

Transformations Midterm Review Quiz

$x \rightarrow x \rightarrow x-3$

Multiple Choice

Identify the choice that best completes the statement or answers the question.

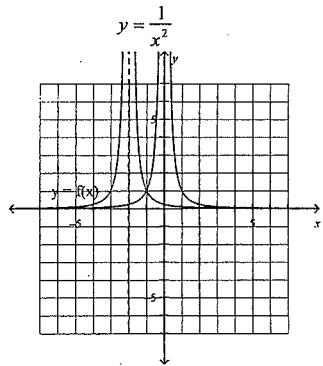
- B 1. The graph of  $y=f(x)$  is translated 3 units right and 4 units down. What is the equation of the translation image in terms of the function  $f$ ?

- A.  $y-3=f(x+4)$   
B.  $y+4=f(x-3)$   
 C.  $y+3=f(x-4)$   
 D.  $y-4=f(x+3)$

- A 2. The function  $y=f(x)$  has domain  $-3 \leq x \leq 2$  and range  $-2 \leq y \leq 2$ . What are the domain and range of  $y-3=f(x+5)$ ?

- A. domain:  $-8 \leq x \leq -3$   
 range:  $1 \leq y \leq 5$   
 B. domain:  $0 \leq x \leq 5$   
 range:  $2 \leq y \leq 5$   
 C. domain:  $-8 \leq x \leq -3$   
 range:  $2 \leq y \leq 5$   
 D. domain:  $0 \leq x \leq 5$   
 range:  $1 \leq y \leq 5$
- Handwritten notes: 3 up, 5 left,  $-3-5 \leq x \leq 2-5$ ,  $-8 \leq x \leq -3$ ,  $-2+3 \leq y \leq 2+3$ ,  $1 \leq y \leq 5$*

- A 3. The graph of  $y=f(x)$  is the image of the graph of  $y=\frac{1}{x^2}$  after a single translation. What is an equation of the image graph?



*Handwritten notes: 2 left,  $x \rightarrow x+2$*

- A.  $y = \frac{1}{(x+2)^2}$   
 B.  $y = \frac{1}{x^2} - 2$   
 C.  $y - 2 = \frac{1}{x^2}$   
 D.  $y = \frac{1}{(x-2)^2}$

- D 4. What is an equation for the image of  $y = \frac{x-2}{x^2}$  after a reflection of its graph in the x-axis followed by a reflection in the y-axis?

- A.  $y = -\frac{-x+2}{(-x)^2}$   
 B.  $y = \frac{x^2}{-x-2}$   
 C.  $y = \frac{x+2}{-x^2}$   
D.  $y = -\frac{-x-2}{(-x)^2}$

*Handwritten notes:  $y \rightarrow -y$ ,  $x \rightarrow -x$ ,  $-y = \frac{-x-2}{(-x)^2}$ ,  $y = \frac{x+2}{x^2}$*

- C 5. The graph of  $y=f(x)$  is compressed horizontally by a factor of  $\frac{1}{2}$  and reflected in the y-axis. What is the equation of the image graph in terms of the function  $f$ ?

- A.  $y = -\frac{1}{2}f(x)$   
 B.  $y = f(-\frac{1}{2}x)$   
C.  $y = f(-2x)$   
 D.  $y = -2f(x)$

*Handwritten note:  $x \rightarrow 2x$*

- A 6. The point A (16, 64) lies on the graph of  $y = \sqrt{x^3}$ . What are the coordinates of its image A' on the graph of  $y = \frac{1}{4}\sqrt{(2x)^3}$ ?

- A. (8, 16)  
 B. (8, 32)  
 C. (4, 16)  
 D. Not enough information is given.

*Handwritten notes: VC by 1/4, HC by 1/2,  $(16 \times \frac{1}{4}, 64 \times \frac{1}{4})$ ,  $(8, 16)$*

- A 7. The graph of  $y=f(x)$  is horizontally compressed by a factor of  $\frac{1}{3}$ , vertically compressed by a factor of  $\frac{1}{2}$ , and reflected in the y-axis. What is an equation of the image graph in terms of the function  $f$ ?

