121 College Algebra

Name key ID: 1

PRACTICE TEST (Semester)

Period____

Simplify. Your answer should contain only positive exponents.

1) $(-m^2)^5 \cdot (-m^0)^4$

(A) $-m^{10}$ B) n^2m^{10}
C) m^4n^6 D) $-m^9n^3$

2) $(-y^4)^{-3} \cdot -x^{-5}$

A) $-x^{28}y^{20}$ (B) $\frac{1}{y^{12}x^5}$
C) y^7 D) $x^{13}y^{20}$

3) $(-m^{-4}n^{-3} \cdot m^2n^4)^5$

A) n^9m (B) $-\frac{n^5}{m^{10}}$
C) $-m^6n^4$ D) $\frac{n^{70}}{m^{10}}$

4) $(u^5v^0 \cdot -u^3v^3 \cdot u^{-1})^4$

A) $-v^7u^9$ (B) $u^{28}v^{12}$
C) $-\frac{1}{u^{12}v^4}$ D) $-\frac{u^8}{v^{18}}$

Write each expression in exponential form.

5) $(\sqrt[5]{3x})^7$

A) $(6x)^{\frac{4}{3}}$ B) $(3x)^{\frac{1}{2}}$
C) $(2x)^{\frac{5}{3}}$ (D) $(3x)^{\frac{7}{5}}$

6) $(\sqrt[3]{x})^4$

A) $x^{\frac{1}{4}}$ (B) $x^{\frac{4}{3}}$
C) $(5x)^{-\frac{5}{3}}$ D) $(10x)^{-\frac{8}{5}}$

7) $\frac{1}{\sqrt{v}}$

A) $v^{\frac{2}{3}}$ B) $(3v)^{\frac{1}{3}}$
C) $(5v)^{\frac{5}{4}}$ (D) $v^{-\frac{1}{2}}$

8) $\sqrt[4]{x}$

A) $(10x)^{\frac{5}{2}}$ B) $x^{-\frac{7}{5}}$
C) $(3x)^{\frac{7}{5}}$ (D) $x^{\frac{1}{4}}$

Simplify each expression.

9) $(9n + 11n^5 + 9n^2) - (6n^2 + 8n + 13n^5)$

(A) $-2n^5 + 3n^2 + n$
B) $-2n^5 + 3n^2$
C) $-2n^5 + 3n^2 + 6n$
D) $-2n^5 + 3n^2 + 14n$

10) $(3x^2 - x^4 - 5x^3) - (-10x^3 + 12x^2 - x^4)$

A) $10x^3 - 9x^2$ B) $-x^3 - 9x^2$
(C) $5x^3 - 9x^2$ D) $16x^3 - 9x^2$

Simplify.

11) $\dfrac{4\sqrt{10}}{5\sqrt{45}}$

A) $\dfrac{4\sqrt{2}}{15}$ B) $\dfrac{15\sqrt{2}}{8}$

C) $\dfrac{5\sqrt{3}}{12}$ D) $\dfrac{2\sqrt{2}}{15}$

12) $\dfrac{4\sqrt{25}}{\sqrt{16}}$

A) $\dfrac{2\sqrt{15}}{15}$ B) 5

C) $\dfrac{2\sqrt{5}}{3}$ D) $\dfrac{\sqrt{5}}{4}$

Find each product.

13) $(-v+5)(8v+5)$

A) $-8v^2+25$

B) $-8v^2-45v-25$

C) $-8v^2+45v-25$

D) $-8v^2+35v+25$

14) $(4p-7)(6p-2)$

A) $24p^2-34p-14$

B) $24p^2+14$

C) $24p^2-50p+14$

D) $28p^2+5p-12$

Factor each completely.

15) $5p^2-36p-81$

A) $(p+9)(5p+9)$

B) $(5p+9)(p-9)$

C) Not factorable

D) $(5p+3)(p-27)$

16) $7v^2+36v-36$

A) $(7v+6)(v-6)$

B) $(7v+4)(v-9)$

C) $(7v-6)(v+6)$

D) $(7v+36)(v-1)$

17) $15x^3+10x^2+21x+14$

A) $(5x^2+7)(3x-2)$

B) $(5x^2+7)(3x+7)$

C) $(5x^2+2)(3x-7)$

D) $(5x^2+7)(3x+2)$

18) $12n^3-3n^2-4n+1$

A) $(3n^2-1)^2$

B) $(4n-1)(3n^2+1)$

C) $(3n^2-1)(4n+1)$

D) $(3n^2-1)(4n-1)$

Simplify each and state the excluded values.

