

Name: Key

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CC ALGEBRA 2

TROICI

UNIT 1 REVIEW: OPERATIONS OF POLYNOMIALS

1) Find the difference of $(x^3 + 5x - 4)$ and $(x^2 - 8x + 3)$. (keep change change)

NOT LIKE terms $\leftarrow x^3 + 5x - 4$
 $+ (-x^2 + 8x - 3)$

x^3	$-x^2$	$+13x$	-7
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2) Express $(3x - 2)(x^2 - 4x + 1)$ as a polynomial in simplest form.

	x^2	$-4x$	$+1$
$3x$	$3x^3$	$-12x^2$	$+3x$
-2	$-2x^2$	$+8x$	-2

$3x^3$	$-14x^2$	$+11x$	-2
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3) Multiply $(-2x + 5)$ by its conjugate. \rightarrow same binomial, different sign.
USES SHORTCUT!

$(-2x + 5)(-2x - 5)$

$4x^2$	-25
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4) Simplify: $(x - 6)^3$

$(x - 6)(x - 6)(x - 6)$
 $x^2 - 6x - 6x + 36$
 $(x^2 - 12x + 36)(x - 6)$

	x^2	$-12x$	$+36$
x	x^3	$-12x^2$	$+36x$
-6	$-6x^2$	$+72x$	-216

x^3	$-18x^2$	$+108x$	-216
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5) Find the quotient using long division: $\frac{2x^3+9x^2+8x+2}{2x+1}$

$$\begin{array}{r}
 \boxed{x^2 + 4x + 2} \\
 2x+1 \overline{) 2x^3 + 9x^2 + 8x + 2} \\
 \underline{- 2x^3 + x^2} \\
 8x^2 + 8x \\
 \underline{- 8x^2 + 4x} \\
 4x + 2 \\
 \underline{- 4x + 2} \\
 0
 \end{array}$$

Factor Completely:

6) $x^4 + 13x^2 + 12$ $\boxed{(x^2 + 12)(x^2 + 1)}$

7) $9c^2 - 16$ $\boxed{(3c - 4)(3c + 4)}$

8) $3x^2 - 6x - 9$ $3(x^2 - 2x - 3)$
 $\boxed{3(x - 3)(x + 1)}$

9) $2x^2 - 5x - 12$ $\overset{m}{24x^2}$
 $\overset{a}{2x^2} - \overset{a}{5x} - \overset{m}{12}$
 $2x^2 - 8x + 3x - 12$
 $2x(x - 4) + 3(x - 4)$
 $\boxed{(2x + 3)(x - 4)}$

10) $3x^2 - 27$ $3(x^2 - 9)$
 $\boxed{3(x + 3)(x - 3)}$

11) $x^3 + 3x^2 - 4x - 12$
 $x^2(x + 3) - 4(x + 3)$
 $(x^2 - 4)(x + 3)$
 $\boxed{(x + 2)(x - 2)(x + 3)}$

SOAP!

12) $125x^3 - 27$

$\sqrt[3]{125x^3} = 5x$

$\sqrt[3]{27} = 3$

$(5x-3)(25x^2+15x+9)$

SOAP!

13) $1 + 64a^3$

$\sqrt[3]{1} = 1$

$\sqrt[3]{64a^3} = 4a$

$(1+4a)(1-4a+16a^2)$

14) $x^2 - 20xy - 156y^2$

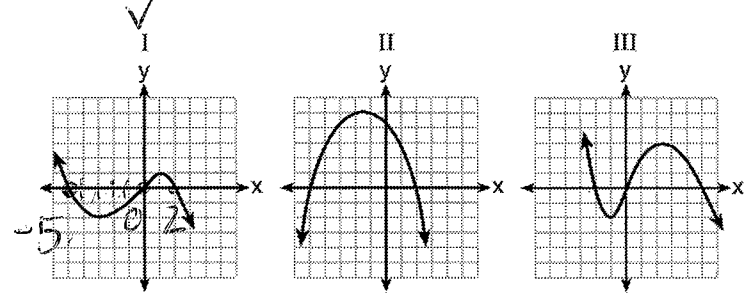
$(x - 26y)(x + 6y)$

15) $x^4 - 16 = (x^2+4)(x^2-4)$

$(x^2+4)(x+2)(x-2)$

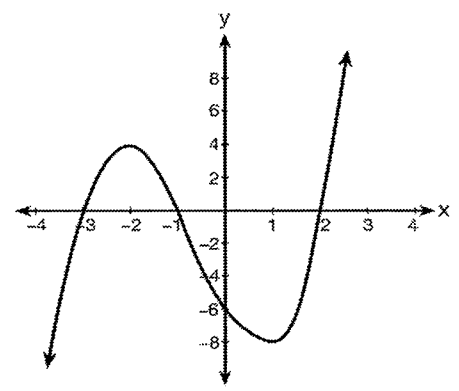
16) A polynomial function contains the factors x , $x-2$, and $x+5$. Which graph(s) below could represent the graph of this function?

