 1 \\ 2x - 3 \overline{) 4x^3 + 2x^2 - 10x - 3} \\ 4x^3 - 6x^2 \\ \hline = \quad 8x^2 - 10x \\ 8x^2 - 12x \\ \hline 2x - 3 \\ 2x - 3 \\ \hline = \quad = \end{array}$$

12. Simplify:

$$\sqrt{49 \cdot x^2 y^8 z^5 w^3}$$

$$\boxed{7 \cdot |x| \cdot y^4 \cdot z^2 \cdot \sqrt{z \cdot w}}$$

13. Simplify:

$$5\sqrt{3} - 3\sqrt{12}$$

$$5\cdot\sqrt{3} - 3\cdot 2\cdot\sqrt{3} = \boxed{-\sqrt{3}}$$

14. Simplify (write as complex number if necessary):

$$\sqrt{-9} \cdot \sqrt{-4}$$

$$3i \cdot 2i = \boxed{-6}$$

15. Simplify (write as complex number if necessary):

$$(3 - \sqrt{-4}) \cdot \sqrt{-16}$$

$$(3 - 2i)\cdot 4i = \boxed{12i + 8}$$

16. Solve (Remember to show your work!):

$$2x^2 + 8x = 0$$

$$x(2x + 8) = 0 \quad \boxed{\begin{array}{c} x = 0 \\ \text{or} \\ x = -4 \end{array}} \quad \text{check} \checkmark$$
$$\checkmark$$

17. Solve (Remember to show your work!):

$$2x^2 - 8 = 0$$

$$2x^2 = 8 \rightarrow x^2 = 4 \rightarrow \boxed{x = \pm 2} \quad \text{check}\checkmark$$

18. Solve (Remember to show your work!):

$$2x^2 + 8 = 0$$

$$2x^2 = -8$$
$$x^2 = -4 \Rightarrow \boxed{x = \pm 2i}$$

19. Solve (Remember to show your work!):

$$2x^2 + 3x - 9 = 0$$

$$X_{1,2} = \frac{-3 \pm \sqrt{9 + 4 \cdot 2 \cdot 9}}{4} = \frac{-3 \pm \sqrt{9 + 72}}{4} = \frac{-3 \pm 9}{4} = \begin{cases} \frac{6}{4} \\ -3 \end{cases}$$
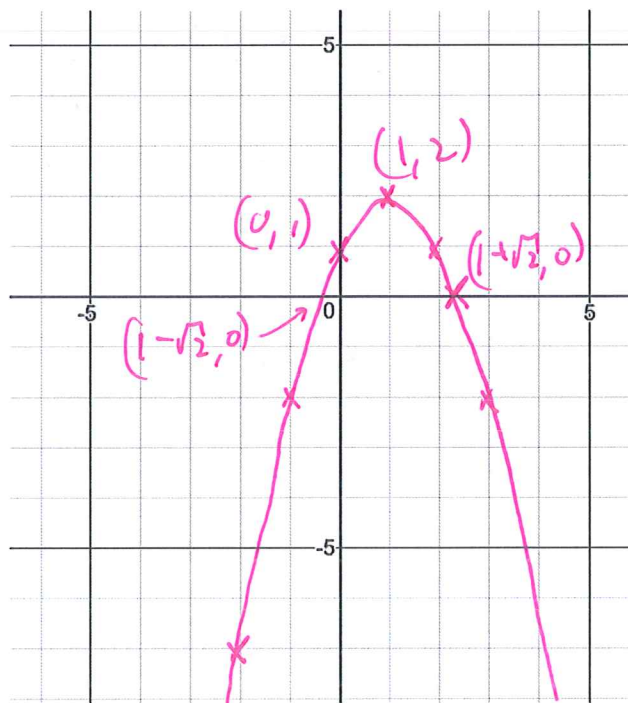
$\sqrt{81}$

check ✓

The next 4 questions refer to the following function:

