

Aug 26-12:16 PM

ii)

$$5x^3 + 21x^2 - 21x - 5$$

$P/Q = \frac{\pm 1, \pm 5}{\pm 1, \pm 5} \Rightarrow \pm 1, \pm 5, \pm \frac{1}{5}$

$x = 1$   
 $x = -5$   
 $x = -\frac{1}{5}$

1)	5	21	-21	-5	
	↓				
	5	26	5	0	

you can solve this!

$5x^2 + 26x + 5 = 0$

-5)	5	26	5	
	↓			
	5	1	0	

$\Rightarrow 5x + 1 = 0$   
 $5x = -1$   
 $x = -\frac{1}{5}$

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12)  $x^4 + 3x^3 - x^2 + 9x - 12$   $x = 1$   
 $x = -4$   
 $x = \pm i\sqrt{3}$   
 $x = -i\sqrt{3}$

$\frac{p}{q} = \frac{\pm 1, 2, 3, 4, 6, 12}{\pm 1}$

$$\begin{array}{r} \downarrow 1 \quad 3 \quad -1 \quad 9 \quad -12 \\ \underline{1 \quad 4 \quad 3 \quad 12 \quad 0} \end{array}$$

$$\begin{array}{r} -4) 1 \quad 4 \quad 3 \quad 12 \\ \underline{\phantom{-4} -4 \quad 0 \quad -12} \\ 1x^2 \quad 0x \quad 3 \quad 0 \end{array} \Rightarrow x^2 + 3 = 0$$

you can solve this!!

$$\begin{array}{r} x^2 + 3 = 0 \\ -3 \quad -3 \\ \hline x^2 = -3 \\ x = \pm\sqrt{-3} \\ x = \pm i\sqrt{3} \end{array}$$

$$\frac{0 \pm \sqrt{0^2 - 4(1)(3)}}{2(1)} = \frac{\pm \sqrt{-12}}{2} = \frac{\pm i\sqrt{12}}{2}$$

$$\sqrt{12} = \sqrt{4 \cdot 3} = 2\sqrt{3} \Rightarrow \pm i\sqrt{3}$$

$$\begin{array}{l} a=1 \\ b=0 \\ c=3 \end{array}$$

constant

Same answer

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$$-5(-7i)(8+8i)$$

$$(35i)(8+8i)$$

$$280i + 280i^2$$

$$280i - 280$$

$$-280 + 280i$$

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5)  $(x+3)^5$   
 $(x-3)^5$

$$\begin{array}{cccccc} & & & & & 1 \\ & & & & 1 & ) \\ & & & 1 & 2 & 1 \\ & & 1 & 3 & 3 & 1 \\ & 1 & 4 & 6 & 4 & 1 \\ 1 & 5 & 10 & 10 & 5 & 1 \end{array}$$

$$\begin{array}{cccccc} 1(x^5)(3^0) & 5(x^4)(3^1) & 10(x^3)(3^2) & 10(x^2)(3^3) & 5(x)(3^4) & 1(x)(3^5) \\ 1 \cdot x^5 \cdot 1 & 5 \cdot x^4 \cdot 3 & 10 \cdot x^3 \cdot 9 & 10 \cdot x^2 \cdot 27 & 5 \cdot x \cdot 81 & 1 \cdot x \cdot 243 \\ x^5 + 15x^4 + 90x^3 + 270x^2 + 405x + 243 \end{array}$$

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11)

$$f(x) = 5x^3 + 21x^2 - 21x - 5$$

$x = -5$   
 $x = 1$   
 $x = -\frac{1}{5}$

$$p/q = \frac{\pm 1, \pm 5}{\pm 1, \pm 5} = \pm 1, \pm \frac{1}{5}, \pm 5$$

$$\begin{array}{r} -5 \overline{) 5 \quad 21 \quad -21 \quad -5} \\ \underline{\phantom{-5} \downarrow -25 \quad 20 \quad 5} \\ 5 \quad -4 \quad -1 \quad 0 \end{array}$$

$$\begin{array}{r} 1 \overline{) 5 \quad -4 \quad -1} \\ \underline{\phantom{1} \downarrow 5 \quad 1} \\ 5 \quad 1 \quad 0 \end{array}$$

$$\begin{aligned} 5x + 1 &= 0 \\ 5x &= -1 \\ x &= -\frac{1}{5} \end{aligned}$$

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12)

