ALGEBRA 2 UNIT 4 REVIEW SHEET

Key

- Unit 1- Operations with Polynomials & Complex Numbers
- Unit 2- Quadratic and HOP Functions
- Unit 3- Functions & Systems
- Unit 4- Rationals
  - Solving Rational Equations
  - Simplifying Rational Expressions
  - Long Division vs. Synthetic Division
    - Factors & Roots

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MULTIPLE CHOICE PRACTICE

1. The function $f(x) = \dfrac{x-3}{x^2+2x-8}$ is undefined when x equals

when denom = 0

1) 2 or −4
2) 4 or −2
3) 3, only
4) 2, only

$x^2+2x-8=0$
$(x+4)(x-2)=0$
$x=-4, 2$

2. Which expression is equivalent to $\dfrac{4x^3+9x-5}{2x-1}$, where $x \neq \frac{1}{2}$?

1) $2x^2+x+5$
2) $2x^2+\frac{11}{2}+\frac{1}{2(2x-1)}$
3) $2x^2-x+5$
4) $2x^2-x+4+\frac{1}{2x-1}$

$$\begin{array}{r} 2x^2+x+5 \\ 2x-1\,\overline{)\,4x^3+0x^2+9x-5} \\ -(4x^3-2x^2) \\ \hline 2x^2+9x \\ -(2x^2-x) \\ \hline 10x-5 \\ -(10x-5) \\ \hline 0 \end{array}$$

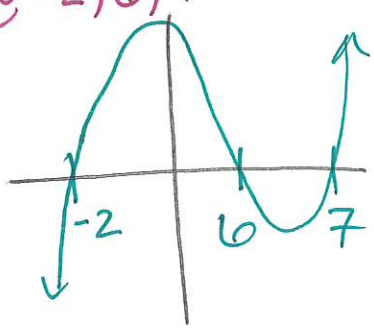
* only LD works here b/c there's a leading coefficient

Graph this!

3. Which binomial is *not* a factor of the expression $x^3-11x^2+16x+84$?

1) $x+2$
2) $x+4$
3) $x-6$
4) $x-7$

Roots @ −2, 6, 7



* Roots are negations of factors

SD OR LD WORK here

4. The expression $\frac{x^3+2x^2+x+6}{x+2}$ is equivalent to

1) x^2+3

2) $x^2+1+\frac{4}{x+2}$

3) $2x^2+x+6$

4) $2x^2+1+\frac{4}{x+2}$

$$\begin{array}{r|rrr|r} -2 & 1 & 2 & 1 & 6 \\ & \downarrow & -2 & 0 & -2 \\ \hline & 1 & 0 & 1 & 4 \end{array}$$

$1x^2+0x+1+\frac{4}{x+2}$

5. Which value is *not* contained in the solution of the system shown below?

1) $a+5b-c=-20$

2) $4a-5b+4c=19$

3) $-a-5b-5c=2$

~~1) −2~~

2) 2

~~3) 3~~

~~4) −3~~

* I want to remove the b-term b/c of the coefficients

Step 1:

Eqs 1&2

$$\begin{array}{r} a+\cancel{5b}-c=-20 \\ +4a-\cancel{5b}+4c=19 \\ \hline 5a+3c=-1 \end{array} \}\text{eq}\#4$$

Step 2:

Eqs 1&3

$$\begin{array}{r} \cancel{a}+\cancel{5b}-c=-20 \\ +-\cancel{a}-\cancel{5b}-5c=2 \\ \hline -6c=-18 \end{array}$$

$\boxed{c=3}$

Step 3: eq 4

$5a+3(3)=-1$

$5a+9=-1$

$5a=-10$

$\boxed{a=-2}$

Step 4: eq 1

$(-2)+5b-(3)=-20$

$5b-5=-20$

$5b=-15$

$\boxed{b=-3}$

definition of parabola

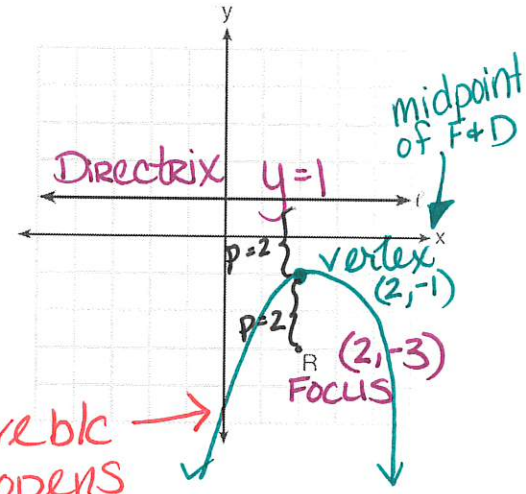
6. Which equation represents the set of points equidistant from line ℓ and point R shown on the graph?

