

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... $\lim_{x \rightarrow c} f(x) = f(c)$



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

Rationalizing radicals - Rationalize to find equivalent function

Page 1

Page 2

Examples:

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

$$\begin{array}{r} 3 \cdot 2 - 5 \\ 6 - 5 \\ \hline 1 \end{array}$$

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

$$\begin{array}{r} \sin \frac{\pi \cdot 1}{2} \\ \hline 1 \end{array}$$

$$5. \lim_{x \rightarrow 3} 3$$

$$\begin{array}{r} \hline 3 \end{array}$$

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

$$\begin{array}{r} \sqrt[3]{4+4} \\ \sqrt[3]{8} \\ \hline 2 \end{array}$$

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

$$\begin{array}{r} \hline 7 \end{array}$$

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

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

$$\begin{array}{r} 5 \cdot 7 \\ \hline 35 \end{array}$$

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

$$\begin{array}{r} 7^2 \\ \hline 49 \end{array}$$

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

$$\begin{array}{r} 7 \cdot 4 \\ \hline 28 \end{array}$$

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

$$\begin{array}{r} \sqrt{7} \\ \hline \end{array}$$

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

$$\begin{array}{r} 7 + 4 \\ \hline 11 \end{array}$$

Page 3

Page 4

Rational Functions

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

$$\begin{array}{r} \frac{0^3 + 1}{0 + 1} \\ \hline 1 \end{array}$$

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

$$\begin{array}{r} \frac{2^3 + 1}{2 + 1} = \frac{9}{3} \\ \hline 3 \end{array}$$

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

undefined $x \neq -1$

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

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

$$\begin{array}{r} (-1)^2 - (-1) + 1 \\ 1 + 1 + 1 \\ \hline 3 \end{array}$$

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

HOMEWORK

pg 87; 1 - 43 odd

Page 5

Page 6