- A.  $y = \frac{1}{2}f(-3x)$   
 B.  $y - 3 = f(x - \frac{1}{2})$   
 C.  $y - \frac{1}{2} = f(x - 3)$   
 D.  $y = -3f(\frac{1}{2}x)$

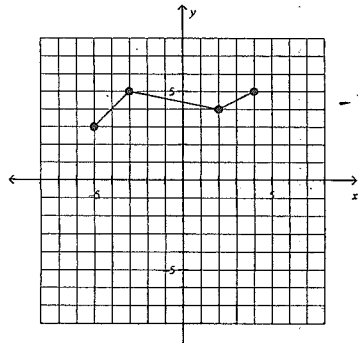
*Handwritten notes:  $x \rightarrow 3x$ ,  $y \rightarrow 2y$*

A 8. Which statement below describes how the graph of  $y+2=-2\sqrt{x-3}$  is related to the graph of  $y=\sqrt{x}$ ?

2 down  
 $\swarrow$   $\searrow$   $\nearrow$   
 VE by 2  
 Reflection x-axis  
 3 Right

- A. The graph of  $y=\sqrt{x}$  is vertically stretched by a factor of 2, reflected in the x-axis, then translated 3 units right and 2 units down.
- B. The graph of  $y=\sqrt{x}$  is horizontally stretched by a factor of 2, not reflected, then translated 2 units right and 3 units down.
- C. The graph of  $y=\sqrt{x}$  is vertically compressed by a factor of  $\frac{1}{2}$ , reflected in the x-axis, then translated 2 units right and 3 units down.
- D. The graph of  $y=\sqrt{x}$  is horizontally compressed by a factor of  $\frac{1}{2}$ , not reflected, then translated 3 units right and 2 units down.

B 9. Here is the graph of  $y=f(x)$ . What are the domain and range of its inverse?



Switch  
 $-5 \leq x \leq 4$   
 $3 \leq y \leq 5$   
 $f(x)$

- A. Domain:  $-5 \leq x \leq 4$   
Range:  $-5 \leq y \leq -3$
- B. Domain:  $3 \leq x \leq 5$   
Range:  $-5 \leq y \leq 4$  ←  $f^{-1}(x)$
- C. Domain:  $-5 \leq x \leq 4$   
Range:  $3 \leq y \leq 5$
- D. Domain:  $3 \leq x \leq 5$   
Range:  $-4 \leq y \leq 5$

A 10. Determine an equation of the inverse of the function  $y = \frac{-5x+2}{4}$ .

- A.  $y = \frac{4x-2}{-5}$
- B.  $y = \frac{4x+2}{-5}$
- C.  $y = \frac{-5x-2}{4}$
- D.  $y = \frac{-5x+4}{2}$

$$x = \frac{-5y+2}{4}$$

$$4x = -5y+2$$

$$4x-2 = -5y$$

$$\frac{4x-2}{-5} = f^{-1}(x)$$

Transformations Midterm Review Quiz  
 Answer Section

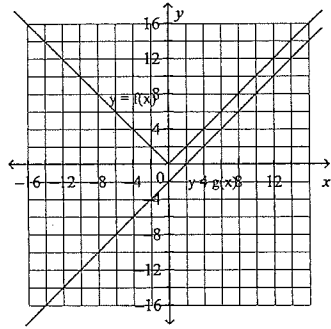
MULTIPLE CHOICE

1. ANS: B PTS: 1 DIF: Easy REF: 3.1 Translating Graphs of Functions  
 LOC: 12.RF2 TOP: Relations and Functions  
 KEY: Conceptual Understanding | Procedural Knowledge
2. ANS: A PTS: 1 DIF: Moderate REF: 3.1 Translating Graphs of Functions  
 LOC: 12.RF2 TOP: Relations and Functions  
 KEY: Conceptual Understanding | Procedural Knowledge
3. ANS: A PTS: 1 DIF: Easy REF: 3.1 Translating Graphs of Functions  
 LOC: 12.RF2 TOP: Relations and Functions  
 KEY: Conceptual Understanding | Procedural Knowledge
4. ANS: D PTS: 1 DIF: Easy REF: 3.2 Reflecting Graphs of Functions  
 LOC: 12.RF5 TOP: Relations and Functions  
 KEY: Conceptual Understanding
5. ANS: C PTS: 1 DIF: Moderate REF: 3.3 Stretching and Compressing Graphs of Functions  
 TOP: Relations and Functions KEY: Conceptual Understanding | Procedural Knowledge  
 LOC: 12.RF3
6. ANS: A PTS: 1 DIF: Moderate REF: 3.3 Stretching and Compressing Graphs of Functions  
 TOP: Relations and Functions KEY: Conceptual Understanding | Procedural Knowledge  
 LOC: 12.RF3 | 12.RF13
7. ANS: A PTS: 1 DIF: Moderate REF: 3.4 Combining Transformations of Functions  
 TOP: Relations and Functions KEY: Conceptual Understanding | Procedural Knowledge  
 LOC: 12.RF4
8. ANS: A PTS: 1 DIF: Moderate REF: 3.4 Combining Transformations of Functions  
 TOP: Relations and Functions KEY: Conceptual Understanding | Procedural Knowledge  
 LOC: 12.RF4 | 12.RF13
9. ANS: B PTS: 1 DIF: Easy REF: 3.5 Inverse Relations  
 LOC: 12.RF5 | 12.RF6 TOP: Relations and Functions  
 KEY: Conceptual Understanding | Procedural Knowledge
10. ANS: A PTS: 1 DIF: Moderate REF: 3.5 Inverse Relations  
 LOC: 12.RF5 | 12.RF6 TOP: Relations and Functions  
 KEY: Conceptual Understanding | Procedural Knowledge

