## Pre-Calculus 11 Practice Final Exam January 2020

Multiple Choice
Identify the choice that best completes the statement or answers the question. Clearly write your answer on the answer page provided. You may write in this booklet but only the answer page will be marked.

_____   **1.** What is the quadratic function in vertex form for the parabola shown below?
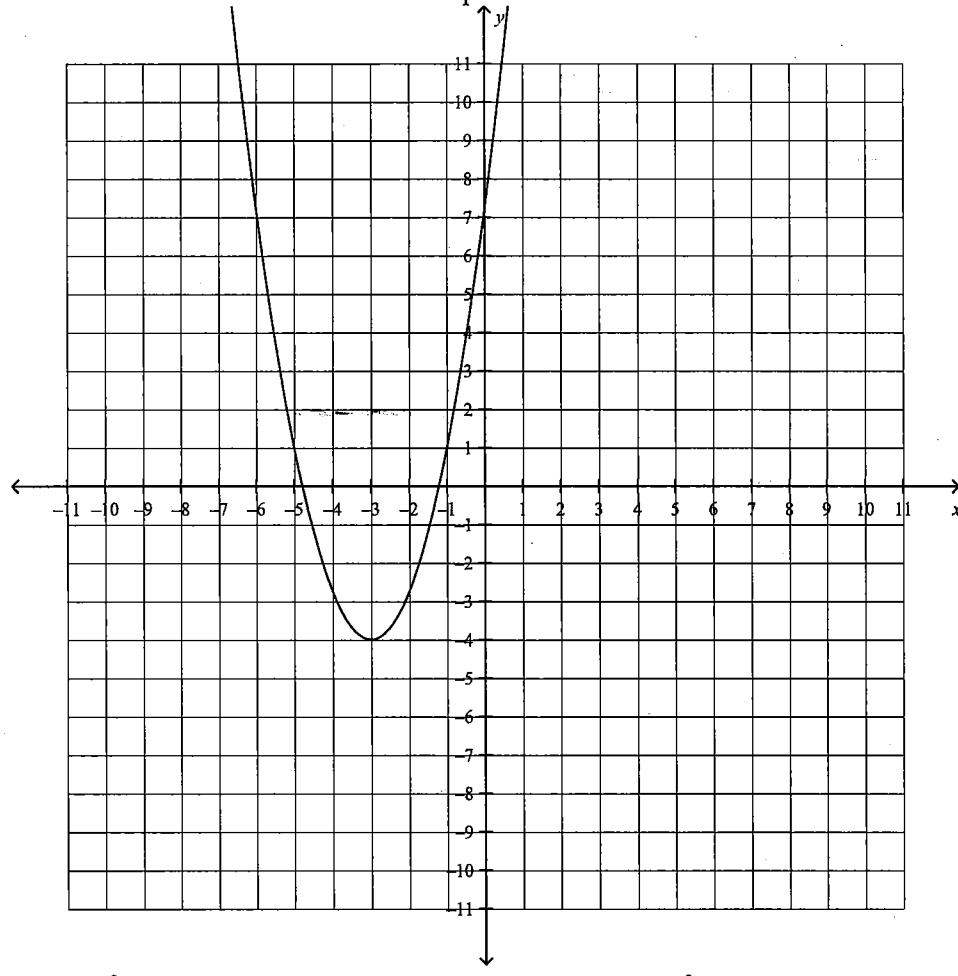
A $f(x) = 1.25(x+4)^2 - 3$	**C** $f(x) = -1.25(x+3)^2 + 4$
B $f(x) = -1.25(x-3)^2 - 3$	**D** $f(x) = 1.25(x+3)^2 - 4$

_____   **2.** What is the axis of symmetry of $f(x) = -3(x-7)^2 - 9$?

A $x = 7$	**C** $x = -3$
B $x = -7$	**D** $x = -9$

_____ 3. What are the domain and range of $y = -5(x+3)^2 - 4$?

    A Domain: $\{x \le -5,\ x \in R\}$ **C** Domain: $\{x \in R\}$
        Range: $\{y \in R\}$ Range: $\{y \ge 3, y \in R\}$
    B Domain: $\{x \in R\}$ **D** Domain: $\{x \ge 3, x \in R\}$
        Range: $\{y \le -4, y \in R\}$ Range: $\{y \in R\}$