19) $\dfrac{n+6}{n^2+3n-18}$

A) $\dfrac{8}{2n-1}$; $\left\{\dfrac{1}{2}\right\}$

B) $8n$; $\{4\}$

C) $\dfrac{1}{n-3}$; $\{3, -6\}$

D) $\dfrac{2n-1}{8}$; No excluded values.

FACTOR

$\frac{n+6}{(n+6)(n-3)}$

$\frac{1}{n-3}$

-18
$6, -3$

Ex: $x \neq 6, 3$

Simplify.

20) $(-3i)+(4i)$

A) $7i$ B) $-2+4i$

C) i D) $-7i$

think like this

$-3x + 4x$

$1x$

Solve each equation.

21) $-6-(6+8v) = v-30$

A) $\{-16\}$

B) { All real numbers. }

C) $\{2\}$

D) $\{16\}$

$-6-6-8v = v-30$

$-12-8v = v-30$

$-v \quad -v$

$-12-9v = -30$

$+12 \quad +12$

$-9v = 18$

22) $-(-2x+1)-5 = 18-x$

A) $\{8\}$ B) $\{6\}$

C) $\{13\}$ D) $\{-1\}$

$2x-1-5 = 18-x$

$i^2 = -1$

$i \cdot i = -1$

$4i \cdot 12i$

$36i^2$

-36

23) $-(x-1) = -14-6x$

A) $\{2\}$ B) $\{-3\}$

C) $\{4\}$ D) { All real numbers. }

$-x+1 = -14-6x$

$+6x \quad +6x$

$5x+1 = -14$

$-1 \quad -1$

$5x = -15$

$x = -3$

24) $-6+2m = -2(m-5)+4$

A) $\{1\}$

B) $\{5\}$

C) $\{10\}$

D) { All real numbers. }

$-6+2m = -2m+10+4$

$+2m \quad +2m$

$-6+4m = 14$

$+6 \quad +6$

$4m = 20$

Solve each equation by taking square roots.

25) $4x^2 - 10 = -64$

A) $\left\{\dfrac{3i\sqrt{6}}{2}, -\dfrac{3i\sqrt{6}}{2}\right\}$

B) $\{\sqrt{55}, -\sqrt{55}\}$

C) $\left\{\dfrac{\sqrt{2667}}{7}, -\dfrac{\sqrt{2667}}{7}\right\}$

D) $\{55, -55\}$

$4x^2 - 10 = -64$

$+10 \quad +10$

$4x^2 = -54$

$\frac{4}{4} \quad \frac{4}{4}$

$x^2 = \frac{-54}{4}$

$\sqrt{x^2} = \sqrt{\frac{-54}{4}}$

$\sqrt{9}\sqrt{6}$

$x = \pm\frac{i\sqrt{54}}{2}$

$x = \pm\frac{3i\sqrt{6}}{2}$

26) $9a^2 + 7 = 718$

A) $\left\{\dfrac{\sqrt{190}}{5}, -\dfrac{\sqrt{190}}{5}\right\}$

B) $\{\sqrt{85}, -\sqrt{85}\}$

C) $\{\sqrt{79}, -\sqrt{79}\}$

D) $\{2\sqrt{2}, -2\sqrt{2}\}$

$9a^2 + 7 = 718$

$-7 \quad -7$

$9a^2 = 711$

$\sqrt{a^2} = \sqrt{79}$

Solve each equation by factoring.

27) $x^2 - 3x = 28$

A) $\{-5, 8\}$ B) $\{8, -3\}$
C) $\{-4, 7\}$ D) $\{-3, 0\}$

$x^2 - 3x - 28 = 0$ -28
$(x-7)(x+4)$ $-7, 4$ -3

28) $p^2 - p = 0$

A) $\{-5, 1\}$ B) $\{1, 6\}$
C) $\{8, 0\}$ D) $\{1, 0\}$

$p(p-1) = 0$
$p = 0 \quad p = 1$

Solve each equation by completing the square.

