

A2 Unit 7 Corrective Assignment

Name KE

Simplify these terms into terms with only positive exponents. (+3 pts)

1.  $(x^8yz)^{-3}$   
 $x^{-24}y^{-3}z^{-3} = \frac{1}{x^{24}y^3z^3}$

2.  $\left(\frac{-4a^3b^{-1}}{624x^2y}\right)^2$   
 $\frac{a^6b^{-2}}{6^2x^4y^2}$   
 $\frac{a^6}{36b^2x^4y^2}$

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

4.  $\left(\frac{-1}{(abc)^{-3}}\right)^4$   
 $= \frac{(-1)^4}{(abc)^{-12}}$   
 $= a^{12}b^{12}c^{12}$

Evaluate the function at the given value using synthetic substitution. Check your answer using direct substitution. (+4 pts)

5.  $f(x) = 2x^4 - 25x^2 + 2x - 3$  at  $x = -4$

6.  $g(z) = a^5 - 2a^4 + 3a^3 - 4a^2 + 5a$  at  $a = 2$

Synthetic substitution:

Synthetic substitution:

-4 | 2 0 -25 2 -3  
 -8 32 -28 104  
 2 -8 7 -26 101

2 | 1 -2 3 -4 5 0  
 2 0 6 4 18  
 1 0 3 2 9 18

Direct substitution:

Direct substitution:

$2(-4)^4 - 25(-4)^2 + 2(-4) - 3$   
 $512 - 400 - 8 - 3$   
 $= 101$

$\frac{5}{2} - 2(2)^4 + 3(2)^3 - 4(2)^2 + 5(2)$   
 $= 24 - 16 + 10$   
 $= 18$

Create a polynomial function with degree greater than 2 that has the given end behavior. (+4 pts)

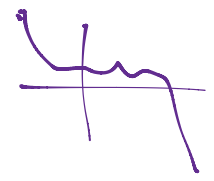
7. As  $x \rightarrow -\infty, f(x) \rightarrow -\infty$   
 and as  $x \rightarrow \infty, f(x) \rightarrow -\infty$



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

MUST HAVE  
 NEG. L.C.  
 EVEN POWER

8. As  $x \rightarrow -\infty, f(x) \rightarrow \infty$   
 and as  $x \rightarrow \infty, f(x) \rightarrow -\infty$



$f(x) = -3x^7 + 2x + 1$

MUST HAVE NEG.  
 L.C. &  
 ODD POWER

9. Graph the function. Label all extrema, zeros, intercepts and end behavior. Round to the nearest hundredth, if necessary. (+16 pts)

$$f(x) = 0.1x^4 - 0.1x^3 - x^2 - x + 3$$

Zeros:  $(1.32345, 0)$   
 $(3.78609, 0)$   
 y-intercept:  $(0, 3)$

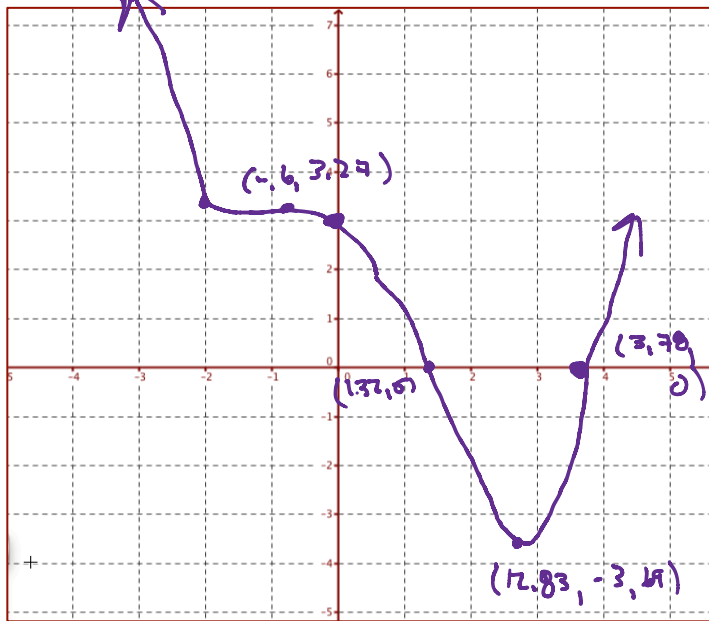
Extrema: local max  $(-0.6, 3.27)$

ABS min  $(2.83, -3.69)$

End Behavior:

$$x \rightarrow -\infty, f(x) \rightarrow \infty$$

$$x \rightarrow \infty, f(x) \rightarrow \infty$$



x	f(x)
-3	7.8
-2	3.4
-1	3.2
0	3
1	1
2	-2.2
3	-3.6

Factor each sum or difference in cubes. (+3 pts)

$$a^3 + b^3 = (a + b)(a^2 - ab + b^2)$$

$$a = x \quad b = 10$$

10.  $64x^3 - 125y^3$

$$a = 4x \quad b = -5y$$

$$(4x - 5y)(16x^2 + 20xy + 25y^2)$$

11.  $x^3 + 1000$

$$(x + 10)(x^2 - 10x + 100)$$

12. Divide  $(k^3 + 15k^2 - 63k - 135)$  by  $(k + 3)$  using polynomial long division. (+5 pts)

$$\begin{array}{r}
 k^2 + 12k - 99 \\
 k+3 \overline{) k^3 + 15k^2 - 63k - 135} \\
 \underline{k^2 + 3k^2} \phantom{- 63k - 135} \\
 12k^2 - 63k \phantom{- 135} \\
 \underline{12k^2 + 36k} \phantom{- 135} \\
 -99k - 135 \\
 \underline{-99k - 297} \\
 162
 \end{array}$$

13. Now check #12 using synthetic division. (+3 pts)

$$\begin{array}{r|rrrr}
 -3 & 1 & 15 & -63 & -135 \\
 & & -3 & -36 & 297 \\
 \hline
 & 1 & 12 & -99 & 162
 \end{array}$$

14. Factor  $k^3 + 15k^2 - 63k - 135$  completely. Also, find all of the roots. (+2 pts)

$$k^2(k + 15) - 9(k + 15)$$

$$\rightarrow (k^2 - 9)(k + 15)$$

$$k^2 - 9 = 0 \quad k + 15 = 0$$

$$\rightarrow k = \pm 3 \quad k = -15$$

For 14 – 16, factor completely using the most appropriate method. (+3 pts each) (Hint: Quad Form, Grouping, GCF first...)

15.  $230x^6 - 230x^4$

$$230x^4(x^2 - 1)$$

$$230x^4(x+1)(x-1)$$

16.  $4a^3 - 4a^2 - 9a + 9$

$$4a^2(a-1) - 9(a-1)$$

$$(4a^2 - 9)(a-1)$$

17.  $7m^3 - 21m^2 + m - 3$

$$7m^2(m-3) + 1(m-3)$$

$$(m-3)(7m^2+1)$$

18.  $10x^4 - 29x^2 + 10$

$$(5x^2 - 2)(2x^2 - 5)$$

Solve by factoring. (+4 pts)

19.  $9x^4 + 25 = 30x^2$

$$9x^4 - 30x^2 + 25 = 0$$

$$(3x^2 - 5)(3x^2 - 5) = 0$$

$$3x^2 - 5 = 0 \text{ or (same)}$$

$$x^2 = \frac{5}{3}$$

$$x = \pm\sqrt{\frac{5}{3}}$$

20.  $x^3 + x^2 = 5x + 5$

$$x^3 + x^2 - 5x - 5 = 0$$

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

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

$$x = -1, \pm\sqrt{5}$$

21.  $28x^5 = 343x^3$

$$28x^5 - 343x^3 = 0$$

$$7x^3(4x^2 - 49) = 0$$

$$x = 0 \quad x = \pm\sqrt{\frac{49}{4}} = \pm\frac{7}{2}$$

$$x = 0, \pm\frac{7}{2}$$

22. Bean collects polynomials for his favorite weekend activity: Fear Factoring! This week, Bean collects  $f(x) = 2x^3 - 41x^2 + 55x + 38$  as his polynomial. Help Bean factor this polynomial completely. Here's a hint: one factor is  $(x - 19)$ . (+4 pts)