_____ 4. What is the equation of the quadratic function $y = x^2 - 20x + 15$ in vertex form?

    A $y = (x-10)^2 - 115$ **C** $y = (x+10)^2 - 115$
    B $y = (x-10)^2 - 85$ **D** $y = (x+10)^2 - 85$

_____ 5. Which quadratic function in standard form represents $y = -5(x+3)^2 + 43$?

    A $y = -5x^2 - 30x - 1$ **C** $y = -5x^2 + 30x - 2$
    B $y = -5x^2 - 15x - 1$ **D** $y = -5x^2 - 30x - 2$

_____ 6. What are the coordinates of the vertex of the quadratic function $y = -4x^2 + 8x - 8$?

    A $(1, -4)$ **C** $(-4, 1)$
    B $(8, -4)$ **D** $(8, -8)$

_____ 7. Factor $x^2 + 12x - 160$ completely.

    A $(x-20)(x-8)$ **C** $(x-20)(x+8)$
    B $(x+20)(x-8)$ **D** $(x+20)(x+8)$

_____ 8. Factor $0.49x^2 - y^2$ completely.
    A $(0.7x - y)(0.7x - y)$ **C** $0.7x - y$
    B $(0.7x - y)(0.7x + y)$ **D** $(0.7x)(0.7x) - (y)(y)$

_____ 9. Factor $6(x^2 - 4x + 4)^2 + (x^2 - 4x + 4) - 1$ completely.
    A $(3x^2 - 12x + 12)(2x^2 - 8x + 8)$ **C** $(3x-1)(2x+1)$
    B $(3x^2 - 12x + 11)(2x^2 - 8x + 9)$ **D** $(x^2 - 4x + 7)(x^2 - 4x + 2)$

_____ 10. Solve $(x-8)(x-9) = 0$.

    A $x = 8$ and $x = -9$ **C** $x = -8$ and $x = 9$
    B $x = -8$ and $x = -9$ **D** $x = 8$ and $x = 9$

_____ 11. Determine the roots of the quadratic equation $9x^2 + 135x = 144$.

    A $x = 1$ and $x = -16$ **C** $x = 9$ and $x = -144$
    B $x = -1$ and $x = 16$ **D** $x = -\dfrac{1}{9}$ and $x = \dfrac{16}{9}$

_____ **12.** When Alex rides his dirt bike off a ramp, his path can be modelled by $h(d) = -3.9d^2 + 19.8d + 9.2$, where d is the horizontal distance from the ramp and h is the height, both in metres. How far away from the ramp does he land, to the nearest tenth of a metre?

    A 0.4 m   **C** 5.5 m

    B 2.8 m   **D** 11 m

_____ **13.** Express $\sqrt[3]{625v^6n^9}$ in simplified form.

    A $10v^2n^3(\sqrt[3]{10})$ **C** $5v^3n^2(\sqrt[5]{3})$

    B $25v^2n^3(\sqrt[3]{5})$ **D** $5v^2n^3(\sqrt[3]{5})$

_____ **14.** What does the expression $-7\sqrt{3} + 5\sqrt{28} - (4\sqrt{12} + 8\sqrt{7})$ simplify to?

    A $1\sqrt{3} + 2\sqrt{7}$ **C** $1\sqrt{3} - 2\sqrt{7}$

    B $-15\sqrt{3} + 2\sqrt{7}$ **D** $-15\sqrt{3} - 2\sqrt{7}$

_____ **15.** Express $(\sqrt{19} - \sqrt{5})(\sqrt{19} + \sqrt{5})$ in simplest form.

    A $2\sqrt{19} - 19\sqrt{5}$ **C** 14

    B $2\sqrt{19} - 2\sqrt{5}$ **D** $\sqrt{14}$

_____ **16.** What are the restrictions on x if the solution to the equation $-4 - \sqrt{-8 - x} = 9$ involves real numbers?