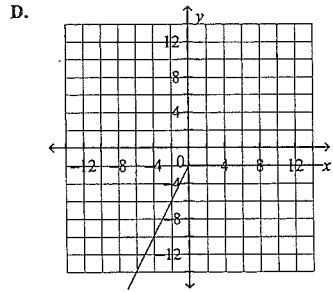
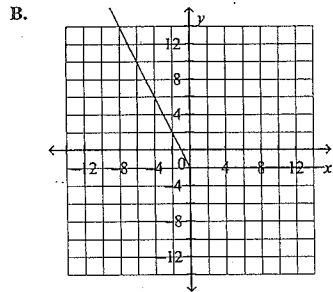
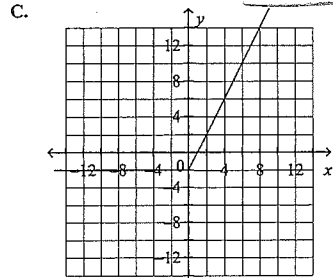
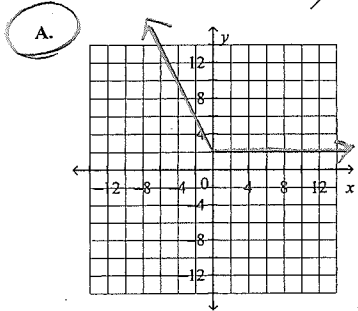
**Functions Midterm Review Quiz**

**Multiple Choice**  
Identify the choice that best completes the statement or answers the question.

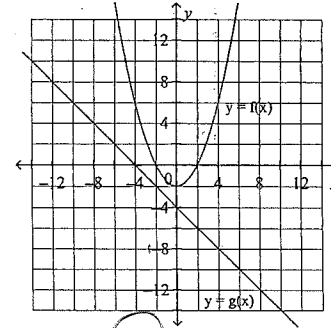
A 1. Here are the graphs of  $y = f(x)$  and  $y = g(x)$ . Which graph below is the graph of  $y = f(x) - g(x)$ ?



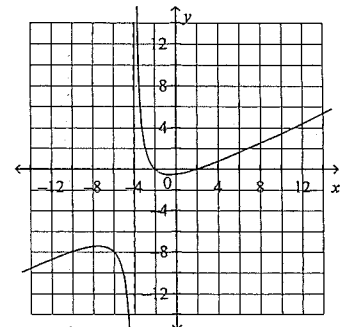
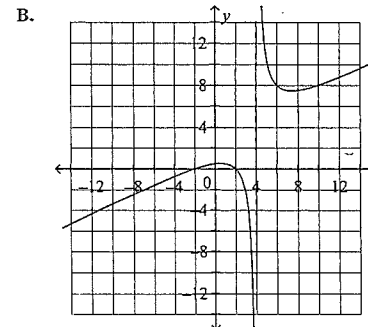
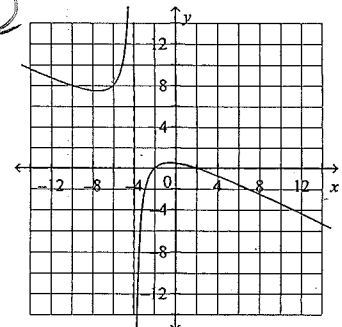
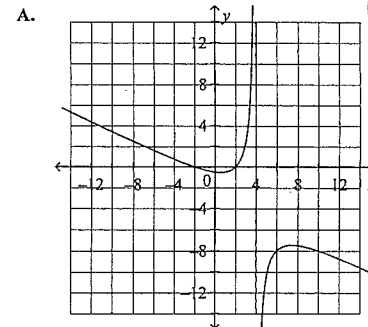
x	f	g	f-g
-8	8	-10	18
-5	4	-6	10
0	0	-2	2
4	2	0	2
8	4	2	2