$$f(x) = x^4 + 3x^3 - x^2 + 9x - 12$$

$p/q = \pm \frac{1, 2, 3, 4, 6}{1}$

$x = -4$   
 $x = 1$   
 $x = i\sqrt{3}$   
 $x = -i\sqrt{3}$

$$\begin{array}{r|rrrrr} -4 & 1 & 3 & -1 & 9 & -12 \\ & \downarrow & -4 & 4 & -12 & 12 \\ \hline & 1 & -1 & 3 & -3 & 0 \end{array}$$

$$\begin{array}{r|rrrr} 1 & 1 & -1 & 3 & -3 \\ & \downarrow & 1 & 0 & 3 \\ \hline & 1 & x^2 & 0x & 3 & 0 \end{array}$$

*constant*

$$x^2 + 3 = 0$$

$$x^2 = -3$$

$$x = \pm\sqrt{-3}$$

$$x = \pm i\sqrt{3}$$

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Algebra 2 Common Core Name \_\_\_\_\_

Unit 2: Solving Polynomials - Practice Test #1 Date \_\_\_\_\_ Period \_\_\_\_

Factor each completely.

1)  $4m^3 + 8m^2 - 32m$  2)  $3p^2 + 3p - 126$

$4m(m^2 + 2m - 8)$   
 $4m(m+4)(m-2)$

3)  $3x^3 - 7x^2$  4)  $7x^2 + 38x + 40$

5)  $64n^2 - 4$  6)  $27m^2 - 3$

Find all roots.

7)  $(2x^2 + 1)(x^2 + 5)(x^2 - 5) = 0$  8)  $(x+2)(x^2 - 2x + 4)(x-2)(x^2 + 2x + 4) = 0$

$x+2=0$   $x+2=0$   
 $x=-2$   $x=-2$

Simplify each expression.

9)  $(12a^3 - 11a^2 - 14a) - (11a - 8a^3 - 11a^2)$  10)  $(13x^3 + 14x - 6) + (x^3 - 7x^2 - 10)$

Find each product.

11)  $(-5n + 2)(-6n + 1)$  12)  $(-a^2 + 7a - 6)(-4a^2 + 2a + 2)$

13)  $(x + 9y)(x - 9y)$  14)  $(x + 6y)^2$

-1-

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

$x+2=0$   
 $x=-2$

~~$x^2-2x+4$~~

$x-2=0$   
 $x=2$

$x^2-2x+4=0$

$1 \cdot 4$   
 $2 \cdot 2$   
 $-1 \cdot -4$   
 $-2 \cdot -2$

$-(-2) \pm \sqrt{(-2)^2 - 4(1)(4)}$   
 $\frac{2 \pm \sqrt{4-16}}{2(1)}$

$2 \pm \frac{\sqrt{4-16}}{2}$

$\frac{2 \pm \sqrt{-12}}{2} \Rightarrow \frac{2 \pm i\sqrt{12}}{2}$

$\frac{2 \pm 2i\sqrt{3}}{2}$

$\frac{\sqrt{12}}{\sqrt{4 \cdot 3}}$   
 $2\sqrt{3}$

$1 \pm i\sqrt{3}$

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5)  $64n^2 - 4$   
 $\sqrt{64} \sqrt{4}$   
 $(8n-2)(8n+2)$

6)  $\frac{27m^2-3}{3}$   
 $3(9m^2-1)$   
 $3(3m-1)(3m+1)$

3)  $3x^3 - 7x^2$   
 $(x^2)(3x-7)$   
 done 😊

share using GCF

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$$12) (-a^2 + 7a - 6)(-4a^2 + 2a + 2)$$

$$\begin{array}{r} 4a^4 - 2a^3 - 2a^2 \\ - 28a^3 + 14a^2 + 14a \\ + 24a^2 - 12a - 12 \\ \hline \end{array}$$

$$4a^4 - 30a^3 + 36a^2 + 2a - 12$$

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

$$\begin{array}{l} x+2=0 \\ x=-2 \end{array}$$

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

$$\frac{2 \pm \sqrt{-2^2 - 4(1)(4)}}{2(1)}$$

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5)  $64n^2 - 4$   
 $\sqrt{64}$     $\sqrt{4}$   
 $(8n+2)(8n-2)$

