

Name: Kelly

Date: 1/16/18

CC ALGEBRA 2

TROICI

MIDTERM REVIEW #1

1. Express the sum of $\sqrt{-80} + 3\sqrt{-45}$ in simplest radical form, in terms of i :

$$\begin{aligned} & \sqrt{-16} \sqrt{5} && 3\sqrt{-45} \\ & 4i\sqrt{5} && 3 \cdot \sqrt{9} \sqrt{5} \\ & && 3 \cdot 3i \sqrt{5} \\ & && 4i\sqrt{5} + 9i\sqrt{5} \\ & && \boxed{13i\sqrt{5}} \end{aligned}$$

2. Factor $9x^2 - 16$ DOTS!

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

3. Factor $x^2 - x - 20$ AM!

$\boxed{(x-5)(x+4)}$

4. Factor $x^3 + 27$ SOAP

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

$a=x$
 $b=3$
 $\boxed{(x+3)(x^2 - 3x + 9)}$

5. Factor $x^3 - 64$ SOAP!

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

$a=x^3$
 $b=4$
 $\boxed{(x^3-4)(x^6 + 4x^3 + 16)}$

GROUPING!

6. Solve for x : $2x^3 + 3x^2 - 18x - 27$

$x^2(2x+3) - 9(2x+3)$

$(x^2-9)(2x+3)$

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

7. Solve for x : $6x^2 - 24x$

GCF!

$\boxed{6x(x-4)}$

8. When $x^3 + kx^2 - 4x + 2$ is divided by $x + 2$, the remainder is 26. Find k .

Root = -2

$P(-2) = 26$

$(-2)^3 + k(-2)^2 - 4(-2) + 2 = 26$

$-8 + 4k + 8 + 2 = 26$

$4k + 2 = 26$

$4k = 24$

$k = 6$

Remainder theorem

If $x - a$ is a root:

$P(a) = 0$

↑
remainder

9. If $x - 1$ is a factor of $x^2 + 2kx - 7$, what does k equal?

$P(1) = 0 \rightarrow$ remainder = 0!

$(1)^2 + 2k(1) - 7 = 0$

$1 + 2k - 7 = 0$

$2k - 6 = 0$

$2k = 6$

$k = 3$

10. Based on the graph, answer the following questions:

a) What is the remainder when the function is divided by $x - 3$?

$P(3) = 0$

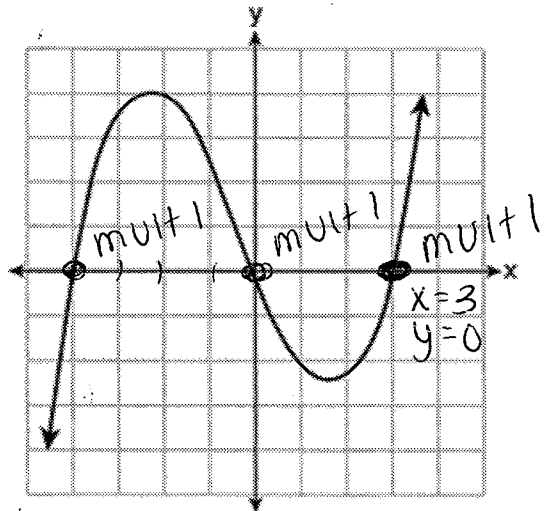
b) What is the equation of the function in factored form?

Roots: -4, 0, 3

Factors:

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

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



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MIDTERM EXTRA REVIEW

1. a. Divide: $x^3 - 4x^2 + 6x - 2$ by $x - 2$

$$\begin{array}{r}
 x^2 - 2x + 2 \\
 x - 2 \overline{) x^3 - 4x^2 + 6x - 2} \\
 \underline{-x^3 + 2x^2} \quad \downarrow \\
 -2x^2 + 6x \\
 \underline{+2x^2 - 4x} \\
 2x - 2
 \end{array}$$

b. Is $x - 2$ a factor of $x^3 - 4x^2 + 6x - 2$? $\frac{-2x + 4}{2}$

NO! remainder of 2.

