COLLEGE ALGEBRA EXAM 1 KGR R^2 NAME _____

SHOW ALL WORK ON THIS TEST OR ON SEPARATE PAPER. Circle answers. TURN IN ALL WORKSHEETS. GRAPHING CALCULATORS ARE REQUIRED ON THIS TEST. (WHEN CALCULATORS ARE USED, SKETCH THE GRAPH, DESCRIBE THE WINDOW, OR OTHERWISE INDICATE WHAT YOU DID!!)

In 1 - 4, factor completely and simplify if possible:

1. $x^4 - 13x^2 + 36$

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

3. $x^4 - 8x^3 - 8x + 64$

4. $2x\,(3x-4)^{\frac{4}{3}} + 3x^2\,(3x-4)^{\frac{1}{3}}$

5. Solve for x:

$$F = \frac{x}{a + x}$$

6. Express as a single fraction. Simplify.

$$\frac{3}{(x+2)^2\,(x-1)} - \frac{4}{(x+2)(x-1)}$$

7. Simplify: $\dfrac{1 + (2x)^{-1}}{2x + (2x)^{-2}}$

8. Use your calculator:

A) $\sqrt[3]{145000}$ B) $64^{\frac{3}{2}}$

9. Use your calculator: A) $\dfrac{3.6 \times 9.2}{6.4 \times 0.00005}$ B) $\dfrac{7.6 \times 10^{-6}}{9.6 \times 10^{15}}$

10. Use your calculator.

A) i^{15} B) $(1 - i)^5$ C) $\dfrac{31 + 29i}{3 + 5i}$

11. Use your calculator. Change decimal answers to fractional form.

A) $64^{-4/3}$ B) $\dfrac{31 + 29i}{3 - 2i}$

In 12 - 13, simplify the radicals (in #13, rationalize denominator):

12. $9\sqrt[3]{24} - \sqrt[3]{81}$

13. $\dfrac{\sqrt{5} + \sqrt{3}}{\sqrt{5} - \sqrt{3}}$

14. Use the calculator to find the decimal approximations (nearest hundredth) of the previous exercises.

a) $9\sqrt[3]{24} - \sqrt[3]{81}$

b) $\dfrac{\sqrt{5} + \sqrt{3}}{\sqrt{5} - \sqrt{3}}$

In 15 - 17, solve for X:

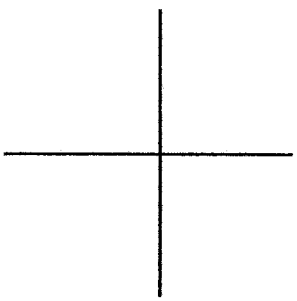
15. Use either an algebra or calculator method (or both) to solve $x^2 = 2(3x - 5)$. Explain what you did and why.

16. $\dfrac{x}{x^2-9} + \dfrac{1}{x+3} = \dfrac{3}{x^2-9}$

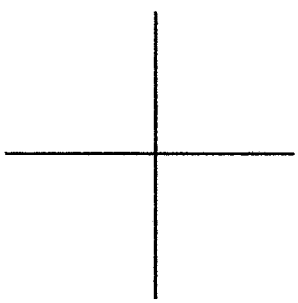
17. $\sqrt{2x + 3} = 2x - 3$

In 18 - 19, use your graphing calculator to sketch:

18. $y = x^3 - 4x$.



19. $y = \sqrt{16 - x^2}$



COLLEGE ALGEBRA EXAM 1 KGRSolutions

1. $x^4 - 13x^2 + 36$
$(x^2-9)(x^2-4)$
$\boxed{(x-3)(x+3)(x-2)(x+2)}$

2. $(x+2y)^2 - 3(x+2y) - 10$
$[(x+2y)-5][(x+2y)+2]$
$\boxed{(x+2y-5)(x+2y+2)}$

3. $x^4 - 8x^3 - 8x + 64$
$x^3(x-8) - 8(x-8)$
$(x-8)(x^3-8)$
$\boxed{(x-8)(x-2)(x^2+2x+4)}$

4. $2x(3x-4)^{4/3} + 3x^2(3x-4)^{1/3}$
$x(3x-4)^{1/3}[2(3x-4) + 3x]$
$x(3x-4)^{1/3}[6x-8+3x]$
$\boxed{x(3x-4)^{1/3}(9x-8)}$

5. $F = \frac{x}{a+x}$
$Fa + Fx = x$
$Fa = x - Fx$
$\frac{Fa}{1-F} = \frac{x(1-F)}{1-F}$
$\boxed{x = \frac{Fa}{1-F}}$