29) $n^2 + 8n + 34 = -10$

A) $\{9 + \sqrt{177}, 9 - \sqrt{177}\}$
B) $\{-4 + 2i\sqrt{7}, -4 - 2i\sqrt{7}\}$
C) $\{11, -9\}$
D) $\{1 + 7i\sqrt{2}, 1 - 7i\sqrt{2}\}$

44 16 8

$n^2 + 8n + 16 = -44 + 16$
$(n+4)^2 = \sqrt{-28}$
$n + 4 = 2i\sqrt{7}$

30) $x^2 + 16x + 41 = 10$

A) $\{-8 + 5i, -8 - 5i\}$
B) $\{-8 + \sqrt{33}, -8 - \sqrt{33}\}$
C) $\{-8 + \sqrt{95}, -8 - \sqrt{95}\}$
D) $\{-1, -31\}$

-41 -41

$x^2 + 16x + 64 = -31 + 64$
x 8
x x^2 8 64
$(x+8)^2 = \sqrt{33}$
$x + 8 = \pm\sqrt{33}$
$x = 8 \pm \sqrt{33}$

Solve each system by elimination.

31) $9x - 5y = -6$
$3x + 7y = 24$

A) $(1, -3)$ B) $(-1, -3)$
C) $(3, -1)$ D) $(1, 3)$

$\begin{bmatrix} 9 & -5 & -6 \\ 3 & 7 & 24 \end{bmatrix}$
rref(A)

32) $2x - 4y = -20$
$-3x - y = 30$

A) $(-10, 0)$ B) $(-4, 0)$
C) $(9, 0)$ D) $(0, 9)$

$\begin{bmatrix} 2 & -4 & -20 \\ -3 & -1 & 30 \end{bmatrix}$

Solve each system by substitution.

33) $-6x - y = -6$
$5x + y = 5$

A) $(4, 0)$ B) $(-1, 0)$
C) $(1, 0)$ D) $(0, -1)$

34) $-21x - 3y = 2$
$7x + y = 2$

A) $(7, 6)$ B) No solution
C) $(7, -6)$ D) $(-7, 6)$

d all roots.

chunking

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

A) $\{i\sqrt{3}, -i\sqrt{3}, 1, -1\}$
B) $\{0, 2i, -2i, -1\}$
C) $\{i\sqrt{2}, -i\sqrt{2}, 1, -1\}$
D) $\{2i, -2i, 1, -1\}$

$m = x^2$

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

$m^2 + 3m - 4 = 0$ $\quad -4, 3$

$(m+4)(m-1) = 0$

$m = -4 \quad m = 1$

$\sqrt{x^2} = \sqrt{-4} \quad \sqrt{x^2} = \sqrt{1}$

36) $x^4 + 12x^2 + 32 = 0$

A) $\{i\sqrt{2}, -i\sqrt{2}, 2i\sqrt{2}, -2i\sqrt{2}\}$
B) $\{2i, -2i, 2i\sqrt{2}, -2i\sqrt{2}\}$
C) $\{2i, -2i, i\sqrt{10}, -i\sqrt{10}\}$
D) $\{i\sqrt{6}, -i\sqrt{6}, 2i\sqrt{2}, -2i\sqrt{2}\}$

$m = x^2$

$(x^2)^2 + 12x^2 + 32 = 0$

$m^2 + 12m + 32 = 0$ $\quad 32 \mid 12$ $\quad 4, 8$

$(m+4)(m+8) = 0$

$m = -4 \quad m = -8$

$\sqrt{x^2} = \sqrt{-4} \quad \sqrt{x^2} = \sqrt{-8}$

$x = \pm 2i \quad \sqrt{-4}\sqrt{2}$

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

Evaluate each expression.

37) $\log_3 81$

A) 27 B) −4
C) 3 D) 4

$3^{\square} = 81$

38) $\log_6 \frac{1}{216}$

A) $\frac{1}{1296}$ B) 3
C) 1 D) −3

$6^{\square} = \frac{1}{216}$

39) $\log_5 \frac{1}{125}$

A) 3 B) −3
C) $\frac{1}{625}$ D) Undefined

$5^{\square} = \frac{1}{125}$

40) $\log_5 25$

A) −2 B) 5
C) 3 D) 2

$5^{\square} = 25$

Condense each expression to a single logarithm.