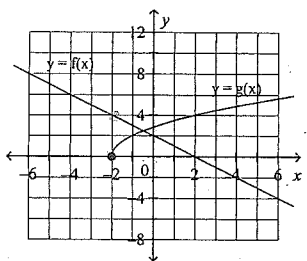
C 2. Here are the graphs of  $y = f(x)$  and  $y = g(x)$ . Which graph below is the graph of  $y = \frac{f(x)}{g(x)}$ ?



x	f	g	f/g
-4	6	0	undefined
-2	0	-2	0
0	-2	-4	1/2
2	0	-2	0
4	6	-8	-3/4
6	16	2	8



3. Use the graphs of  $y=f(x)$  and  $y=g(x)$ . What are the domain and range of  $y=f(x)-g(x)$ ?

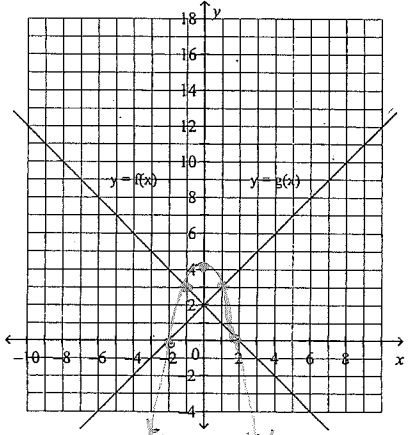


intersections of the domains of  $f(x)$  and  $g(x)$

x	f	g	f-g
-4	6	0	6
-2	4	0	4
0	2	3	-1
2	0	4	-4
4	-2	5	-7

- A. Domain:  $x \in \mathbb{R}$   
Range:  $y \leq -2$
- B. Domain:  $x \leq -2$   
Range:  $y \leq 4$
- C. Domain:  $x \geq -2$   
Range:  $y \in \mathbb{R}$
- D.** Domain:  $x \geq -2$   
Range:  $y \leq 4$

4. Use the graphs of  $y=f(x)$  and  $y=g(x)$ . What are the domain and range of  $y=f(x) \cdot g(x)$ ?



x	f	g	f.g
0	2	2	4
-1	3	1	3
1	1	3	3
-2	4	0	0
2	0	4	0
-3	5	-1	-5
3	-1	5	-5

- A. Domain:  $x \in \mathbb{R}$   
Range:  $y \in \mathbb{R}$
- B.** Domain:  $x \in \mathbb{R}$   
Range:  $y \leq 4$
- C. Domain:  $x \in \mathbb{R}$   
Range:  $y \leq 2$
- D. Domain:  $x \geq 4$   
Range:  $y \in \mathbb{R}$

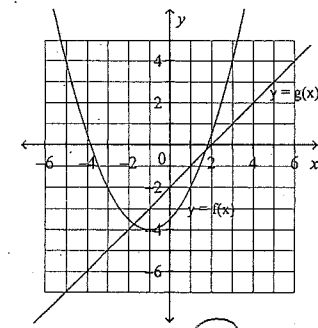
5. Given  $h(x) = 5x^2 + 2x - 3$ , which pair of equations below are possible equations for  $f(x)$  and  $g(x)$  so that  $h(x) = f(x) - g(x)$ ?

- A.  $f(x) = 5x^2$   
 $g(x) = 2x - 3$
- B.  $f(x) = 4x^2$   
 $g(x) = x^2 + 2x - 3$
- C.  $f(x) = 4x^2$   
 $g(x) = -x^2 - 2x - 3$
- D.**  $f(x) = 5x^2$   
 $g(x) = -2x + 3$

6. Given  $f(x) = |x-5|$  and  $g(x) = \frac{1}{x}$ , what is the domain and range of  $h(x) = f(x) + g(x)$ ?

- A. Domain:  $x \neq 0$   
Range:  $y \in \mathbb{R}$
- B. Domain:  $x \geq 5$   
Range:  $y \leq 5$
- C. Domain:  $x \neq 0$   
Range:  $y \leq 5$
- D.** Domain:  $x \neq 5$   
Range:  $y \in \mathbb{R}$