1) $y = -\frac{1}{8}(x+2)^2 + 1$

2) $y = -\frac{1}{8}(x+2)^2 - 1$

3) $y = -\frac{1}{8}(x-2)^2 + 1$

4) $y = -\frac{1}{8}(x-2)^2 - 1$



negative b/c it opens down

7. The graph of $p(x)$ is shown.

What is the remainder when $p(x)$ is divided by $x+4$?

1) $x-4$

2) -4

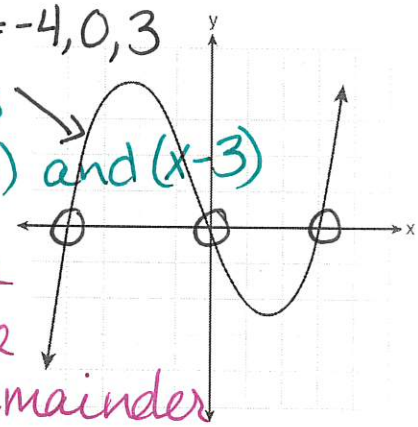
3) 0

4) 4

Roots @ $x = -4, 0, 3$

∴ factors @ $(x+4)$ (x) and $(x-3)$

if it is a factor, there is NO remainder



8. The graph of the function $p(x)$ is sketched.

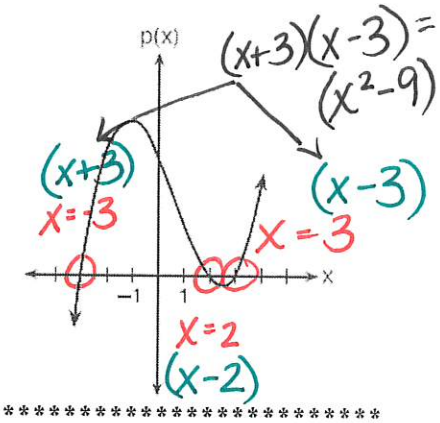
Which equation could represent $p(x)$?

1) $p(x) = (x^2 - 9)(x - 2)$

2) $p(x) = x^3 - 2x^2 + 9x + 18$

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

4) $p(x) = x^3 + 2x^2 - 9x - 18$



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SHORT ANSWER PRACTICE

8. Solve for all values of p: $\frac{3p}{p-5} - \frac{2}{p+3} = \frac{p}{p+3}$

*combine terms w/ common denoms 1st!

$+\frac{2}{p+3}$ $\quad$ $+\frac{2}{p+3}$

$\frac{3p}{p-5} = \frac{p+2}{p+3}$

$3p^2 + 9p = p^2 - 5p + 2p - 10$

$\frac{2p^2 + 12p + 10}{2} = \frac{0}{2}$

$p^2 + 6p + 5 = 0$

$(p+1)(p+5) = 0$

$p = \{-1, -5\}$

9. Find algebraically the $\boxed{\text{zeros}}$ for $p(x) = x^3 + x^2 - 4x - 4$.

Solutions

$$(x^3 + x^2) + (-4x - 4) = 0$$

$$x^2(x+1) - 4(x+1) = 0$$

$$(x+1)(x^2-4) = 0$$

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

$$\{-1, \pm 2\}$$

10. Solve the equation $\sqrt{2x-7} + x = 5$ algebraically, and justify the solution set.

$$-x \quad -x$$

$$\sqrt{2x-7}^2 = (5-x)^2$$

$$2x - 7 = 25 - 10x + x^2$$

$$0 = x^2 - 12x + 32$$

$$0 = (x-4)(x-8)$$

$$x = 4, \cancel{8}$$

$$\{4\}$$

11. Solve $\frac{x \cdot 2x}{x(x-2)} - \frac{11}{x}\frac{(x-2)}{(x-2)} = \frac{8}{x^2 - 2x}$ for x.

$$x(x-2)$$

$$\frac{2x^2 - 11x + 22}{x(x-2)} = \frac{8}{x(x-2)}$$

$$\frac{-8}{x(x-2)} \qquad \frac{-8}{x(x-2)}$$

$$\frac{2x^2 - 11x + 14}{x(x-2)} = \frac{0}{1}$$

$$2x^2 - 11x + 14 = 0$$

$$(2x + -7)(x - 2) = 0$$

$$x = 7/2, \cancel{2}$$

$$\left\{\frac{7}{2}\right\}$$

12. Simplify the expression $\frac{3x^2+5x-2}{x^3+2x^2}$.

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

$$\boxed{\frac{3x-1}{x^2}}$$

13. Given $r(x) = x^3 - 4x^2 + 4x - 6$, find the value of $r(2)$. What does your answer tell you about $x - 2$ as a factor of $r(x)$? Explain.

$$r(2) = (2)^3 - 4(2)^2 + 4(2) - 6$$

$$\boxed{r(2) = -6}$$

Because $x=2$ is NOT a Root, $(x-2)$ is NOT a factor.