6)  $\frac{27m^2 - 3}{3}$  ← GCF  
 $\sqrt[3]{27}$     $\sqrt{3}$   
 $3(9m^2 - 1)$   
 $\sqrt{9} = 3$     $\sqrt{1} = 1$   
 $3(3m-1)(m+1)$

4)  $7x^2 + 38x + 40$   
 $\sqrt{7(40)} = 280$   

$$\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$\frac{-38 \pm \sqrt{38^2 - 4(7)(40)}}{2(7)}$$

$$\frac{-38 \pm \sqrt{1444 - 1120}}{14}$$

$$\frac{-38 \pm \sqrt{324}}{14} = \frac{-38 \pm 18}{14}$$

$$= \frac{-38 + 18}{14} = \frac{-38 - 18}{14}$$


$$= \frac{-20}{14} = \frac{-10}{7} \quad = \frac{-56}{14} = \frac{-23}{7}$$

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3)  $3x^3 - 7x^2$

$(x^2)(3x-7)$    GCF

Done



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State the possible rational zeros for each function. Then find all rational zeros.

15)  $f(x) = 5x^3 - x^2 - 5x + 1$

16)  $f(x) = 3x^3 - 11x^2 + 5x + 3$

Divide.

17)  $(v^3 - 8v^2 + 23v - 25) \div (v - 4)$

18)  $(9x^4 - 29x^3 + 11x^2 - 11x - 12) \div (x - 3)$

Expand completely.

19)  $(y + 2)^5$

20)  $(y - 2)^5$

21)  $(x - 3)^5$

22)  $(y + 3)^4$

Simplify.

23)  $(-6 + 6i)(-1 + 5i)$

24)  $(5 + 6i)(2 - 7i)$   $10 - 35i + 12i - 42i^2$   
 $10 - 23i + 42$   
 $52 - 23i$

25)  $(-8i)(-3i)(-1 - 3i)$

26)  $(-8 - 3i)^2$

$(-8 - 3i)(-8 - 3i)$   
 $64 + 24i + 24i + 9i^2$

27)  $(i) + (-7 + 4i) + 8$

$i - 7 + 4i + 8$   
 $1 + 5i$

28)  $(-8 - i) - (-6 - 7i)$

29)  $(3 + 7i) - (-7 - i)$

30)  $(-6 + 6i) - (-1 - 2i)$

-2-

20)  $(y - 2)^6$

$$\begin{array}{ccccccc}
 & & & & & & 1 \\
 & & & & & & 1 & 1 \\
 & & & & & 1 & 2 & 1 \\
 & & & & 1 & 3 & 3 & 1 \\
 & & 1 & 4 & 6 & 4 & 1 \\
 & 1 & 5 & 10 & 10 & 5 & 1 \\
 1 & 6 & 15 & 20 & 15 & 6 & 1
 \end{array}$$



26)  $(-8-3i)^2$  *can't do this.*  $\rightarrow$

$$(-8-3i)(-8-3i)$$

$$64 + 24i + 24i + 9i^2$$

$$64 + 48i - 9$$

$$55 + 48i$$

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25)  $(-8i)(-3i)(-1-3i)$

$$24i^2$$

$$24(-1)(-1-3i)$$

$$-24(1-3i)$$

$$-24 + 72i$$

$$i^2 = -1$$

$$x^2 = x^2$$

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18)  $(9x^4 - 29x^3 + 11x^2 - 11x - 12) \div (x - 3)$

$x - 3$

$$\begin{array}{r} x=3 \overline{) 9 \quad -29 \quad 11 \quad -11 \quad -12} \\ \underline{\phantom{x=3} \downarrow 27 \quad -6 \quad 15 \quad 12} \\ 9 \quad -2 \quad 5 \quad 4 \quad \underline{0} \end{array}$$

$(x - 3)(9x^3 - 2x^2 + 5x + 4)$

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find all rational zeros.