    A $x \geq 169$ **C** $x \leq 13$

    B $x \geq 9$ **D** $x \leq -8$

_____ **17.** Solve $\sqrt{8x} + 4 = 7$

    A $x = \dfrac{3}{64}$ **C** $x = \dfrac{9}{8}$

    B $x = \dfrac{9}{64}$ **D** $x = \dfrac{3}{8}$

_____ **18.** Solve $x - 9\sqrt{x} + 18 = 0$.

    A $x = 4$ **C** $x = 36$ or $x = 9$

    B $x = \dfrac{1}{4}$ **D** $x = -9$ or $x = -36$

_____ **19.** The non-permissible value(s) for the rational expressions $\dfrac{12}{x^2 - 1}$ is (are)

    A $x \neq 2\sqrt{3}$ **C** $x \neq 1, x \neq -1$

    B $x \neq 1$ **D** $x \neq 1$

_____ **20.** Express the quotient $\dfrac{x^2 - 3x - 4}{x^2 - 5x + 4} \div \dfrac{2x^2 + 11x + 9}{x^2 + x - 2}$ in simplest form.

    A $\dfrac{(x-1)(x+2)}{(x+1)(2x+9)}$ **C** $\dfrac{2x+9}{x+2}$

    B $\dfrac{x+2}{2x+9}$ **D** $\dfrac{(x+1)(2x+9)}{(x-1)(x+2)}$

____ **21.** When fully simplified, ignoring restrictions on the variable, $\dfrac{-7xy+9}{x^2y^2} + \dfrac{-4+3xy}{-3xy}$ is equal to

   A $\dfrac{-11xy+12}{-3x^2y^2}$

   C $\dfrac{-4xy+5}{-3x^3y^3}$

   B $\dfrac{3x^2y^2+17xy-27}{-3x^2y^2}$

   D $\dfrac{3x^2y^2+17xy-27}{-3x^3y^3}$

____ **22.** What is the exact solution to the equation $\dfrac{4x+4}{x-1} = \dfrac{3}{4}$

   A -1

   C $-\dfrac{19}{13}$

   B $\dfrac{3}{16}$

   D $-\dfrac{13}{19}$

____ **23.** Solve the rational equation $\dfrac{x}{x+1} = \dfrac{7-x}{x^2-6x-7} + \dfrac{5}{x-7}$.

   A $x = -12$ and 1 **C** $x = 12$
   B $x = 7$ and -1 **D** $x = -12$

____ **24.** Solve $\dfrac{x^2+2x-24}{16-x} = \dfrac{x^2+7x+6}{x+5}$.

   A $x = 22$ **C** $x = 16$ and $x = 5$ and $x = 6$
   B $x = -9$ and $x = 2$ **D** $x = 9$ and $x = -2$

____ **25.** Evaluate $\left| -9 + 2^2 \right| - \left| 4 - (-5) \right| + |7 - 6| + |-3|$.

   A -6 **C** -4
   B 6 **D** 0

_____ **26.** The graph of $y = \left|(x+2)^2 - 2\right|$ is

A
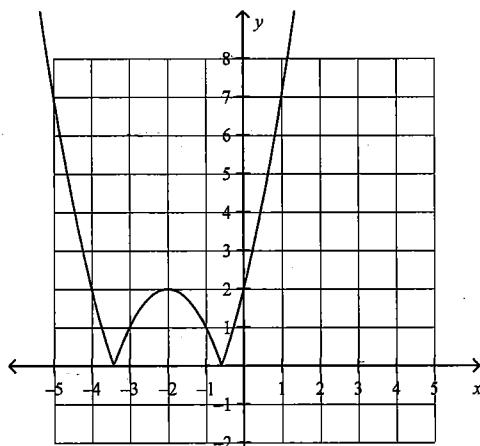
C
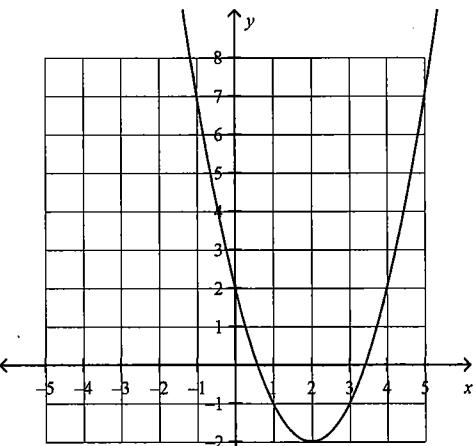
B
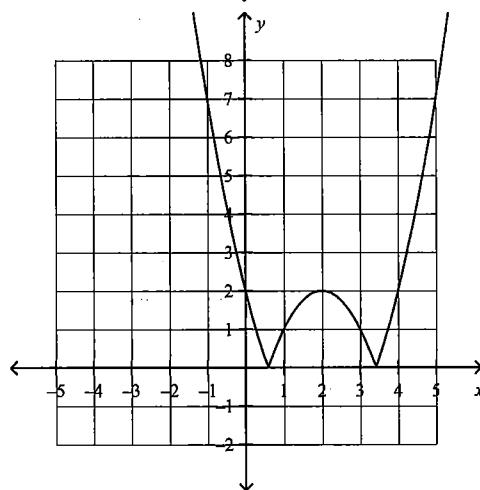
D
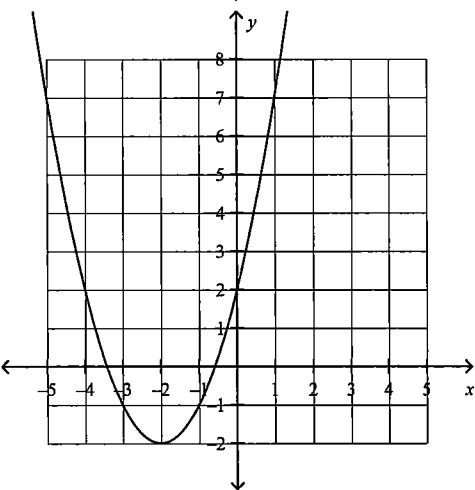
_____ **27.** Solve $\left|x^2 - 4x - 8\right| = 3x + 10$.