6. $\frac{3}{(x+2)^2(x-1)} - \frac{4}{(x+2)(x-1)}$
$\frac{3}{(x+2)^2(x-1)} - \frac{4}{(x+2)(x-1)} \cdot \frac{(x+2)}{(x+2)}$
$\frac{3-4x-8}{(x+2)^2(x-1)}$
$\boxed{\frac{-4x-5}{(x+2)^2(x-1)}}$

7. $\frac{1+\frac{1}{2x}}{2x+\frac{1}{4x^2}} = \left(1+\frac{1}{2x}\right) \div \left(2x+\frac{1}{4x^2}\right)$
$= \frac{2x+1}{2x} \div \frac{8x^3+1}{4x^2}$
$= \frac{2x+1}{2x} \cdot \frac{4x^2}{(2x+1)(4x^2-2x+1)}$
$= \boxed{\frac{2x}{4x^2-2x+1}}$

8a) [custom] [3] [$\sqrt[x]{}$] [145000] [=] $\boxed{52.54}$
b) 64 [^] [(] 3 [÷] 2 [)] = $\boxed{512}$

9a) [(] 3.6 [×] 9.2 [)] ÷ [(] 6.4 [×] .00005 [)]
= $\boxed{103500}$
b) 7.6 [EE] [(-)] 6 [÷] 9.6 [EE] 15 = $\boxed{7.92 \times 10^{-22}}$

9a) i^{15} [(] 0 [,] 1 [)] [^] 15 [=]
(5E-13, -1) = 0 - i = $\boxed{-i}$
b) $(1-i)^5$ [(] 1 [,] (-) 1 [)] [^] 5 = (-4, 4)
= $\boxed{-4+4i}$
c) $\frac{31+29i}{3+5i}$ = (31, 29) ÷ (3, 5) = (7, -2)
= $\boxed{7-2i}$

11a) $64^{-4/3}$ =
64 ∧ ((-) 4 ÷ 3) = .00390625
[CUSTOM] [FRAC] $\boxed{1/256}$
b) $\frac{31+29i}{3-2i}$ = (31, 29) ÷ (3, -2)
[FRAC] = $\boxed{\frac{35+149i}{13}}$

?. $9\sqrt[3]{24} - \sqrt[3]{81}$
$9 \cdot \sqrt[3]{8}\sqrt[3]{3} - \sqrt[3]{27} \cdot \sqrt[3]{3}$
$9 \cdot 2\sqrt[3]{3} - 3\sqrt[3]{3}$
$18\sqrt[3]{3} - 3\sqrt[3]{3}$
$\boxed{15\sqrt[3]{3}}$

13. $\frac{(\sqrt{5}+\sqrt{3})(\sqrt{5}+\sqrt{3})}{(\sqrt{5}-\sqrt{3})(\sqrt{5}+\sqrt{3})}$
$= \frac{5+2\sqrt{15}+3}{5-3}$ (14) See Below
$= \frac{8+2\sqrt{15}}{2} = \boxed{4+\sqrt{15}}$

14. $\frac{x}{(x-3)(x+3)} + \frac{1}{x+3} = \frac{3}{(x-3)(x+3)}$ $x \neq \pm 3$
$x + x - 3 = 3$
$2x = 6$
$x = 3$
Reject $\boxed{\text{No Sol}}$

15. $x^2 = 2(3x-5)$
$x^2 = 6x - 10$
$x^2 - 6x + 10 = 0$
$x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$
$= \frac{6 \pm \sqrt{36-4(1)(10)}}{2}$
$= \frac{6 \pm \sqrt{-4}}{2} = \frac{6 \pm 2i}{2}$
$= \boxed{3 \pm i}$

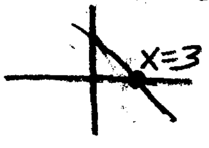
$x^2 = 2(3x-5)$
$x^2 - 6x + 10 = 0$
[2nd POLY]
Order = 2 (3, 1)
(3, -1)
$\boxed{3 \pm i}$

a) 21.63
b) 7.87

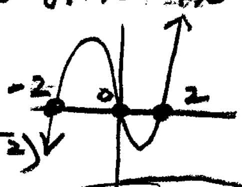
15. Does not factor!
1. Quadratic Formula
2. Completing Square
3. 2nd POLY

17. $(\sqrt{2x+3})^2 = (2x-3)^2$
$2x+3 = 4x^2 - 12x + 9$
$-2x-3 \quad\quad -2x-3$
$0 = 4x^2 - 14x + 6$
$0 = 2(2x^2 - 7x + 3)$
$(2x-1)(x-3)$
$x = 1/2$ $\boxed{x=3}$
Reject $\sqrt{9} = 6-3$

Calculator:
$y1 = \sqrt{(2x+3)} - 2x + 3$



18. $y1 = x^3 - 4x$



$\boxed{x = -4, 0, 2}$

19. $y1 = \sqrt{(16-x^2)}$

Semicircle!