DO NOW

pg 78; 65, 67, 68

65. false
67. false
68. false

2.3 Evaluating Limits Analytically

Strategies for Finding Limits:

Direct Substitution - For well-behaved functions that are continuous at c... $\lim_{x \to c} f(x) = f(c)$

Reducing fractions - (Theorem 2.7) factor/simplify to find an equivalent function

Rationalizing radicals - Rationlize to find equivalent function

Examples:

1. $\lim_{x \to 2} (3x - 5)$

$3 \cdot 2 - 5$
$6 - 5$
$\boxed{1}$

2. $\lim_{x \to 4} \sqrt[3]{x + 4}$

$\sqrt[3]{4+4}$
$\sqrt[3]{8}$
$\boxed{2}$

3. $\lim_{x \to 1} \sin \frac{\pi x}{2}$

$\sin \frac{\pi \cdot 1}{2}$
$\boxed{1}$

4. $\lim_{x \to 7} x$

$\boxed{7}$

5. $\lim_{x \to 7} 3$

$\boxed{3}$

For 6 - 10, $\lim_{x \to c} f(x) = 7$ and $\lim_{x \to c} g(x) = 4$

6. $\lim_{x \to c} 5f(x)$

$5 \cdot 7$
$\boxed{35}$

7. $\lim_{x \to c} \sqrt{f(x)}$

$\boxed{\sqrt{7}}$

8. $\lim_{x \to c} [f(x)]^2$

7^2
$\boxed{49}$

9. $\lim_{x \to c} [f(x) + g(x)]$

$7 + 4$
$\boxed{11}$

10. $\lim_{x \to c} [f(x) \cdot g(x)]$

$7 \cdot 4$
$\boxed{28}$

Rational Functions

11. $\lim_{x \to 0} \frac{x^3 + 1}{x + 1}$

$\frac{0^3+1}{0+1} = \boxed{1}$

12. $\lim_{x \to 2} \frac{x^3 + 1}{x + 1}$

$\frac{2^3+1}{2+1} = \frac{9}{3} = \boxed{3}$

13. $\lim_{x \to -1} \frac{x^3 + 1}{x + 1}$

undefined $x \neq -1$

$\lim_{x \to -1} \frac{(x+1)(x^2-x+1)}{x+1}$

$\lim_{x \to -1} (x^2 - x + 1)$

$(-1)^2 - -1 + 1$
$1 + 1 + 1$
$\boxed{3}$

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

HOMEWORK

pg 87; 1 - 43 odd