   **A** $x = 2$

   B $x = -9$

   C $x = 9$ and -2

   D $x = 1$ and 0

_____ **28.** Which graph represents the reciprocal of the linear function $y = 9x - 4$?

A
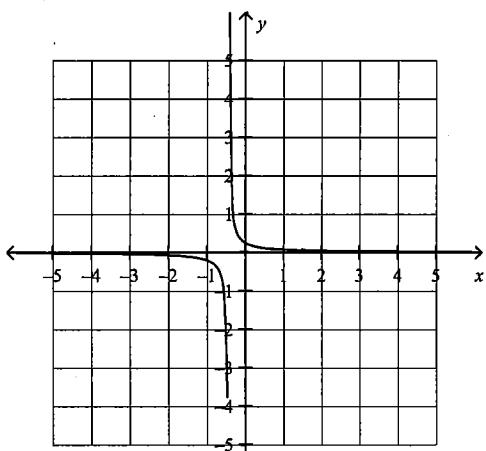

C
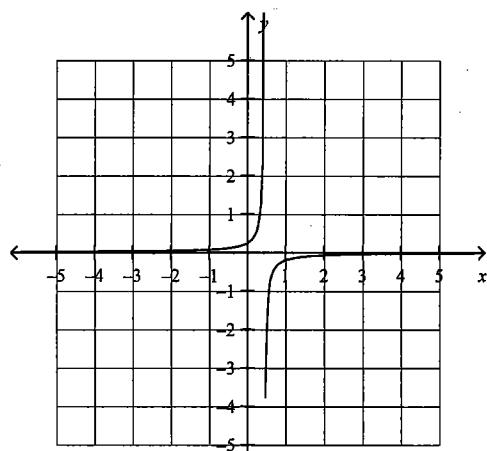
B
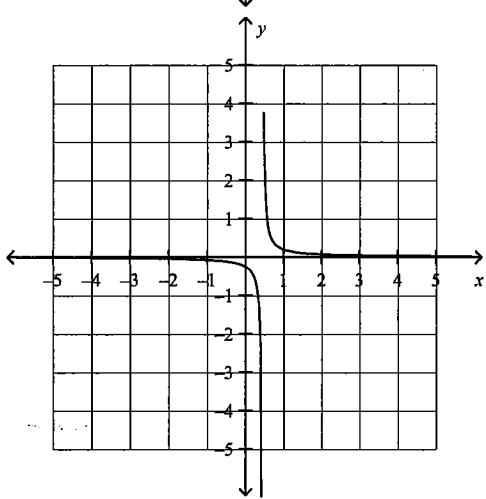
D
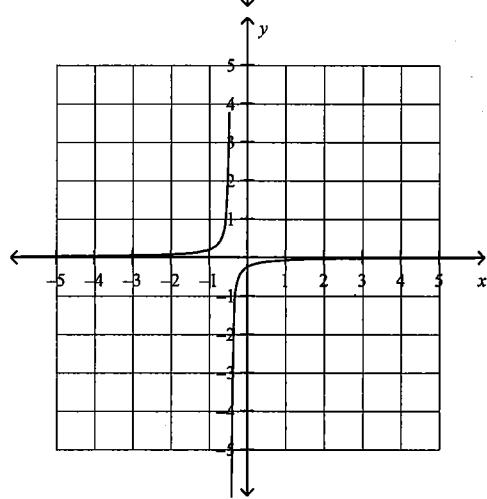
____ **29.** Which graph represents the reciprocal of $y = (x+2)^2 - 2$?