41) $\frac{\log_7 x}{3} + \frac{\log_7 y}{3} + \frac{\log_7 z}{3}$

A) $\log_7 \sqrt[3]{zyx}$
B) $\log_7 \left(z\sqrt[3]{yx}\right)$
C) $\log_7 \left(y^6 x^3\right)$
D) $\log_7 \frac{x^{18}}{y^6}$

$\frac{1}{3}\log_7 x + \frac{1}{3}\log_7 y + \frac{1}{3}\log_7 z$

$\log_7 (xyz)^{\frac{1}{3}}$

$\log_7 \sqrt[3]{xyz}$

42) $30\log_2 x - 6\log_2 y$

A) $\log_2 \frac{x^5}{y^6}$ B) $\log_2 \left(z\sqrt{yx}\right)$
C) $\log_2 \frac{x^{30}}{y^6}$ D) $\log_2 \left(y^{30} x^6\right)$

$\log_2 \frac{x^{30}}{y^6}$

43) $6\log_6 10 + 30\log_6 3$

A) $\log_6 \frac{10^{30}}{3^6}$

B) $\log_6 (3^{30} \cdot 10^6)$

C) $\log_6 (7^5\sqrt{10})$

D) $\log_6 (3^6 \cdot 10^{30})$

$\log_6 10^6 + \log_6 3^{30}$

$\log_6 10^6 \cdot 3^{30}$

$\log_6 (3^{30} \cdot 10^6)$

44) $4\log_8 5 + 6\log_8 11$

A) $\log_8 \frac{5^{24}}{11^6}$

B) $\log_8 (11^6 \cdot 5^4)$

C) $\log_8 \sqrt{330}$

D) $\log_8 (11^{24} \cdot 5^6)$

$\log_8 (5^4 \cdot 11^6)$

Expand each logarithm.

45) $\log_4 (x \cdot y \cdot z^3)$

A) $2\log_4 x - 6\log_4 y$

B) $6\log_4 x - 2\log_4 y$

C) $3\log_4 z + \frac{\log_4 x}{3}$

D) $\log_4 x + \log_4 y + 3\log_4 z$

$\log_4 x + \log_4 y + \log_4 z^3$

46) $\log (u^2 \cdot v)^4$

A) $\log u + \log v + 2\log w$

B) $2\log u - 4\log v$

C) $8\log u - 4\log v$

D) $8\log u + 4\log v$

$4(\log u^2 + \log v)$

$4\log u^2 + 4\log v$

$8\log u + 4\log v$

47) $\log_4 (w^3\sqrt[3]{u})$

A) $3\log_4 w + \frac{\log_4 u}{3}$

B) $3\log_4 u - 6\log_4 v$

C) $3\log_4 u + 6\log_4 v$

D) $6\log_4 u - 18\log_4 v$

$\log_4 w^3 + \log_4 u^{\frac{1}{3}}$

$3\log_4 w + \frac{1}{3}\log_4 u$

$3\log_4 w + \frac{\log_4 u}{3}$

48) $\log_7 \frac{u^4}{v^6}$

A) $4\log_7 u + 6\log_7 v$

B) $4\log_7 w + \frac{\log_7 u}{2}$

C) $24\log_7 u - 6\log_7 v$

D) $4\log_7 u - 6\log_7 v$

$\log_7 u^4 - \log_7 v^6$

$4\log_7 u - 6\log_7 v$

Solve each equation. Remember to check for extraneous solutions.

49) $-6 + \sqrt{7n-6} = 2$

A) {10} B) {3}

C) {10, 3} D) {−3}

Must get $\sqrt{7n-6}$ by itself!!!

$-6 + \sqrt{7n-6} = 2$

$+6 \quad +6$

$(\sqrt{7n-6})^2 = (8)^2$

$7n - 6 = 64$

$+6 \quad +6$

$7n = 70$

$n = 10$

50) $(\sqrt{12-2n})^2 = (\sqrt{9-n})^2$

A) {−3} B) {6, 3}

C) {−2, 3} D) {3}

both $\sqrt{}$ are by themselves on opposite sides of = sign so square both sides

$12 - 2n = 9 - n$

$-9 \quad +2n \quad -9 + 2n$

$3 = n$

51) $k = \sqrt{6-k}$ Square both sides

A) No solution. B) {−3}
C) {2} D) {−3, 3}

extraneous $k=-3$

quadratic $k=2$ Must Check

$k^2 = 6-k$

$k^2+k-6=0$ -6, $3,-2$, 1

$(k+3)(k-2)=0$

$-3=\sqrt{6--3}$ no

$2=\sqrt{6-2}$

$2=2$ yes

52) $-4 = -5 + \sqrt{x+8}$ (+5 +5)

A) {−7, −4} B) {−7}
C) {−8} D) {8}

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

$1 = x+8$

$-8 \quad -8$

$-7 = x$

Solve each equation.