$P/q = \frac{\pm 1, \pm 3}{\pm 1, \pm 3}$

16)  $f(x) = 3x^3 - 11x^2 + 5x + 3$

$x = 1$

$x = 3$

$x = -1/3$

$$\begin{array}{r} 1 \overline{) 3 \quad -11 \quad 5 \quad 3} \\ \underline{\phantom{1} \downarrow 3 \quad -8 \quad -3} \\ 3 \quad -8 \quad -3 \quad \underline{0} \end{array}$$

$$\begin{array}{r} 3 \overline{) 3 \quad -8 \quad -3} \\ \underline{\phantom{3} \downarrow 9 \quad 3} \\ 3 \quad 1 \quad \underline{0} \end{array}$$

$\Rightarrow 3x + 1 = 0$

$\} x = -1 \quad x = -1/3$

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$$3) 3x^3 - 7x^2$$

$$(x^2)(3x - 7)$$

Done ✓



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$$2) 3p^2 + 3p - 126$$

$$3(p^2 + p - 42)$$

$$3 \overline{) 126}$$

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**Simplify each expression.**

$$9) (12a^3 - 11a^2 - 14a) + (-11a + 8a^3 + 11a^2) + (8a^3 + 11a^2 - 11a)$$

*combine like terms*

$$20a^3 - 25a$$

**Find each product.**

$$11) (-5n + 2)(-6n + 1)$$

$$30n^2 - 5n - 12n + 2$$

$$30n^2 - 17n + 2$$

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**Find all roots.**

$$7) (2x^2 + 1)(x^2 + 5)(x^2 - 5) = 0$$

Factors

$$2x^2 + 1 = 0$$

$$x^2 + 5 = 0$$

$$x^2 - 5 = 0$$

$$2x^2 = -1$$

$$x^2 = -5$$

$$x^2 = 5$$

$$x^2 = -\frac{1}{2}$$

$$x = \pm\sqrt{-5}$$

$$x = \pm\sqrt{5}$$

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

$$x = \pm i\sqrt{5}$$

$$x = \pm i\sqrt{\frac{1}{2}}$$

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$$6) \frac{27m^2}{3} - \frac{3}{3}$$

$$3(9m^2 - 1)$$

$$3(3m-1)(3m+1)$$

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$$5) 64n^2 - 4\sqrt{4}$$

$$(\sqrt{64}n - 2)(\sqrt{64}n + 2)$$

$$64n^2 + \cancel{16n} - \cancel{16n} - 4$$

answer

$$30n^2 - 4$$

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Factor each completely.

1)  $4m^3 + 8m^2 - 32m$

*Not correct 😞*

GCF  
(4m)

$$\frac{4m^3}{4m} + \frac{8m^2}{4m} - \frac{32m}{4m}$$

$$4m(m^2 + 2m - 8) \quad +4 \cdot -2 = -8$$

$$(4m)(m+4)(m-2) \quad +4 \quad +(-2) = 2$$

→  $m=0 \quad m=-4 \quad m=2$   
 roots solution  
 zeros x-int.

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Simplify each expression.

9)  $(12a^3 - 11a^2 - 14a) + (-11a + 8a^3 + 11a^2)$

*subtraction*

$+ (+8a^3) (+11a^2) (-14a)$

---

$20a^3 - 25a$

Find each product.

11)  $(-5n + 2)(-6n + 1)$

*multiplication*

$30n^2 - 5n - 12n + 2$   
 $30n^2 - 17n + 2$

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Find all roots.

$$7) \underbrace{(2x^2 + 1)} \underbrace{(x^2 + 5)} \underbrace{(x^2 - 5)} = 0$$

↑ ↑ ↑  
FACTORS

$2x^2 + 1 = 0$	$x^2 + 5 = 0$	$x^2 - 5 = 0$
$2x^2 = -1$	$x^2 = -5$	$x^2 = 5$
$x^2 = -\frac{1}{2}$	$x = \pm\sqrt{-5}$	$x = \pm\sqrt{5}$
$x = \pm\sqrt{-\frac{1}{2}}$	$x = \pm\sqrt{5}$	
$x = \pm\sqrt{\frac{1}{2}}$		

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5)  $64n^2 - 4$

$\sqrt{64}$   $\sqrt{4}$

$(8n + 2)(8n - 2)$

$(8n + 2)(8n - 2)$

~~$(4n + 1)(4n - 1)$~~

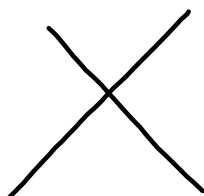
$64n^2 - 16n + 16n - 4$

$64n^2 - 4$

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Factor each completely.