A
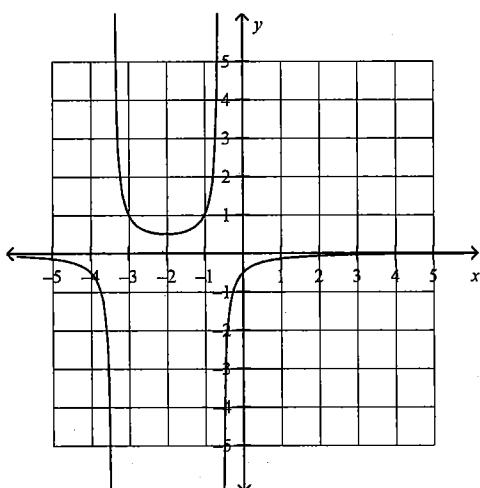
C
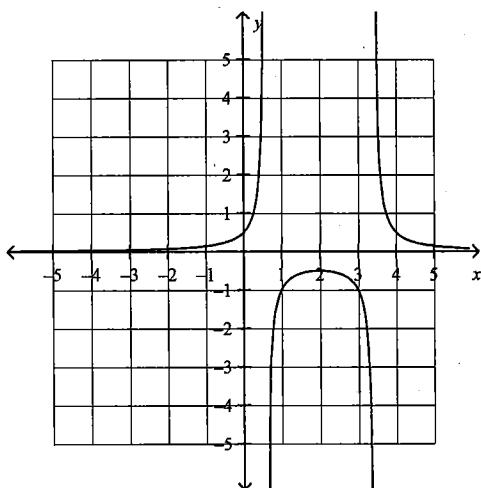
B
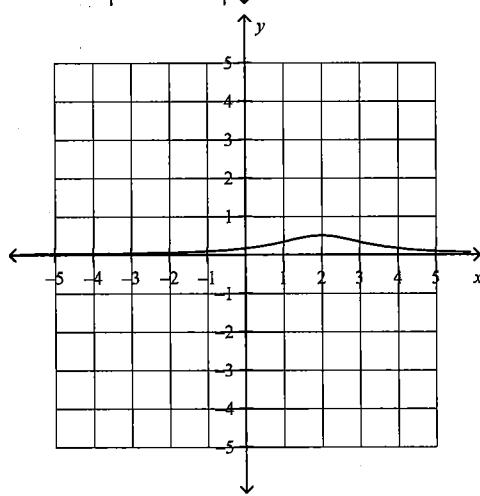
D
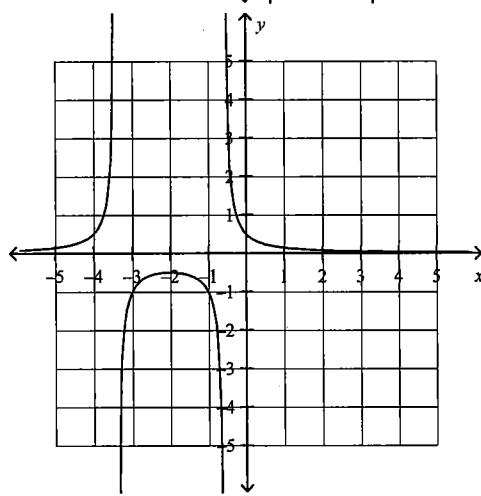
____ **30.** The equation of the vertical asymptote for the reciprocal of $y = \dfrac{7}{2}x - 5$ is