53) $8 = (27-p)^{\frac{3}{4}}$

A) {2, 8} B) {11}
C) {2, 0} D) {2, 7}

take to reciprocal power

$8^{\frac{4}{3}} = (27-p)^{\frac{3}{4}\cdot\frac{4}{3}}$

$(8^{\frac{1}{3}})^4 = 27-p$

$2^4 = 27-p$

$16 = 27-p$

$-27 \quad -27$

$-11 = -p$

54) $34 = 2 + 2p^{\frac{2}{3}}$ (−2 −2) get by itself First

A) {64} B) {−2, 64}
C) {7, 64} D) {64, −64}

$\frac{32}{2} = \frac{2p^{\frac{2}{3}}}{2}$

$16 = p^{\frac{2}{3}}$

$(16)^{\frac{3}{2}} = (p^{\frac{2}{3}})^{\frac{3}{2}}$

$(\sqrt{16})^3 = p$

$p = (\pm 4)^3$

This that said cat

55) $\log_9 4 + \log_9 (x-9) = 1$

A) $\left\{-\frac{81}{32}\right\}$ B) $\left\{-\frac{3}{5}\right\}$
C) $\left\{\frac{45}{4}\right\}$ D) {39}

$\log_2 16 = 4$

$2^4 = 16$

$\log_9 4(x-9) = 1$

$\log_9 4x-36 = 1$

$9^1 = 4x-36$

$9 = 4x-36$ (+36 +36)

$45 = 4x$

56) $\log_7 (x-2) - \log_7 x = \log_7 74$

A) $\left\{-\frac{2}{73}, -19\right\}$ B) No solution.
C) {−19} D) $\left\{-\frac{2}{73}\right\}$

Must Check

$\log_7 \frac{x-2}{x} = \log_7 74$

$\frac{x-2}{x} = 74$

$x-2 = 74x$

$-x \quad -x$

$-2 = 73x$

$x = -\frac{2}{73}$

extraneous

Solve each equation. Round your answers to the nearest ten-thousandth.

57) $e^{b+8} + 5 = 44.8$ (−5 −5)

A) −6.438 B) −6.4001
C) No solution. D) −4.3161

$e^{b+8} = 39.8$

now take ln of both sides

$\ln e^{b+8} = \ln 39.8$

$(b+8)(\ln e) = \ln 39.8$ ($\ln e$ equals 1)

$b+8 = \ln 39.8$

$-8 \quad -8$

$b = -4.316$

58) $-8 \cdot 9^{9n} = -64$

A) 0.1996 B) 0.1003
C) 0.1052 D) 0.231

$\frac{-8\cdot 9^{9n}}{-8} = \frac{-64}{-8}$

$9^{9n} = 8$

now take log or ln of both sides

$\log 9^{9n} = \log 8$

$\frac{9n \cdot \log 9}{\log 9} = \frac{\log 8}{\log 9}$

$\frac{9n}{9} = \frac{.946394}{9}$

$n = .1052$

Solve each equation.

59) $\log_{11}(x-4)+5=6$

A) $\left\{\frac{701}{100}\right\}$ B) $\{15\}$

C) $\left\{\frac{1}{175}\right\}$ D) $\{28\}$

$\log_{11}(x-4)+5=6$
$-5\quad -5$
$\log_{11}(x-4)=1$
$11^1=x-4$
$11=x-4$
$+4\quad +4$
$15=x$

$\log_2 16=4$
$2^4=16$

60) $-6+\log_6 10n=-2$

A) $\{84\}$ B) $\left\{\frac{1}{5}\right\}$

C) $\left\{-\frac{1}{7}\right\}$ D) $\left\{\frac{648}{5}\right\}$

$-6+\log_6 10n=-2$
$+6\quad +6$
$\log_6 10n=4$
$6^4=10n$
$1296=10n$
$\frac{1296}{10}=\frac{10n}{10}$
$\frac{648}{5}=n$

61) $2^{-3x+1}=2^{-x}$

A) $\left\{-\frac{9}{10}\right\}$ B) No solution.