(check w/ remainder theorem)

2. Solve the following systems of equations

$4x + 8y + 4z = 100$

$8(4x - y - 5z = 1) = 2$

$-4x - 2y + 16z = 64$

$$\begin{array}{r}
 4x + 8y + 4z = 100 \\
 + 32x - 8y - 40z = 8 \\
 \hline
 36x - 36z = 108
 \end{array}$$

$$\begin{array}{r}
 -4x - 2y + 16z = 64 \\
 + -8x + 2y + 10z = -2 \\
 \hline
 -12x + 26z = 62
 \end{array}$$

$36x - 36z = 108 \iff -12x + 26z = 62$

check!

$4x - y - 5z = 1$

$4(10) - (4) - 5(7) = 1$

$40 - 4 - 35 = 1$
 $1 = 1 \checkmark$

$36x - 36z = 108$

$3(-12x + 26z = 62)$

$-36x + 78z = 186$

$+ 36x - 36z = 108$

$42z = 294$

$z = 7$

$36x - 36(7) = 108$

$36x - 252 = 108$

$36x = 360$

$x = 10$

$4x + 8y + 4z = 100$

$4(10) + 8y + 4(7) = 100$

$40 + 8y + 28 = 100$

$8y + 68 = 60$

$8y = 32$
 $y = 4$

3. Solve the systems of equations below algebraically and graphically.

$$x - y = -1$$

$$y = x^2 + 1$$

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

$$x - x^2 - 1 = -1$$

$$\frac{-x^2 + x + 1}{-1 \quad -1} = \frac{0}{-1}$$

$$x^2 - x = 0$$

$$x(x-1) = 0$$

$$x=0 \quad y=0^2+1=1$$

$$x=1 \quad y=1^2+1=2$$

$(0, 1)$

4. Solve the systems of equations below algebraically

$$x^2 + y^2 = 25$$

$$y = \frac{3}{4}x$$

$$x^2 + \left(\frac{3}{4}x\right)^2 = 25$$

$$x^2 + .5625x^2 = 25$$

$$\frac{1.5625x^2}{1.5625} = \frac{25}{1.5625}$$

$$x^2 = \frac{25}{1.5625}$$

$$\sqrt{x^2} = \sqrt{16}$$

$$x = \pm 4$$

$$x=4 \quad y = \frac{3}{4}(4) = 3$$

$$y=3$$

$$(4, 3)$$

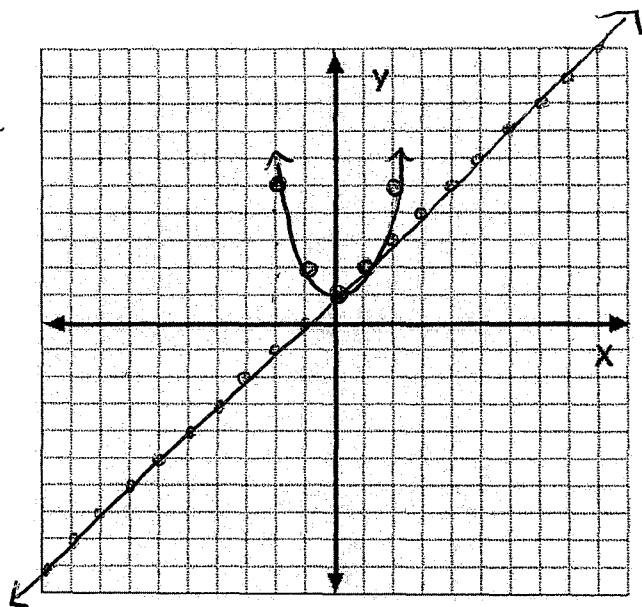
$$x=-4$$

$$y = \frac{3}{4}(-4) = -3$$

$$y=-3$$

$$(-4, -3)$$

$$\begin{array}{r} x - y = -1 \\ -x \quad -x \\ \hline -y = -1 - x \\ y = 1 + x \end{array}$$



$$y = x^2 + 1$$

x	y
-2	5
-1	2
0	1
1	2
2	5