A $x = \dfrac{7}{10}$ **C** $x = -\dfrac{10}{7}$

B $x = \dfrac{10}{7}$ **D** $x = -\dfrac{7}{10}$

____ **31.** The solution to -7(3 - b) + 6(-6 - 8b) < 25 is

A b < -2   **C** b > 2
**B** b < 2   **D** b > -2

_____ **32.** Which graph represents the solution to the inequality $2x^2 - 9x + 6 \geq 0$?

A

C

B
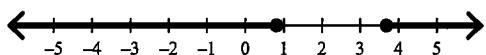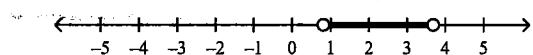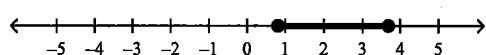
D
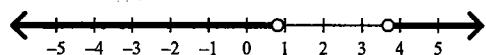
_____ **33.** The solution set to the inequality $-2x^2 + 6x - 4 > 0$ is

A $\{-2 < x < -1, x \in R\}$ C $\{1 < x < 2, x \in R\}$

B $\{x < 1, x > 2, x \in R\}$ D $\{x < -2, x > -1, x \in R\}$

_____ **34.** What are the three other angles in standard position that have a reference angle of 31°?

A   149°, 211°, 329°   C   62°, 93°, 124°

B   121°, 211°, 301°   D   76°, 121°, 211°

_____ **35.** The point (44, –33) is on the terminal arm of $\angle A$. Which is the set of exact primary trigonometric ratios for the angle?

A $\sin A = -\dfrac{3}{5}, \cos A = \dfrac{4}{5}, \tan A = -\dfrac{3}{4}$

B $\sin A = -\dfrac{5}{3}, \cos A = \dfrac{5}{4}, \tan A = -\dfrac{3}{4}$

C $\sin A = -\dfrac{4}{5}, \cos A = \dfrac{3}{5}, \tan A = -\dfrac{3}{4}$

D $\sin A = \dfrac{4}{5}, \cos A = -\dfrac{3}{5}, \tan A = -\dfrac{4}{3}$

_____ **36.** What is the exact value for tan (120°)?

A $\sqrt{3}$ C   1

B $-\dfrac{1}{\sqrt{3}}$ D $-\sqrt{3}$

____ **37.** Which strategy would be best to solve for x in the triangle shown?
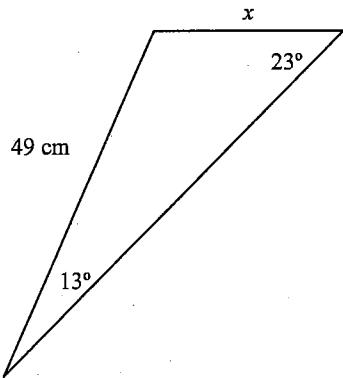

Diagram not drawn to scale.

A   primary trigonometric ratios   C   cosine law
B   sine law   D   none of the above

____ **38.** Determine the length of x, to the nearest tenth of a centimetre.
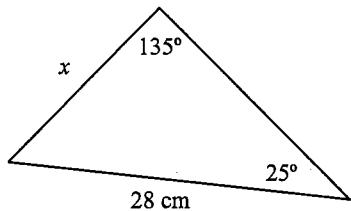
Diagram not drawn to scale.

A   46.8   C   66.3
B   35.9   D   16.7

____ **39.** What is the length of x, to the nearest tenth of a metre?
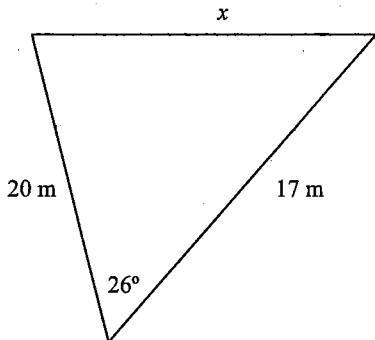
Diagram not drawn to scale.

A   10.5 m   C   8.8 m
B   19.8 m   D   26.2 m

____ **40.** Patrick invested $4000 for 9 years. At the investment's maturity, its value was $5476. What was the annual simple interest rate?

A   3.8%
B   4.1%
C   6.2%
D   5.3%

____ **41.** Determine the future value and the total interest earned for the investment.

Principal (P) ($)	Compound Interest Rate per Annum (%)	Compounding Frequency	Term
16 000	5.4	monthly	4.5 years

A $20 389.98; $4389.98
B $19 848.02; $3848.02
C $20 398.53; $4398.53
D $20 956.50; $4956.50

____ **42.** Jemima makes $1010.00 worth of purchases on her credit card. If the credit card charges 21% simple interest, how much interest will she accumulate on the unpaid balance over 45 days?

A $22.59   C $31.75
B $26.15   D $93.15