Math 114
Midterm 2
Fri Feb 19, 2010

Name: _____
8:30am - 9:20am

- **YOU MUST SHOW LOGICAL, NEAT AND ORGANIZED WORK TO EARN FULL CREDIT**
- **IT MUST BE CLEAR HOW YOU ARRIVED AT YOUR ANSWER**
- **PUT A BOX AROUND YOUR FINAL ANSWER**
- **ALL FINAL ANSWERS WHICH ARE RADICALS MUST BE SIMPLIFIED**
- **ALL FRACTIONS MUST BE IN SIMPLEST FORM**

Find the equation of the circle with center $(5, -3)$ and radius 4.

SCORE: ___ / 6 POINTS

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

Simplify $\sqrt{240}$.

SCORE: ___ / 6 POINTS

$4\sqrt{15}$

$2 \mid 240$
$2 \mid 120$
$2 \mid 60$
$2 \mid 30$
$3 \mid 15$
$5 \mid 5$
1

Write using fractional and/or negative exponents (where applicable).

SCORE: ___ / 10 POINTS

[a] $(\sqrt[5]{b})^7 = b^{\frac{7}{5}}$

[b] $\sqrt[3]{p^{27}} = p^{\frac{27}{3}} = p^9$

[c] $\frac{1}{\sqrt{n^9}} = \frac{1}{n^{\frac{9}{2}}} = n^{-\frac{9}{2}}$

Perform the indicated operations and simplify. **Write your final answers using fractional exponents.**

SCORE: ___ / 10 POINTS

[a] $w^6 w^{\frac{2}{3}} = w^{6+\frac{2}{3}} = w^{\frac{20}{3}}$

[b] $\frac{\sqrt[4]{k}}{\sqrt[6]{k}} = \frac{k^{\frac{1}{4}}}{k^{\frac{1}{6}}} = k^{\frac{1}{4}-\frac{1}{6}} = k^{\frac{1}{12}}$

Simplify $\sqrt{72a^8v^9r^7}$. **Write your final answer using radicals.** **SCORE: ___ / 6 POINTS**

$6a^4v^4r^3\sqrt{2vr}$

Rationalize the denominator and simplify. **SCORE: ___ / 12 POINTS**

[a] $\frac{15}{4\sqrt{10}} = \frac{15}{4\sqrt{10}} \cdot \frac{\sqrt{10}}{\sqrt{10}}$

$= \frac{15\sqrt{10}}{40}$

$= \frac{3\sqrt{10}}{8}$

[b] $\frac{6}{4+\sqrt{7}} = \frac{6}{4+\sqrt{7}} \cdot \frac{4-\sqrt{7}}{4-\sqrt{7}}$

$= \frac{6(4-\sqrt{7})}{16-7}$

$= \frac{6(4-\sqrt{7})}{9}$

$= \frac{2(4-\sqrt{7})}{3} = \frac{8-2\sqrt{7}}{3}$

Find the distance between the points $(7,-2)$ and $(-1,-6)$. **Write your final answer using radicals.** **SCORE: ___ / 6 POINTS**

$\sqrt{(7-(-1))^2+(-2-(-6))^2}$

$= \sqrt{8^2+4^2}$

$= \sqrt{80} = 4\sqrt{5}$

Solve the equation $11-2\sqrt{h}=5$ using algebra. **Check your answer(s).** **SCORE: ___ / 8 POINTS**

$-2\sqrt{h} = -6$

$\sqrt{h} = 3$

$\boxed{h=9}$

CHECK: $11-2\sqrt{9}$

$= 11-2(3)$

$= 11-6$

$= 5$ ✓

Find the center and radius of the circle $x^2 + y^2 + 14x - 10y + 26 = 0$. **SCORE: ___ / 10 POINTS**

$x^2+14x+49+y^2-10y+25 = -26+49+25$

$(x+7)^2+(y-5)^2 = 48$

CENTER = $(-7, 5)$

RADIUS = $\sqrt{48} = 4\sqrt{3}$

Solve the equation $m + \sqrt{22 - m} = 2$ using algebra. **Check your answer(s).** **SCORE: ___ / 12 POINTS**

$\sqrt{22-m} = 2-m$

$22-m = 4-4m+m^2$

$0 = m^2-3m-18$

$0 = (m-6)(m+3)$

$m = 6$ OR -3

CHECK: $m=6$

$6+\sqrt{22-6}$

$= 6+\sqrt{16}$

$= 6+4$

$= 10$ X

$m = -3$

$-3+\sqrt{22-3}$

$= -3+\sqrt{25}$

$= -3+5$

$= 2$ ✓

Perform the indicated operations and simplify. **Write your final answers using radicals.** **SCORE: ___ / 14 POINTS**

[a] $\sqrt{6g^8}\sqrt{10g^5}$

$= \sqrt{60g^{13}}$

$= 2g^6\sqrt{15g}$

[b] $(2\sqrt{5}+\sqrt{3})(\sqrt{10}-3\sqrt{6})$

$= 2\sqrt{50}-6\sqrt{30}+\sqrt{30}-3\sqrt{18}$

$= 2\cdot 5\sqrt{2}-5\sqrt{30}-3\cdot 3\sqrt{2}$

$= 10\sqrt{2}-5\sqrt{30}-9\sqrt{2}$

$= \sqrt{2}-5\sqrt{30}$

Divide. Rationalize the denominator and simplify. **SCORE: ___ / 6 POINTS**

$\frac{\sqrt{7}}{\sqrt{56}} = \sqrt{\frac{7}{56}} = \sqrt{\frac{1}{8}} = \frac{1}{\sqrt{8}} = \frac{1}{2\sqrt{2}} = \frac{\sqrt{2}}{4}$

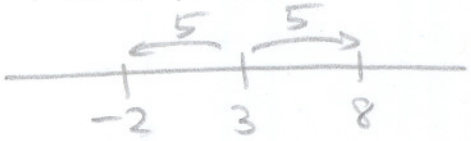
Solve $5+|3-x|=10$. **Check your answer(s).**

SCORE: ___ / 10 POINTS

$|3-x|=5$ OR $3-x=5$ or $3-x=-5$

$-x=2$ or $-x=-8$

$x=-2$ or $x=8$



$x=-2$ OR $x=8$

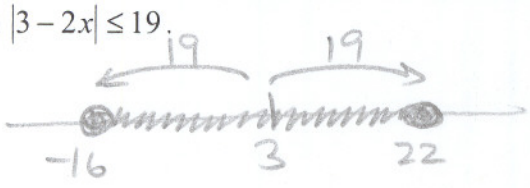
CHECK:

$5+|3-2|=5+|5|=10$ ✓

$5+|3-8|=5+|-5|=10$ ✓

Solve $|3-2x|\leq 19$.

SCORE: ___ / 10 POINTS



$-16\leq 2x\leq 22$

$-8\leq x\leq 11$

OR $-19\leq 3-2x\leq 19$

$-22\leq -2x\leq 16$

$11\geq x\geq -8$

$-8\leq x\leq 11$

If $f(x)=2x^2-3x-1$, find $f(a-2)$.

SCORE: ___ / 8 POINTS

$f(a-2)=2(a-2)^2-3(a-2)-1$

$=2(a^2-4a+4)-3a+6-1$

$=2a^2-8a+8-3a+6-1$

$=2a^2-11a+13$

Circle the **two** graphs below that represent functions.

SCORE: ___ / 6 POINTS