1)  $4m^3 + 8m^2 - 32m$



Mistakes!!

$$\frac{4m^3}{4m} + \frac{8m^2}{4m} - \frac{32m}{4m}$$

$$4m(m^2 + 2m - 8)$$

$\begin{matrix} +4 \cdot -2 = -8 \\ +4 \oplus -2 = 2 \end{matrix}$

$$(4m)(m+4)(m-2)$$

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16)  $f(x) = 3x^3 - 11x^2 + 5x + 3$

$P/Q = \frac{\pm 1, \pm 3}{\pm 1, \pm 3} = \pm 1, \pm 3, \pm 1/3$

$x=3$   
 $x=1/3$   
 $x=-1/3$

$$\begin{array}{r} 3 \phantom{00} 3 \phantom{00} -11 \phantom{00} 5 \phantom{00} 3 \\ \phantom{3} \downarrow \phantom{00} 9 \phantom{00} -6 \phantom{00} -3 \\ \hline 3 \phantom{00} -2 \phantom{00} -1 \phantom{00} 0 \end{array}$$

$3x^2 - 2x - 1 = 0$

$$\begin{array}{r} 3 \phantom{00} -2 \phantom{00} -1 \\ \phantom{3} \downarrow \phantom{00} 3 \phantom{00} 1 \\ \hline 3 \phantom{00} 1 \phantom{00} 0 \end{array}$$

$3x + 1 = 0$

$3x = -1$   
 $x = -1/3$

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15

$$2x^3 + x^2 - 2x - 1$$

x =  
x =  
x =

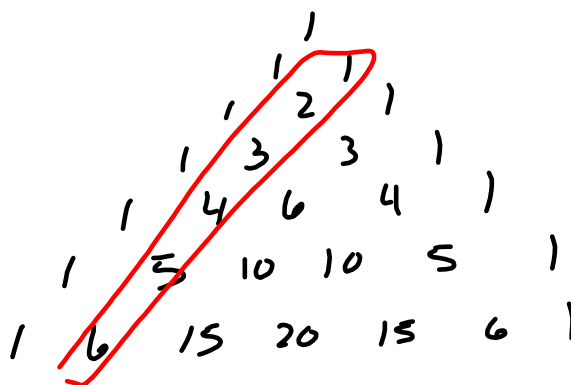
16

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

x =  
x =  
x =

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20)  $(y-2)^6$



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State the possible rational zeros for each function. Then find

15)  $f(x) = 5x^3 - x^2 - 5x + 1$       16)  $f(x)$

$\frac{p}{q} = \pm 1, \frac{1}{5}$        $x = 1$   
 $x = -1$   
 $x = \frac{1}{5}$

$$\begin{array}{r|rrrr} 1 & 5 & -1 & -5 & 1 \\ & \downarrow & & & \\ \hline & 5 & 4 & -1 & 0 \end{array} \quad 5x^2 + 4x - 1 = 0$$
  

$$\begin{array}{r|rr} -1 & 5 & 4 & -1 \\ & \downarrow & -5 & 1 \\ \hline & 5x & -1 & 0 \end{array}$$

constant

$5x - 1 = 0$   
 $x = \frac{1}{5}$

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21)  $(x-3)^5$

$$\begin{array}{cccccc} & & & & & 1 \\ & & & & & 1 & 1 \\ & & & & & 1 & 2 & 1 \\ & & & & & 1 & 3 & 3 & 1 \\ & & & & & 1 & 4 & 6 & 4 & 1 \\ & & & & & 1 & 5 & 10 & 10 & 5 & 1 \end{array}$$

$1(x-3)^5$	$5(x-3)^4$	$10(x-3)^3$	$10(x-3)^2$	$5(x-3)$	$1(x-3)^5$
$1 \cdot x^5 \cdot 1$	$5 \cdot x^4 \cdot -3$	$10 \cdot x^3 \cdot 9$	$10 \cdot x^2 \cdot -27$	$5 \cdot x \cdot 81$	$1 \cdot 1 \cdot -243$
$x^5$	$-15x^4$	$90x^3$	$-270x^2$	$405x$	$-243$

$x^5 - 15x^4 + 90x^3 - 270x^2 + 405x - 243$

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State the possible rational zeros for each func

15)  $f(x) = 5x^3 - x^2 - 5x + 1$

Divide.

