MCV4U Practice Exam

MCV4U Exam: Calculus Component

1. C **2.** D

3. C **4.** A

5. B **6.** C

7. A **8.** C

9. B **10.** C

11. a) $4x(2x^2 - 1)^2 (x^4 + 3)^4 (13x^4 - 5x^2 + 9)$

b) $\dfrac{42 + 15x}{(7 - 3x^2)^{\frac{3}{2}}}$

c) $3x^2 \cos x^3 \cos^3 x - 3\sin x \cos^2 x \sin x^3$

d) $\dfrac{2x(1 + 2x)}{e^{3-4x}}$

12. a) $-\dfrac{1}{8}$ **b)** $\dfrac{5}{7}$

13. $x = 2,\ x = 3$

14. $-\dfrac{6}{(x - 3)^3}$

15. $(0, 0), \left(\dfrac{2}{3}, \dfrac{8}{9}\right)$

16. a) domain: $\{x \neq \pm 2, x \in \mathbb{R}\}$; no x-intercept; y-intercept: $\frac{3}{4}$, horizontal asymptote: $y = 0$; vertical asymptotes: $x = 2$, $x = -2$

b) local minimum: $\left(0, \frac{3}{4}\right)$; increasing: $0 < x < 2$, $x > 2$; decreasing: $x < -2$, $2 < x < 0$

c) no points of inflection; concave down: $x < -2$, $x > 2$; concave up: $-2 < x < 2$

17. 20 784.6 cm^3

18. a) $p(x) = 380 + 5x$

b) $R(x) = (380 + 5x)(12.50 - 0.25x)$

c) $R'(x) = -\dfrac{5x + 65}{2}$

d) $x = -13$, maximum revenue occurs with 13 increases of \$0.25

19. a) 0.803 m

b) 1.08 m/s at $t = 3.34$

c) 1.57 s, when the first point of inflection occurs

MCV4U Exam: Vector Component

1. C **2.** B **3.** D **4.** B **5.** D **6.** D

7. B **8.** B **9.** C **10.** D **11.** B **12.** D

13. Answers may vary.

a) $\overrightarrow{AC}$ **b)** $\overrightarrow{DB}$

14. a) $\overrightarrow{PQ} \cdot \overrightarrow{QR} = 0$ **b)** $\dfrac{15\sqrt{2}}{2}$

c) S(−4, 2, 2)

15. 923.1 km/h [N28.1°E]

16. 112.4 N and 150.1 N

17. a) $-\frac{3}{29}$ [−5, 1, −1] **b)** 0.5375

18. a) 5000 J **b)** 4000 J

19. $[1, -2, 3] + s[3, -2, 8] + t[4, 3, -5]$

20. The planes intersect in a line:

$[x, y, z] = \left[-\frac{5}{7}, -\frac{22}{7}, 0\right] + t\left[-\frac{9}{7}, \frac{1}{7}, 1\right]$

21. The planes intersect at point (1, 2, −1)