Math 114
Midterm 2
Fri Feb 19, 2010

Name: _____
7:30am - 8:20am

- 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

Write using fractional and/or negative exponents (where applicable). **SCORE: ___ / 10 POINTS**

[a] $(\sqrt[3]{n})^{24} = n^{\frac{24}{3}} = n^8$

[b] $\sqrt[5]{b^{32}} = b^{\frac{32}{5}}$

[c] $\dfrac{1}{\sqrt{p^{25}}} = \dfrac{1}{p^{\frac{25}{2}}} = p^{-\frac{25}{2}}$

Perform the indicated operations and simplify. **Write your final answers using fractional exponents.** **SCORE: ___ / 10 POINTS**

[a] $\dfrac{\sqrt[4]{w}}{\sqrt[6]{w}} = \dfrac{w^{\frac{1}{4}}}{w^{\frac{1}{6}}} = w^{\frac{1}{4}-\frac{1}{6}} = w^{\frac{1}{12}}$

[b] $k^4 k^{\frac{5}{6}} = k^{4+\frac{5}{6}} = k^{\frac{29}{6}}$

Find the equation of the circle with center $(-4, 2)$ and radius 9. **SCORE: ___ / 6 POINTS**

$(x+4)^2 + (y-2)^2 = 81$

Simplify $\sqrt{252}$. **SCORE: ___ / 6 POINTS**

$2 \mid 252$
$2 \mid 126$
$3 \mid 63$
$3 \mid 21$
$7 \mid 7$
1

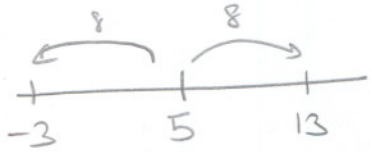
$6\sqrt{7}$

Solve $3+|5-x|=11$. **Check your answer(s).** **SCORE: ___ / 10 POINTS**

$|5-x|=8$ → OR → $5-x=8$ OR $5-x=-8$

$-x=3$ OR $-x=-13$

$x=-3$ OR $x=13$



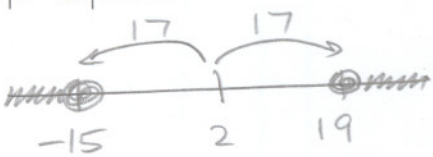
$x=-3$ OR $x=13$

CHECK:

$3+|5-(-3)|=3+|8|=11$ ✓

$3+|5-13|=3+|-8|=11$ ✓

Solve $|2-3x|\geq 17$. **SCORE: ___ / 10 POINTS**



OR $2-3x\geq 17$ OR $2-3x\leq -17$

$-3x\geq 15$ OR $-3x\leq -19$

$x\leq -5$ OR $x\leq \frac{19}{3}$

$3x\leq -15$ OR $3x\geq 19$

$x\leq -5$ OR $x\geq \frac{19}{3}$

If $f(x)=3x^2-2x-1$, find $f(a-1)$. **SCORE: ___ / 8 POINTS**

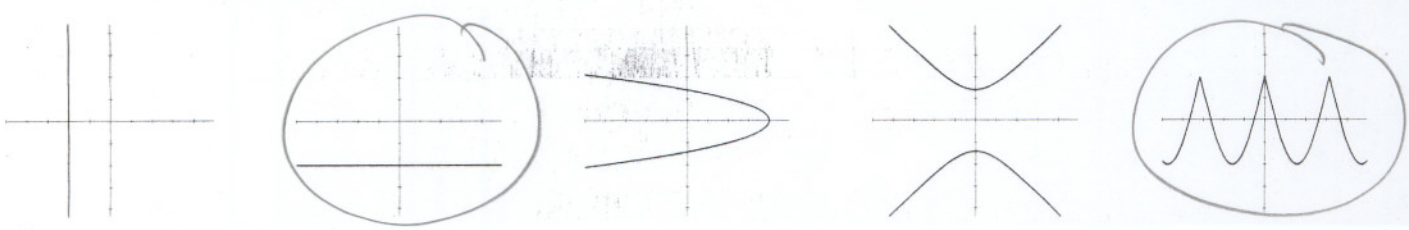
$f(a-1)=3(a-1)^2-2(a-1)-1$

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

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

$=3a^2-8a+4$

Circle the **two** graphs below that represent functions. **SCORE: ___ / 6 POINTS**



Find the distance between the points $(6, -7)$ and $(-4, -2)$. **Write your final answer using radicals.** **SCORE: ___ / 6 POINTS**

$$\sqrt{(6--4)^2+(-7--2)^2}$$

$$\sqrt{10^2+(-5)^2}$$

$$\sqrt{125} = 5\sqrt{5}$$

Solve the equation $14-3\sqrt{h}=2$ using algebra. **Check your answer(s).** **SCORE: ___ / 8 POINTS**

$$-3\sqrt{h}=-12$$

$$\sqrt{h}=4$$

$$\boxed{h=16}$$

CHECK: $14-3\sqrt{16}$

$=14-3(4)$

$=14-12$

$=2$ ✓

Simplify $\sqrt{72r^5a^{10}v^9}$. **Write your final answer using radicals.** **SCORE: ___ / 6 POINTS**

$$6r^2a^5v^4\sqrt{2rv}$$

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

[a] $\dfrac{10}{3\sqrt{15}} = \dfrac{10}{3\sqrt{15}} \cdot \dfrac{\sqrt{15}}{\sqrt{15}}$

$= \dfrac{10\sqrt{15}}{45}$

$= \dfrac{2\sqrt{15}}{9}$

[b] $\dfrac{8}{5+\sqrt{7}} = \dfrac{8}{5+\sqrt{7}} \cdot \dfrac{5-\sqrt{7}}{5-\sqrt{7}}$

$= \dfrac{8(5-\sqrt{7})}{25-7}$

$= \dfrac{{}^{4}\cancel{8}(5-\sqrt{7})}{\cancel{18}_{9}}$

$= \dfrac{4(5-\sqrt{7})}{9} = \dfrac{20-4\sqrt{7}}{9}$

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

[a] $\sqrt{20g^7}\sqrt{3g^6}$

$= 2g^3\sqrt{5g}\cdot g^3\sqrt{3}$

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

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

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

$= -\sqrt{30}-3\sqrt{2}+6\cdot 5\sqrt{2}$

$= -\sqrt{30}-3\sqrt{2}+30\sqrt{2}$

$= 27\sqrt{2}-\sqrt{30}$

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

$\frac{\sqrt{5}}{\sqrt{60}} = \sqrt{\frac{5}{60}} = \sqrt{\frac{1}{12}} = \frac{1}{\sqrt{12}} = \frac{1}{2\sqrt{3}} = \frac{\sqrt{3}}{6}$

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

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

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

CENTER $= (-5,7)$

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

Solve the equation $m+\sqrt{14-m}=2$ using algebra. **Check your answer(s).** **SCORE: ___ / 12 POINTS**

$\sqrt{14-m} = 2-m$

$14-m = 4-4m+m^2$

$0 = m^2-3m-10$

$0 = (m-5)(m+2)$

$m = 5$ OR $\boxed{-2}$

CHECK: $m=5$

$5+\sqrt{14-5}$

$= 5+\sqrt{9}$

$= 5+3$

$= 8$ ✗

$m=-2$

$-2+\sqrt{14-2}$

$= -2+\sqrt{16}$

$= -2+4$

$= 2$ ✓