C) $\left\{-\frac{9}{5}\right\}$ D) $\left\{\frac{1}{2}\right\}$

this = that
$-3x+1=-x$
$+3x\quad +3x$
$1=2x$
$\frac{1}{2}=x$

this = that said the cat

62) $5^{3x}=5^{-2x}$

A) $\left\{-\frac{1}{3}\right\}$ B) $\{-1\}$

C) $\left\{\frac{6}{7}\right\}$ D) $\{0\}$

$3x=-2x$
$+2x\quad +2x$
$5x=0$
$\frac{5x}{5}=\frac{0}{5}$
$x=0$

Identify the center and radius of each.

63) $(x+16)^2+(y+11)^2=7$

A) Center: $(-16,-11)$
Radius: $\sqrt{7}$

B) Center: $(16,-11)$
Radius: $\sqrt{7}$

C) Center: $(-16,-11)$
Radius: 7

D) Center: $(-11,16)$
Radius: $\sqrt{7}$

(h,k) both in parenthesis so $h \equiv k$ opposite of both
$(-16,-11)$
$r=\sqrt{7}$

64) $(x-9)^2+(y+1)^2=81$

A) Center: $(9,1)$
Radius: 9

B) Center: $(1,9)$
Radius: 9

C) Center: $(-9,-1)$
Radius: 9

D) Center: $(9,-1)$
Radius: 9

$(9,-1)$
$r=\sqrt{81}$
$r=9$

Evaluate each function at the given value.

65) $f(n)=-4n^4-19n^3+4n^2-6n-15$ at $n=-5$

A) -11 B) 2 C) 4 D) -10

You can the plug in chug or use remainder theorem and Synthetic divide

$-5\,|\,-4\quad -19\quad 4\quad -6\quad -15$
$\downarrow\quad 20\quad -5\quad 5\quad 5$
$-4\quad 1\quad -1\quad -1\quad -10$

or way easier

$-4(-5)^4-19(-5)^3+4(-5)^2-6(-5)-15$

Perform the indicated operation.

66) $f(n) = 3n + 5$
$g(n) = 3n - 4$
Find $(f \cdot g)(n)$

A) $-6n^4 + 12n^3 - 6n^2$
B) $-4n^3 + 12n^2 - 9n$
C) $9n^2 + 3n - 20$
D) $2n^3 + 5n^2 + 2n$

$f \cdot g(x) = (3n+5)(3n-4)$

$9n^2 - 12n + 15n - 20$

67) $f(x) = -3x + 2$
$g(x) = 2x + 4$
Find $(f \cdot g)(x)$

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

A) $-4x^3 + 4x$
B) $4x^3 + 3x^2 - 4x - 3$
C) $-6x^2 - 8x + 8$
D) $-6x^2 + 8x + 8$

$-6x^2 - 12x + 4x + 8$

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

68) $g(x) = 4x - 4$
$f(x) = 3x^3 + 2x$
Find $g(f(x))$

A) $2x^2 - 3$
B) $4x^3 - 20x^2 + 8x - 5$
C) $2x^2 - 4x + 9$
D) $12x^3 + 8x - 4$

$g(f(x))$

$g(3x^3 + 2x)$ substitute

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

$12x^3 + 8x - 4$

69) $f(a) = -2a - 3$
$g(a) = 2a + 5$
Find $(f \circ g)(a)$

means same thing

A) $4a - 1$
B) $-4a - 13$
C) $-2a + 7$
D) $-4a - 1$

$f(g(a))$

$f(2a+5)$

$-2(2a+5) - 3$

$-4a - 10 - 3$

$-4a - 13$

M121 College Algebra Final

Name_____ ID: 1

PRACTICE SHORT ANSWER

Period____

State the number of complex roots, the possible number of real and imaginary roots, and the possible rational roots for each equation. Then find all roots.

1) $x^3 + 11x^2 - 25x + 13 = 0$

3 R 0 Imag
1 R 2 Imag

$\pm 1, \pm 13$

± 1 mult

1	1	11	−25	13
		1	12	−13
	1	12	−13	0

$x = 1$

$x^2 + 12x - 13$

$x^2 + 6x + 36 = 13 + 36$

$(x+6)^2 = 49$

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

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

$\frac{\pm 1}{\pm 1, \pm 3}$ $\pm 1, \pm \frac{1}{3}$

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

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

$x = \frac{1}{3}$ $x = \pm 1$

Sketch the graph of each function.