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

20. Fill-in the table of values for the function.

x	y
-2	-7
-1	-2
0	1
1	2
2	1
3	-2

21. Graph the function. Label the vertex, and indicate the x-intercepts and y-intercepts if any.

$(1, 2)$

$(0, 1)$

$(1 + \sqrt{2}, 0)$

$(1 - \sqrt{2}, 0)$

22. Calculate (algebraically) the y-intercept(s).

$$x = 0 \rightarrow y = -(0-1)^2 + 2 = \boxed{1}$$

23. Calculate (algebraically) the x-intercept(s).

$$y = 0 \Rightarrow -(x-1)^2 + 2 = 0$$

$$(x-1)^2 = 2$$

$$x - 1 = \pm\sqrt{2}$$

$$\boxed{x = 1 \pm \sqrt{2}}$$

24. Solve for x.

  a. $x = \log_3 27$ $\boxed{x = 3}$

  b. $3 = \log_2 x$ $\boxed{x = 2^3 = 8}$

  c. $2^{x+2} = 16$

  $$2^{x+2} = 2^4 \quad \boxed{x = 2}$$

25. Calculate the following.

  a. $\log_8(2)$ $\boxed{\frac{1}{3}}$

  b. $\log_2\left(\frac{1}{4}\right)$ $\boxed{-2}$

  c. $\log(1000)$ $\boxed{3}$

26. Simplify (Rationalize the denominator):

$$\frac{3 - \sqrt{12}}{\sqrt{3}} \quad \begin{matrix} \times \sqrt{3} \\ \times \sqrt{3} \end{matrix} = \frac{3\sqrt{3} - \sqrt{3}(2\sqrt{3})}{3} =$$

$$\boxed{\sqrt{3} - 2}$$

27. Simplify and give restricted values:

$$\frac{x}{x-4} - \frac{(x-1)}{x+3}$$

   a. Restricted values:

$$\boxed{x = 4, x \neq -3}$$

   b. simplify:

$$\frac{x^2 + 3x - (x^2 - 5x + 4)}{(x-4)(x+3)} = \boxed{\frac{8x + 4}{(x-4)(x+3)}}$$

28. Solve and check:

$$\frac{9}{x^2 - 25} + \frac{3}{x+5} = 0$$

   a. Solve:

$$\frac{9 + 3(x-5)}{(x-5)(x+5)} = 0$$

$$9 + 3x - 15 = 0 \Rightarrow 3x = 6 \Rightarrow \boxed{x = 2}$$

   b. Check:

check

$$\frac{9}{4-25} + \frac{3}{7} \stackrel{?}{=} 0$$

$$\frac{-9}{21} + \frac{3}{7} \stackrel{?}{=} 0 \quad \checkmark$$

29. Solve and check:

$$\sqrt{3x + 10} = 2 \cdot x$$

c. Solve:

$3x + 10 = 4x^2$

$4x^2 - 3x - 10 = 0$

$x_{1,2} = \dfrac{3 \pm \sqrt{9 + 4 \cdot 4 \cdot 10}}{8} =$ $\overleftarrow{\sqrt{169}}$

$\dfrac{3 \pm 13}{8} = \begin{cases} \to 2 \\ \to \frac{-10}{8} \end{cases}$

don't work.

d. Check:

$2: \quad \sqrt{16} \stackrel{?}{=} 2 \cdot 2$

$4 = 4 \checkmark$

30. Simplify and give restricted values:

$$\frac{9x^2 - 16}{(3x + 4)} \div \frac{3x - 4}{9x + 4}$$

a. Restricted values:

$x \neq -\dfrac{4}{3} \qquad x \neq -\dfrac{4}{9}$

$x \neq \dfrac{4}{3}$

b. simplify:

$\dfrac{(3x - 4)(3x + 4)}{3x + 4} \cdot \dfrac{(9x + 4)}{(3x - 4)} = \boxed{9x + 4}$

=== End of test