Calculus, Limits, Indeterminate

Name _____ **Date** _____

Find the following indeterminate limits

(1) $\lim_{y \to 2} \dfrac{\sqrt{-y^3 + y^2 - y + 55} - 7}{10 - \sqrt{3y^3 - 7y^2 + 104}}$

(2) $\lim_{a \to -1} \dfrac{\sqrt{3a^3 - a^2 - 3a + 65} - 8}{5 - \sqrt{-a^3 - 6a^2 - 8a + 22}}$

(3) $\lim_{c \to 0} \dfrac{3c^4 + c^3 + 4c^2}{2c^3 - 2c^2}$

(4) $\lim_{q \to 3} \dfrac{\sqrt{-3q^2 + 10q + 33} - 6}{3 - \sqrt{q^3 + q^2 - 14q + 15}}$

(5) $\lim_{d \to 2} \dfrac{3d^5 - 2d^4 - 5d^3 - 5d^2 - 4}{d^4 + 2d^3 - 11d^2 + 3d + 6}$

(6) $\lim_{c \to 4} \dfrac{\sqrt{2c^2 - 9c + 20} - 4}{1 - \sqrt{3c^3 - 11c^2 - 9c + 21}}$

(7) $\lim_{y \to 5} \dfrac{3y^4 - 26y^3 + 37y^2 + 80y + 50}{5y^3 - 55y^2 + 175y - 125}$

(8) $\lim_{a \to 3} \dfrac{-3a^3 + 19a^2 - 33a + 9}{-5a^3 + 28a^2 - 33a - 18}$

(9) $\lim_{c \to -2} \dfrac{3c^4 + 13c^3 + 13c^2 - 8c - 12}{c^3 + 7c^2 + 16c + 12}$

(10) $\lim_{b \to 2} \dfrac{\sqrt{2b^3 - 7b^2 + 5b + 83} - 9}{1 - \sqrt{3b^3 - 11b^2 + 6b + 9}}$

Answers

Find the following indeterminate limits

(1) $\lim\limits_{y\to 2} \dfrac{\sqrt{-y^3+y^2-y+55}-7}{10-\sqrt{3y^3-7y^2+104}}$

$= \dfrac{45}{28}$

(2) $\lim\limits_{a\to -1} \dfrac{\sqrt{3a^3-a^2-3a+65}-8}{5-\sqrt{-a^3-6a^2-8a+22}}$

$= -5$

(3) $\lim\limits_{c\to 0} \dfrac{3c^4+c^3+4c^2}{2c^3-2c^2}$

$= -2$

(4) $\lim\limits_{q\to 3} \dfrac{\sqrt{-3q^2+10q+33}-6}{3-\sqrt{q^3+q^2-14q+15}}$

$= \dfrac{4}{19}$

(5) $\lim\limits_{d\to 2} \dfrac{3d^5-2d^4-5d^3-5d^2-4}{d^4+2d^3-11d^2+3d+6}$

$= \dfrac{32}{5}$

(6) $\lim\limits_{c\to 4} \dfrac{\sqrt{2c^2-9c+20}-4}{1-\sqrt{3c^3-11c^2-9c+21}}$

$= -\dfrac{7}{188}$

(7) $\lim\limits_{y\to 5} \dfrac{3y^4-26y^3+37y^2+80y+50}{5y^3-55y^2+175y-125}$

$= \dfrac{97}{20}$

(8) $\lim\limits_{a\to 3} \dfrac{-3a^3+19a^2-33a+9}{-5a^3+28a^2-33a-18}$

$= \dfrac{8}{17}$

(9) $\lim\limits_{c\to -2} \dfrac{3c^4+13c^3+13c^2-8c-12}{c^3+7c^2+16c+12}$

$= 7$

(10) $\lim\limits_{b\to 2} \dfrac{\sqrt{2b^3-7b^2+5b+83}-9}{1-\sqrt{3b^3-11b^2+6b+9}}$

$= \dfrac{1}{18}$