MAT1033 Test 4 Name Key

(D. Howard 3-16)

Simplify each of the following. Use exact values. Do not write as a decimal.

1. $81^{1/4} =$ $\sqrt[4]{81} = \sqrt[4]{3\cdot3\cdot3\cdot3} = \boxed{3}$

2. $\sqrt[5]{-32} =$ $\sqrt[5]{(-2)(-2)(-2)(-2)(-2)} = \boxed{-2}$

3. $\sqrt{\frac{9}{25}} =$ $\frac{\sqrt{9}}{\sqrt{25}} = \boxed{\frac{3}{5}}$

4. $\sqrt{50x^{13}} =$ $\sqrt{2\cdot5\cdot5\cdot(x^2)^6\cdot x} = \boxed{5x^6\sqrt{2x}}$

5. $\sqrt[5]{27}\cdot\sqrt[4]{9} =$ $27^{1/5}\cdot9^{1/4} = (3^3)^{1/5}(3^2)^{1/4} = 3^{3/5}\cdot3^{2/4}$

$= 3^{\frac{3}{5}+\frac{1}{2}} = 3^{\frac{6}{10}+\frac{5}{10}} = 3^{\frac{11}{10}} = \sqrt[10]{3^{11}}$

$= \sqrt[10]{3^{10}\cdot3} = \boxed{3\sqrt[10]{3}}$

6. $\sqrt{45} - 2\sqrt{5} =$

$\sqrt{5(3\cdot3)} - 2\sqrt{5} = 3\sqrt{5} - 2\sqrt{5} = \boxed{\sqrt{5}}$

FOIL

7. $(\sqrt{x}-8)(\sqrt{x}+8) =$ $\sqrt{x}^2 + 8\sqrt{x} - 8\sqrt{x} - 64$

$= \boxed{x-64}$

8. $(5+9i)-(6-i) =$

$5+9i-6+i$

$\boxed{-1+10i}$

9. $(-3i)(8i) =$ $-24i^2 = -24(-1) = \boxed{24}$

10. $i^{37} =$ $(i^4)^9 i = (1)^9 i = 1 \cdot i = \boxed{i}$

11. Find the domain of $f(x) = \sqrt{x+10}$.

$x+10 \geq 0$ OR

$\boxed{x \geq -10}$

$x \geq -10$

CALC #4

12. Given $f(x) = -x^2 + 2x + 3$, answer the following. OR

a. Find the vertex.

$x = \frac{-b}{2a} = \frac{-2}{2(-1)} = 1$ $\boxed{V(1,4)}$

$y = -(1)^2 + 2(1) + 3 = 4$

b. Use the vertex to write *f(x)* in vertex form.

$y = a(x-h)^2 + k$

$\boxed{y = -(x-1)^2 + 4}$

c. Find the axis of symmetry.

$x = \#$ $\Rightarrow$ $\boxed{x = 1}$

d. Find the x-intercepts by using the quadratic formula. $0 = -x^2 + 2x + 3$

$x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$ $a = -1$ $b = 2$ $c = 3$

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

$x = \frac{-2 \pm \sqrt{16}}{-2} = \frac{-2 \pm 4}{-2} =$ $\frac{-2+4}{-2} = \frac{2}{-2} = -1$

$\boxed{(-1,0)\ (3,0)}$ $\frac{-2-4}{-2} = \frac{-6}{-2} = 3$

e. Find the y-intercept.

$y = -(0)^2 + 2(0) + 3 = 3$

$\boxed{(0,3)}$

f. Sketch a complete graph of *f(x)*.