17)  $(v^3 - 8v^2 + 23v - 25) \div (v - 4)$

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Simplify.

$$23) (-6 + 6i)(-1 + 5i) = 6 - 30i - 6i + 30i^2$$

$$6 - 36i - 30$$

$$-24 - 36i$$

$$\rightarrow 25) [(-8i)(-3i)](-1 - 3i)$$

$$[24i^2](-1 - 3i)$$

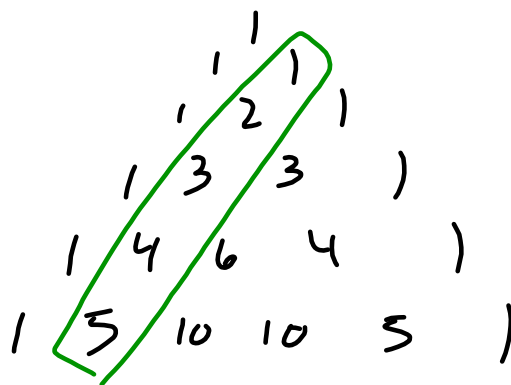
$$[24(-1)](-1 - 3i)$$

$$(-24)(-1 - 3i)$$

$$24 + 72i$$

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21)  $(x-3)^5$



$1(x)^5(3)^0$	$5(x)^4(3)^1$	$10(x)^3(3)^2$	$10(x)^2(3)^3$	$5(x)^1(3)^4$	$1(x)^0(3)^5$
$1 \cdot x^5 \cdot 1$	$5 \cdot x^4 \cdot 3$	$10 \cdot x^3 \cdot 9$	$10 \cdot x^2 \cdot 27$	$5 \cdot x \cdot 81$	$1 \cdot 1 \cdot 243$
$x^5$	$-15x^4$	$90x^3$	$-270x^2$	$405x$	$-243$

$$x^5 - 15x^4 + 90x^3 - 270x^2 + 405x - 243$$

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**Divide.**

17)  $(v^3 - 8v^2 + 23v - 25) \div (v - 4)$

$$v - 4 = 0$$

$$v = 4$$

$$\begin{array}{r}
 4 \overline{) 1 - 8 \ 23 - 25} \\
 \underline{\downarrow 4 \ -16 \ 28} \\
 1 \ -4 \ 7 \ \underline{\frac{3}{v-4}}
 \end{array}$$

$$(v-4)(v^2 - 4v + 7 + \frac{3}{v-4})$$

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State the possible rational zeros for each function. Then find all rational zeros.

15)  $f(x) = 5x^3 - x^2 - 5x + 1$

16)  $f(x) = 3x^3 - 11x^2 + 5x + 3$

$\frac{p}{q} = \pm \frac{1}{1, 5}$   
 $= \pm 1, \pm \frac{1}{5}$

$x = 1$   
 $x = -1$   
 $x = \frac{1}{5}$

$x = 1 \mid \begin{array}{r} 5 \quad -1 \quad -5 \quad 1 \\ \downarrow 5 \quad 4 \quad -1 \\ \hline 5 \quad 4 \quad -1 \quad 0 \end{array}$   $\leadsto 5x^2 + 4x - 1$

$x = -1 \mid \begin{array}{r} 5 \quad 4 \quad -1 \\ \downarrow -5 \quad 1 \\ \hline 5 \quad -1 \quad 0 \end{array}$

$x$       constant

$5x - 1 = 0$   
 $5x = 1$   
 $x = \frac{1}{5}$

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Simplify each expression.

9)  $(12a^3 - 11a^2 - 14a) - (11a - 8a^3 - 11a^2)$   
 $+ (-11a + 8a^3 + 11a^2)$

$20a^3 - 25a$

Find each product.

11)  $(-5n + 2)(-6n + 1)$

$30n^2 - 5n - 12n + 2$

$3n^2 - 17n + 2$

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Find all roots. *FACTORS*

$$7) (2x^2 + 1)(x^2 + 5)(x^2 - 5) = 0$$

$$2x^2 + 1 = 0 \quad x^2 + 5 = 0 \quad x^2 - 5 = 0$$

$$2x^2 = -1 \quad x^2 = -5 \quad x^2 = 5$$

$$x^2 = -\frac{1}{2}$$

$$x = \pm \sqrt{-5} \quad x = \pm \sqrt{5}$$

$$x = \pm i\sqrt{5}$$

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

$$x = \pm i\sqrt{\frac{1}{2}}$$

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$$5) 64n^2 - 4$$

$$\sqrt{64} \quad \sqrt{4}$$

$$(8n + 2)(8n - 2)$$

$$64n^2 - 16n + 16n - 4$$

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Factor each completely.