7. Given the graphs of  $y=f(x)$  and  $y=g(x)$ , what is the value of  $f(g(3))$ ?



$g(3) = 1$   
 $f(1) = -2$

8. For the functions  $f(x) = x + 3$  and  $g(x) = x^2 - 3$ , which expression has the greatest value?

- A.  $f(g(4))$
- B.  $f(g(-5))$
- C.  $g(f(2))$
- D.  $g(f(-3))$

9. Given the functions  $f(x) = 2x + 4$  and  $g(x) = \sqrt{x+5}$ , what is the value of  $a$  for which  $f(g(a)) = 16$ ?

- A. 31
- B. 36
- C. -26
- D. 35

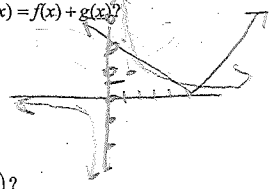
10. The function  $h(x) = g(f(x))$  is the composite of  $f(x) = \frac{2-x}{2}$  and  $g(x) = \frac{1}{\sqrt{x}}$ . What is the domain of  $h(x)$ ?

- A.  $-2 < x < 0$
- B.**  $x < 2$
- C.  $x < -2$  or  $x > 0$
- D.  $x > 0$

$h(x) = \frac{1}{\sqrt{2-x}}$

$2-x > 0$

$2 > x$



$f(\sqrt{x+5}) = 16$

$2(\sqrt{x+5}) + 4 = 16$

$2\sqrt{x+5} = 12$

$\sqrt{x+5} = 6$

$x+5 = 36$

$x = 31$

**Polynomials Midterm Review Quiz**

**Multiple Choice**

Identify the choice that best completes the statement or answers the question.

C 1. Divide:  $(4x^2 - 49y^2) \div (2x + 7y)$   

$$\begin{array}{r} 2x - 7y \\ 2x + 7y \end{array}$$

- A.  $2x + 7y$     B.  $-2x + 7y$     C.  $2x - 7y$     D.  $-2x - 7y$

C 2. What is the remainder when  $x^3 + 4 - 11x + 3x^2$  is divided by  $6 + x$ ?  $x \neq 6$   

$$\begin{array}{r} -6 \ 1 \ 3 \ -11 \ 4 \\ -6 \ 18 \ -42 \\ \hline 1 \ -3 \ -38 \end{array}$$

- A. 70    B. -62    C. -38    D. 46

D 3. Divide  $-3x^3 - 2x^2 + 4x + 3$  by  $x + 3$ . Write the division statement.  

$$\begin{array}{r} -3x^2 + 7x - 17 \\ x + 3 \overline{) -3x^3 - 2x^2 + 4x + 3} \\ \underline{-3x^3 - 9x^2} \phantom{+ 4x + 3} \\ 7x^2 + 4x \phantom{+ 3} \\ \underline{7x^2 + 21x} \phantom{+ 3} \\ -17x + 3 \\ \underline{-17x - 51} \\ 54 \end{array}$$

- A.  $-3x^3 - 2x^2 + 4x + 3 = (x + 3)(-3x^2 - 11x + 25)$   
 B.  $-3x^3 - 2x^2 + 4x + 3 = (x + 3)(-3x^2 - 11x + 25) - 48$   
 C.  $-3x^3 - 2x^2 + 4x + 3 = (x + 3)(-3x^2 + 7x - 17)$   
D.  $-3x^3 - 2x^2 + 4x + 3 = (x + 3)(-3x^2 + 7x - 17) + 54$

D 4. Which polynomial has  $x + 3$  as a factor?  
 A.  $x^3 - 12x^2 + 37x$     B.  $x^3 - 9x^2 - 12x + 37$   
 C.  $x^3 - 9x^2 + x$     D.  $x^3 - 9x^2 + x + 111$

B 5. When  $4x^3 + qx^2 + 11x - 20$  is divided by  $x - 3$ , the remainder is 4. What is the value of  $q$ ?  

$$\begin{array}{l} 4(3)^3 + q(3)^2 + 11(3) - 20 = 4 \\ 108 + 9q + 33 - 20 = 4 \\ 9q = -117 \\ q = -13 \end{array}$$