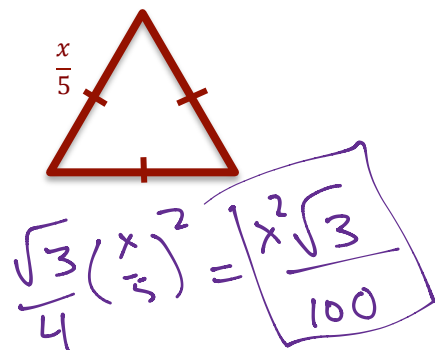
19		2	-41	55	38
			38	-57	-38
		2	-3	-2	

$$(2x^2 - 3x - 2)(x - 19)$$

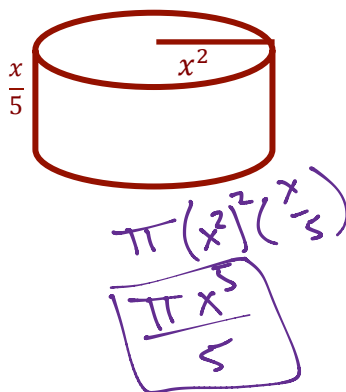
$$(2x + 1)(x - 2)(x - 19)$$

23. Write an expression for the figure's area or volume in terms of x. (+3 pts)

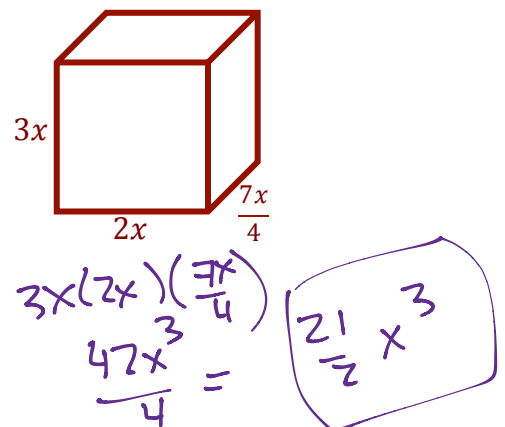
a.  $A = \frac{\sqrt{3}}{4}s^2$



b.  $V = \pi r^2 h$



c.  $V = lwh$



Algebra Skills ( $\frac{1}{2}$ pt. Each)

GRAPH

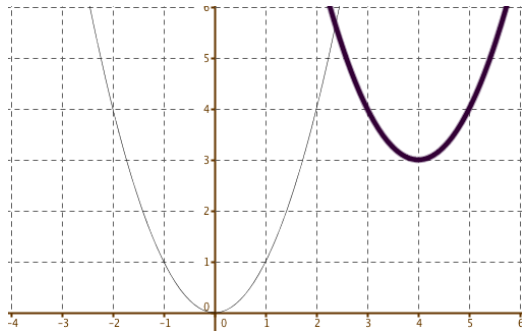
Below, the graph of  $f(x) = (x - 4)^2 + 3$  is sketched in bold. Its parent function  $f(x) = x^2$  is represented by the thin curve.

24. Describe the translation of the parent graph.

Right 4  
up 3

25. How does the translation relate to the equation?

$(x - 4)$   
 $+ 3$



SIMPLIFY

26.  $\sqrt{48} - 5\sqrt{16} - 2\sqrt{3}$

$4\sqrt{3} - 20 - 2\sqrt{3}$

$2\sqrt{3} - 20$

27.  $2\sqrt{7}(4 - 2\sqrt{7})$

$8\sqrt{7} - 4 \cdot 7$

$8\sqrt{7} - 28$

SOLVE

28. Solve:

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

$x = 0$   $x = \frac{1}{2}$   $x = -\frac{1}{2}$

29. Factor and solve.

$2x^2 - 39x - 20 = 0$

$(2x + 1)(x - 20) = 0$

$x = -\frac{1}{2}$   $x = 20$