1)  $4m^3 + 8m^2 - 32m$

↑            ↑  
Long way!

$$\frac{4m^3}{4m} + \frac{8m^2}{4m} - \frac{32m}{4m}$$

$$4m(m^2 + 2m - 8) \quad + \frac{4}{4} \cdot \frac{-2}{-2} = -8$$

$$4m(m + 4)(m - 2) \quad + \frac{4}{4} \oplus \frac{-2}{-2} = 2$$

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Simplify.

23)  $(-6 + 6i)(-1 + 5i)$

24)  $(5 + 6i)(2 - 7i)$

$$6 - 30i - 6i + 30(-2)$$

$$\rightarrow 6 - 30i - 6i - 30$$

$$-24 - 36i$$

25)  $(-8i)(-3i)(-1 - 3i)$

26)  $(-8 - 3i)^2$

$$24i^2(-1 - 3i)$$

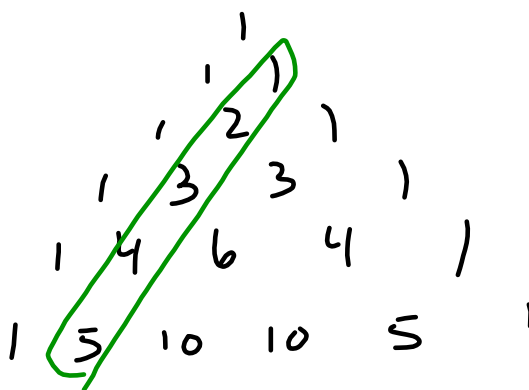
$$24(-1)$$

$$-24(-1 - 3i)$$

$$24 + 72i$$

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21)  $(x-3)^5$



$1(x)^5$	$5(x)^4(-3)$	$10(x)^3(-3)^2$	$10(x)^2(-3)^3$	$5(x)^1(-3)^4$	$1(x)^0(-3)^5$
$1 \cdot x^5 \cdot 1$	$5 \cdot x^4 \cdot (-3)$	$10 \cdot x^3 \cdot 9$	$10 \cdot x^2 \cdot -27$	$5 \cdot x \cdot 81$	$1 \cdot 1 \cdot 243$
$x^5$	$-15x^4$	$90x^3$	$-270x^2$	$405x$	$-243$

$$x^5 - 15x^4 + 90x^3 - 270x^2 + 405x - 243$$

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Divide.

17)  $(v^3 - 8v^2 + 23v - 25) \div (v - 4)$

$$v - 4 = 0$$

$$v = 4$$

$$\begin{array}{r}
 4 \overline{) 1 - 8 \ 23 \ -25} \\
 \underline{4 \ -16 \ 28} \\
 1 \ x^2 - 4 \ x \ 7 \ \left| 3 \ \frac{3}{v-4} \right.
 \end{array}$$

$$(v-4) \left( x^2 - 4x + 7 + \frac{3}{v-4} \right)$$

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**State the possible rational zeros for each function. Then find all rational zeros.**

15)  $f(x) = 5x^3 - x^2 - 5x + 1$                       16)  $f(x) = 3x^3 - 11x^2 + 5x + 3$

$P/Q = \pm \frac{1}{1, 5}$                        $x = 1$   
 $x = -1$   
 $x = 1/5$

$= \pm 1, 1/5$

$x = 1 \mid \begin{array}{r} 5 \quad -1 \quad -5 \quad 1 \\ \downarrow \quad 5 \quad 4 \quad -1 \\ \hline 5 \quad 4 \quad -1 \quad 0 \end{array}$                        $5x^2 + 4x - 1 = 0$

$x = -1 \mid \begin{array}{r} 5 \quad 4 \quad -1 \\ \downarrow \quad -5 \quad 1 \\ \hline 5 \quad x \quad -1 \quad 0 \end{array}$

*constant*

$5x - 1 = 0$   
 $5x = 1$   
 $x = 1/5$

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Algebra 2 Common Core                      Name \_\_\_\_\_

Unit 2: Solving Polynomials - Practice Test #1                      Date \_\_\_\_\_ Period \_\_\_\_

**Factor each completely.**

1)  $4m^3 + 8m^2 - 32m$                       2)  $3p^2 + 3p - 126$   
 $4m(m+4)(m-2)$                        $3(p+7)(p-6)$