- A. -5    B. -13    C. -11    D. -28
6. Which statements are always true for the graph of a cubic function?  
 i) When the graph has exactly 1 x-intercept, the graph has no hills and no valleys.  
 ✓ ii) When the graph has 2 or 3 x-intercepts, the graph has 1 hill and 1 valley.  
 ✓ iii) When the  $x^3$ -term is positive, the graph falls to the left and rises to the right.  
 ✓ iv) When the  $x^3$ -term is negative, the graph rises to the left and falls to the right.
- A. i, ii, iv    B. i, iii, iv    C. i, ii, iii    D. ii, iii, iv

D 7. Which type of polynomial function is  $f(x) = -2x^5 - 3x^4 - 3x^2 + 6$ ?  
 A. cubic    B. quadratic    C. quartic    D. quintic

$$\begin{array}{r} -3 \ 1 \ -12 \ 37 \ 0 \\ -3 \ 45 \\ \hline 1 \ -15 \ \phantom{0} \end{array}$$
 NO

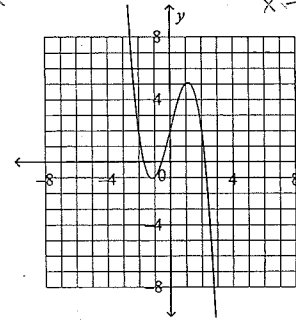
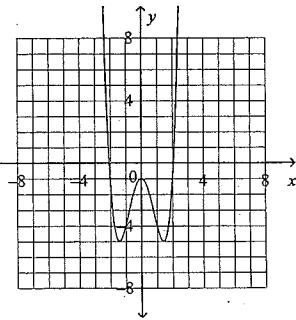
$$\begin{array}{r} -3 \ 1 \ -9 \ 1 \ 0 \\ -3 \ 9 \ -30 \\ \hline 1 \ \phantom{0} \ 10 \ -30 \end{array}$$
 NO

$$\begin{array}{r} -3 \ 1 \ -9 \ -12 \ 37 \\ -3 \ 36 \ -72 \\ \hline 1 \ -12 \ 24 \ \phantom{0} \end{array}$$
 NO

$$\begin{array}{r} -3 \ 1 \ -9 \ 1 \ 111 \\ -3 \ 36 \ -111 \\ \hline 1 \ -12 \ 37 \ 0 \end{array}$$
 yes

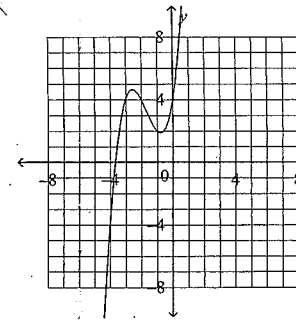
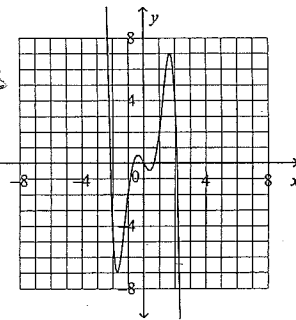
B 8. Identify the graph that corresponds to the function  $f(x) = -x^3 + 5x^2 - 2x$ .  
 $f(x) = -x^3 + 5x^2 - 2x = x(-x^2 + 5x - 2)$   
 $x = 0$  x-int

quartic



B.

5 zeroes



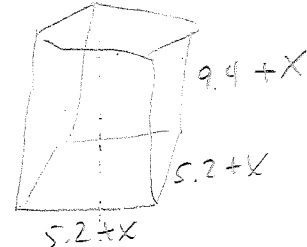
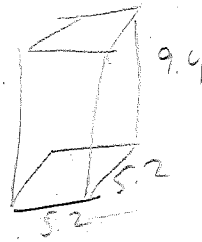
Cubic only 3 zeroes

Cubic

9. A carton of juice in the shape of a rectangular prism has dimensions 5.2 cm by 5.2 cm by 9.4 cm. The manufacturer wants to design a carton with double the capacity by increasing each dimension by  $x$  centimetres. Which equation could be used to determine the value of  $x$ ?