3) $f(x) = 2x^2 - 8x + 6$

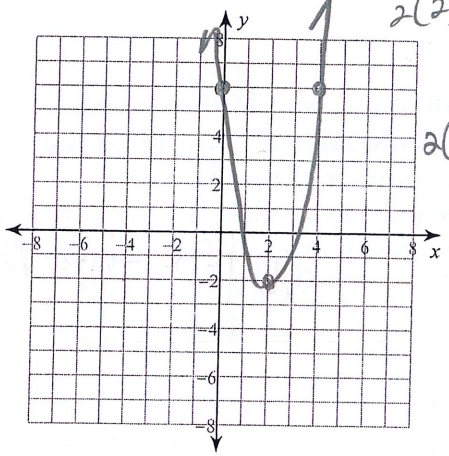
$\frac{8}{2(2)}$

$(2, -2)$

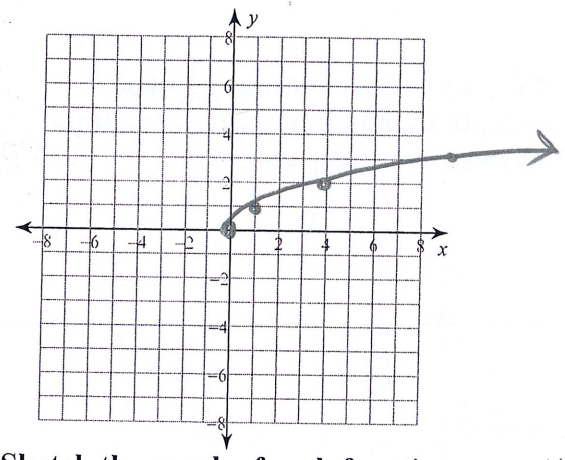
$2(2)^2 - 8(2) + 6$

$8 - 16 + 6$

$-8 + 6$



4) $y = \sqrt{x}$



Identify the domain and range of each. Then sketch the graph.

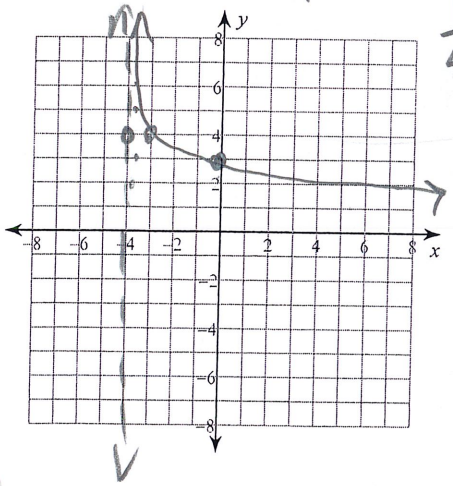
5) $y = \log_{\frac{1}{4}}(x+4) + 4$

Left 4 up 4

$y = \log_{\frac{1}{4}} x$

$\frac{1}{4}^y = x$

x	y
16	−2
4	−1
1	0
$\frac{1}{4}$	1
$\frac{1}{16}$	2



V

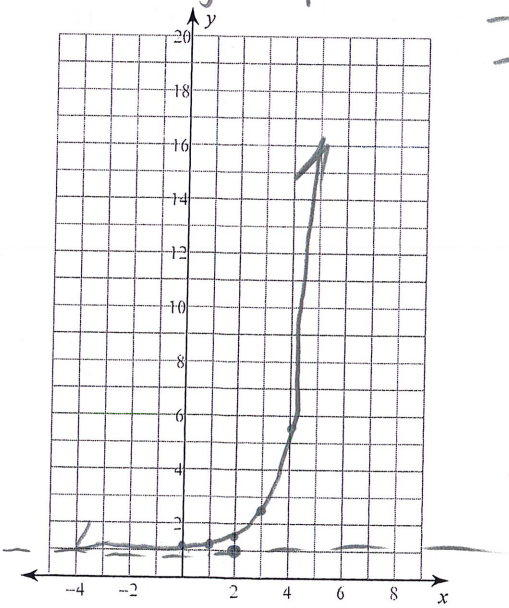
Sketch the graph of each function.