3)  $3x^3 - 7x^2$                       4)  $7x^2 + 38x + 40$   
 $x^2(3x-7)$                        $(7x+10)(x+4)$

5)  $64n^2 - 4$                       6)  $27m^2 - 3$   
 $4(4n+1)(4n-1)$                        $3(3m+1)(3m-1)$

**Find all roots.**

7)  $(2x^2 + 1)(x^2 + 5)(x^2 - 5) = 0$                       8)  $(x+2)(x^2 - 2x + 4)(x-2)(x^2 + 2x + 4) = 0$   
 $\left\{ \frac{\sqrt{2}}{2}, -\frac{\sqrt{2}}{2}, \sqrt{5}, -\sqrt{5}, \sqrt{5}, -\sqrt{5} \right\}$                        $\{-2, 1 + i\sqrt{3}, 1 - i\sqrt{3}, 2, -1 + i\sqrt{3}, -1 - i\sqrt{3}\}$

**Simplify each expression.**

9)  $(12a^3 - 11a^2 - 14a) - (11a - 8a^3 - 11a^2)$                       10)  $(13x^2 + 14x - 6) + (x^3 - 7x^2 - 10)$   
 $20a^3 - 25a$                        $14x^3 - 7x^2 + 14x - 16$

**Find each product.**

11)  $(-5n + 2)(-6n + 1)$                       12)  $(-a^2 + 7a - 6)(-4a^2 + 2a + 2)$   
 $30n^2 - 17n + 2$                        $4a^4 - 30a^3 + 36a^2 + 2a - 12$

13)  $(x + 9y)(x - 9y)$                       14)  $(x + 6y)^2$   
 $x^2 - 81y^2$                        $x^2 + 12xy + 36y^2$

-1-

State the possible rational zeros for each function. Then find all rational zeros.

15)  $f(x) = 5x^3 - x^2 - 5x + 1$   
 Possible rational zeros:  $\pm 1, \pm \frac{1}{5}$   
 Rational zeros:  $\left\{\frac{1}{5}, -1, 1\right\}$

16)  $f(x) = 3x^3 - 11x^2 + 5x + 3$   
 Possible rational zeros:  $\pm 1, \pm 3, \pm \frac{1}{3}$   
 Rational zeros:  $\left\{3, -\frac{1}{3}, 1\right\}$

Divide.

17)  $(v^3 - 8v^2 + 23v - 25) \div (v - 4)$   
 $v^2 - 4v + 7 + \frac{3}{v-4}$

18)  $(9x^4 - 29x^3 + 11x^2 - 11x - 12) \div (x - 3)$   
 $9x^3 - 2x^2 + 5x + 4$

Expand completely.

19)  $(y + 2)^5$   
 $y^5 + 10y^4 + 40y^3 + 80y^2 + 80y + 32$

20)  $(y - 2)^6$   
 $y^6 - 12y^5 + 60y^4 - 160y^3 + 240y^2 - 192y + 64$

21)  $(x - 3)^5$   
 $x^5 - 15x^4 + 90x^3 - 270x^2 + 405x - 243$

22)  $(y + 3)^4$   
 $y^4 + 12y^3 + 54y^2 + 108y + 81$

Simplify.

23)  $(-6 + 6i)(-1 + 5i)$   
 $-24 - 36i$

24)  $(5 + 6i)(2 - 7i)$   
 $52 - 23i$

25)  $(-8i)(-3i)(-1 - 3i)$   
 $24 + 72i$

26)  $(-8 - 3i)^2$   
 $55 + 48i$

27)  $(i) + (-7 + 4i) + 8$   
 $1 + 5i$

28)  $(-8 - i) - (6 - 7i)$   
 $-14 + 6i$

29)  $(3 + 7i) - (-7 - i)$   
 $10 + 8i$

30)  $(-6 + 6i) - (-1 - 2i)$   
 $-5 + 8i$

-2-

$$10) (r^3 + 13r^2 + 28r - 24) \div (r + 10)$$

$$r + 10 \overline{) r^3 + 13r^2 + 28r - 24}$$

$$r = -10 \left| \begin{array}{rrrr} 1 & 13 & +28 & -24 \\ \downarrow & -10 & -30 & +20 \\ \hline 1 & 3 & -2 & -4 \end{array} \right.$$