- A.  $508.352 = (5.2 - x)^2(9.4 - x)$   
 B.  $254.176 = (5.2 + x)^2(9.4 + x)$

- C.  $508.352 = (5.2 + x)^2(9.4 + x)$   
 D.  $254.176 = (5.2 - x)^2(9.4 - x)$



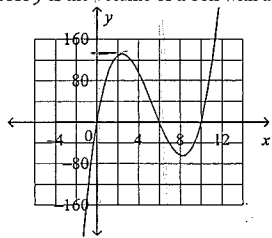
$$V = 5.2 \times 5.2 \times 9.4 = 254.176$$

$$2V = 508.352 = (5.2 + x)(5.2 + x)(9.4 + x)$$

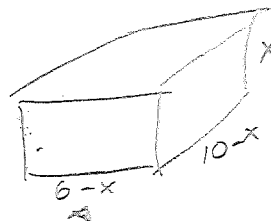
D

10. Here is the graph of  $y = 2x(10-x)(6-x)$ . Suppose  $y$  is the volume of a box with a top.

The box is made from a piece of cardboard 20 cm long and 12 cm wide. Squares of side length  $x$  centimetres are cut from the corners of the cardboard to make a net for the box.



$$0 < x < 6$$



Which statements are correct?

- i) The minimum volume is approximately  $65 \text{ cm}^3$ .
- ii) The maximum volume is approximately  $131 \text{ cm}^3$ .
- iii) The volume is 0 when  $x$  is approximately  $8.2 \text{ cm}$ .
- iv) The maximum volume occurs when  $x$  is approximately  $2.4 \text{ cm}$ .

A. i, ii, iii

B. i, ii, iv

C. iii, iv

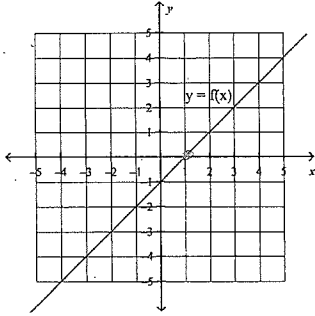
 D. ii, iv

**Radicals and Rationals Midterm Review Quiz**

**Multiple Choice**

Identify the choice that best completes the statement or answers the question.

- D 1. For the graph of  $y = f(x)$  shown below, what are the domain and range of  $y = \sqrt{f(x)}$ ?



DS X  
IV  
C

- A. domain:  $x \geq -1$ ;  
range:  $y \in \mathbb{R}$
- B. domain:  $x \geq 0$ ;  
range:  $y \geq 1$
- C. domain:  $x \leq 1$ ;  
range:  $y \geq 0$
- D. domain:  $x \geq 1$ ;  
range:  $y \geq 0$

- B 2. The graph of which function below has a vertical asymptote at  $x = 5$ ?

A.  $y = \frac{x-5}{x-4}$  VA at  $x=4$

C.  $y = \frac{x-5}{x^2-25}$  = VA at  $x=-5$

B.  $y = \frac{x^2}{x-5}$

D.  $y = \frac{x^2-25}{x+5}$  ← hole at  $x=-5$

3. The graph of which function below has a horizontal asymptote?

A.  $y = \frac{x^2+2}{x^2-2}$  HA at  $y=1$

C.  $y = \frac{x^2}{x-3}$

B.  $y = \frac{x^2-7x+12}{x+7}$

D.  $y = \frac{x^2-4}{x+7}$

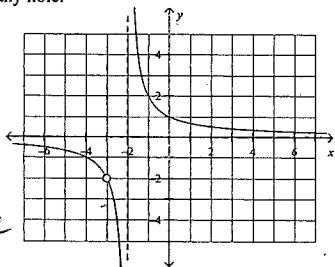
C

4. For the graph of this rational function, state the domain and write the equations of any asymptotes and the coordinates of any hole.

$$y = \frac{2x+6}{x^2+5x+6}$$

$$y = \frac{2(x+3)}{(x+3)(x+2)}$$

hole at  $x = -3$   
VA at  $x = -2$



hole at  $x = -3$

$$y = \frac{2}{x+2}, x \neq -2$$

$$f(-3) = \frac{2}{-3+2} = \frac{2}{-1} = -2$$

- A. domain:  $x \neq -2$  and  $x \neq -3$ ;  
vertical asymptotes:  $x = -2, x = -3$ ;  
horizontal asymptote:  $y = 0$  ✓

- C.** domain:  $x \neq -2$  and  $x \neq -3$  ✓  
vertical asymptote:  $x = -2$  ✓  
hole:  $(-3, -2)$  ✓  
horizontal asymptote:  $y = 0$  ✓

- B. domain:  $x \neq -2$ ;  
vertical asymptote:  $x = -2$ ;  
horizontal asymptote:  $y = -2$  ✓