ROOTS = 0, 2, -5



- 1) I, only
- ~~2) II, only~~
- ~~3) I and III~~
- ~~4) I, II, and III~~

17) Given the graph below:



$(x+3)(x+1)(x-2)$

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

$x^2 + 4x + 3$

x	x^3	$+4x^2$	$+3x$
-2	$-2x^2$	$-8x$	-6

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

- a) State the zeros (roots) of the function: -3, -1, 2
- b) State the factors of the function: $(x+3)(x+1)(x-2)$
- c) State the equation of the function: $f(x) = x^3 + 2x^2 - 5x - 6$

18) Suppose one of the factors of $x^3 - 10x^2 + 27x - 18$ is $(x-3)$, what are the other two factors?

$$\begin{array}{r} x^2 - 7x + 6 \\ x-3 \overline{) x^3 - 10x^2 + 27x - 18} \\ \underline{-x^3 + 3x^2} \\ -7x^2 + 27x \\ \underline{+7x^2 - 21x} \\ 6x - 18 \\ \underline{6x - 18} \\ 0 \end{array}$$

$$\boxed{(x-6)(x-1)}$$

19) Suppose we know that the polynomial equation has three real solutions and that one of the roots of $x^3 + 3x^2 - 4x - 12 = 0$ is $x = -3$. State all solutions. $(x+3)$ FACTOR

$$\begin{array}{r} x^2 + 0x - 4 \\ x+3 \overline{) x^3 + 3x^2 - 4x - 12} \\ \underline{-x^3 + 3x^2} \\ 0x^2 - 4x \\ \underline{0x^2 + 0x} \\ -4x - 12 \\ \underline{+4x + 12} \\ 0 \end{array}$$

$$\begin{array}{l} x^2 - 4 \\ (x+2)(x-2) \\ x = -2 \quad | \quad x = 2 \end{array}$$

SOLUTIONS:
 $\{-3, -2, 2\}$

20) Factor $x^3 - 64$

SOAP

(1) $(x+4)(x^2 - 4x + 16)$

(3) $(x-4)(x^2 + 4x + 16)$

(2) $(x+8)(x^2 - 8x + 64)$

(4) $(x-8)(x^2 + 8x + 64)$

21) Which polynomial represents $(x^2 + 2x - 1)(4x - 5)$? (Use your calculator to do this problem)

- y₂ {
- (1) $4x^3 - 5x^2 - 6x + 5$
 - (2) $4x^3 + 3x^2 - 14x - 5$
 - (3) $4x^3 + 3x^2 - 14x + 5$
 - (4) $4x^3 - 3x^2 - 14x + 5$

y₁ LOOK FOR SAME TABLE!

* 22) The completely factored form of $2d^4 + 6d^3 - 18d^2 - 54d$ is

- (1) $2d(d^2 - 9)(d + 3)$
- (2) $2d(d^2 + 9)(d + 3)$
- (3) $2d(d + 3)^2(d - 3)$
- (4) $2d(d - 3)^2(d + 3)$

equivalent but 3 is the correct answer b/c choice 1 is not completely factored!

21) Which factorization is incorrect?

(1) $4k^2 - 49 = (2k + 7)(2k - 7)$ DOTS ✓

(2) $a^3 - 8b^3 = (a - 2b)(a^2 + 2ab + 4b^2)$ SOAP ✓

(3) $m^3 + 3m^2 - 4m + 12 = (m - 2)^2(m + 3)$ WRONG!

(4) $t^3 + 5t^2 + 6t + t^2 + 5t + 6 = (t + 1)(t + 2)(t + 3)$ GROUPING

$$\begin{array}{l} m^3 + 3m^2 - 4m + 12 \\ m^2(m+3) - 4(m+3) \\ (m^2 - 4)(m+3) \end{array}$$

$$(m+2)(m-2)(m+3)$$

$$\begin{array}{l} (t+1)(t^2+5t+6) + (t^2+5t+6) \\ (t+1)(t+2)(t+3) + (t+2)(t+3) \\ (t+1)(t+2)(t+3) \end{array}$$