6) $y = \frac{1}{2} \cdot 3^{x-2} + 1$

Right 2 up 1

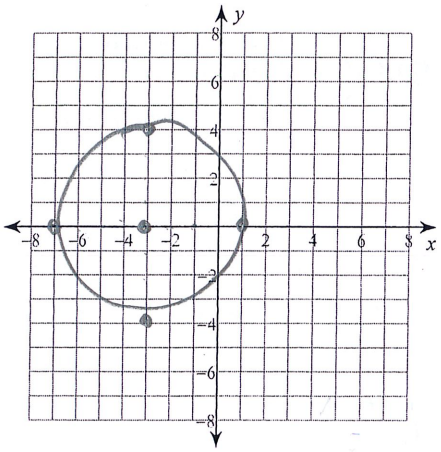
$y = \frac{1}{2} 3^x$

x	y
−2	$\frac{1}{18}$
−1	$\frac{1}{6}$
0	$\frac{1}{2}$
1	$1\frac{1}{2}$
2	4.5

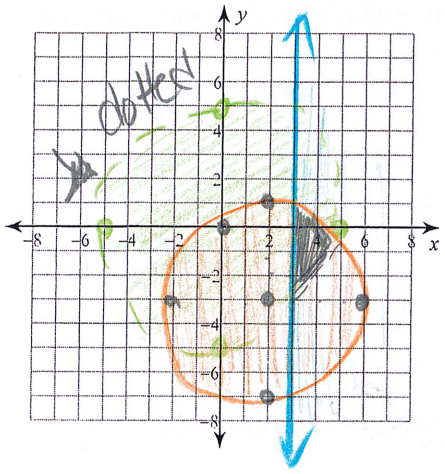


Identify the center and radius of each. Then sketch the graph.

7) $(x+3)^2 + y^2 = 16$ $(-3, 0)$ $r = 4$



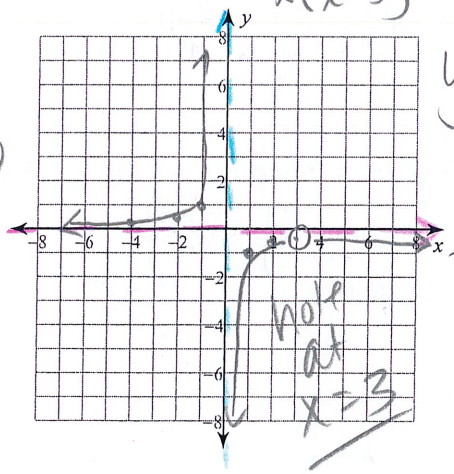
8) Graph the system $(x-2)^2 + (y+3)^2 \leq 16$ $x^2 + y^2 < 25$ $x \geq 3$



Identify the points of discontinuity, holes, vertical asymptotes, and horizontal asymptote of each. Then sketch the graph.

9) $f(x) = \dfrac{-x+3}{x^2-3x}$ $\dfrac{-1(x-3)}{x(x-3)}$ V.A. $x=0$ V.A. HA $y=0$ $y = \dfrac{-1}{x}$

$n < m$ hole at $x=3$

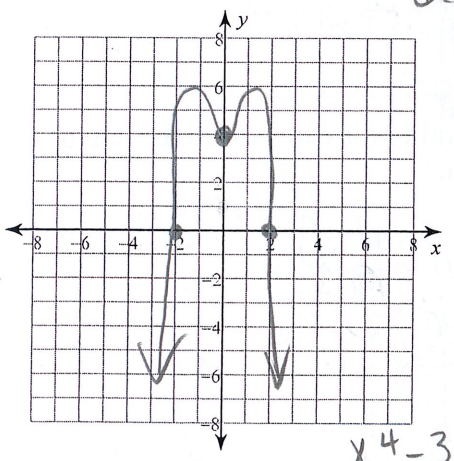


x	y
-4	$-\frac{1}{4}$
-2	$-\frac{1}{2}$
-1	-1
0	undefined
$\frac{1}{2}$	-2
2	$-\frac{1}{2}$
4	$-\frac{1}{4}$

State the maximum number of turns the graph of each function could make. Then sketch the graph. State the number of real zeros. Approximate the relative minima and relative maxima to the nearest tenth.

change this problem

10) $f(x) = -x^4 + 3x^2 + 4$ degree of 4 even open down



$-4, 1, -3$

$m = x^2$ $x^4 - 3x^2 - 4 = 0$ $(m-4)(m+1) = 0$ $m = 4$ $m = -1$

$x^4 - 3x^2 + 4 = 0$ $m^2 - 3m + \frac{9}{4} = -1 + \frac{9}{4}$ $x = \pm 2$ $x = \pm 1$

$\left(m - \frac{3}{2}\right)^2 = \frac{13}{4}$ $m - \frac{3}{2} = \pm\frac{\sqrt{13}}{2}$ $m = \frac{3}{2} \pm \frac{\sqrt{13}}{2}$