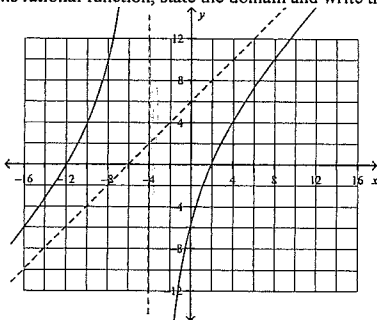
- D. domain:  $x \neq 0$  and  $x \neq -3$ ;  
vertical asymptote:  $x = 0$ ;  
hole:  $(-3, -2)$ ;  
horizontal asymptote:  $y = -2$  ✓

D

5. For the graph of this rational function, state the domain and write the equations of any asymptotes.

$$y = \frac{x^2+10x-23}{x+4}$$

VA at  $x = -4$



$$\begin{array}{r} x+4 \overline{) x^2+10x-23} \\ \underline{x^2+4x} \phantom{-23} \\ 6x-23 \\ \underline{6x+24} \\ -47 \end{array}$$

- A. domain:  $x \neq 6$ ;  
vertical asymptote:  $x = 6$ ;  
oblique asymptote:  $y = x - 4$  ✓

- C. domain:  $x \neq 6$ ;  
vertical asymptote:  $x = 6$  ✗  
oblique asymptote:  $y = x + 6$  ✓

- B. domain:  $x \neq -4$ ;  
vertical asymptote:  $x = -4$ ;  
oblique asymptote:  $y = x - 4$  ✓

- D.** domain:  $x \neq -4$  ✓  
vertical asymptote:  $x = -4$  ✓  
oblique asymptote:  $y = x + 6$  ✓



- C 6. For the graph of this rational function, identify the equation of any asymptote.

$$y = \frac{6x+8}{x^2+4}$$

$x \in \mathbb{R}$  ; No VA

degree of  $f(x) < g(x)$   
 $\therefore$  HA at  $y=0$

- A. The graph has an oblique asymptote at  $y = 6x + 8$ .  
 B. The graph has a vertical asymptote at  $x = 2$ .  
C The graph has a horizontal asymptote at  $y = 0$ .  
 D. The graph has no vertical or horizontal asymptotes.

- C 7. What is the solution of this radical equation, to the nearest tenth if necessary?

$$\sqrt{x-4} = \frac{4}{x^2+1} - 2$$

Rational

- A.  $x = 4$  or  $x = -1$   
 B.  $x = -5.2$  or  $x = 2.3$

- C.  $x = -5.2$  or  $x = 2.3$  or  $x = \pm 0.5$   
 D.  $x = 0$

- B 8. State the domain of this function.

$$y = \frac{x^2+7x+10}{-2-x} = \frac{(x+5)(x+2)}{-1(x+2)}$$

- A.  $x \neq \pm 2$   
B.  $x \neq -2$

- C.  $x \neq -2, x \neq -5$   
 D.  $x \in \mathbb{R}$

$$(x^2+x-5)(x^2+1) = 4(x-4) - 2(x-4)(x^2+1)$$

$$x^4 + x^2 + x^3 + x - 5x^2 - 5 = 4x - 16 - 2(x^3 + x - 4x^2 - 4)$$

$$x^4 + x^3 - 4x^2 + x - 5 = -2x^3 + 8x^2 + 2x - 8$$

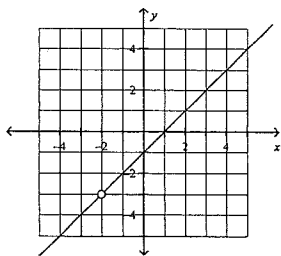
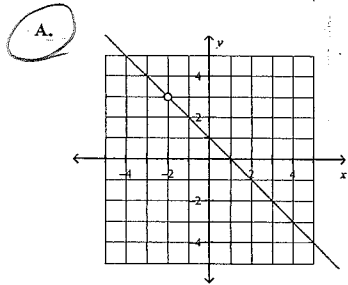
$$x^4 + 3x^3 - 12x^2 - x + 3 = 0$$

Graphing calculator to solve.

9. Which graph represents the function  $y = \frac{(x+2)(-x+1)}{x+2}$ ?

$-x$ -int at  $x = 1$

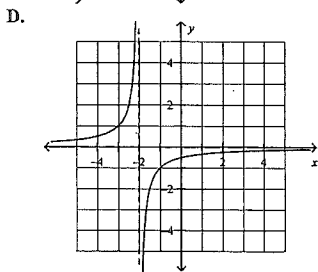
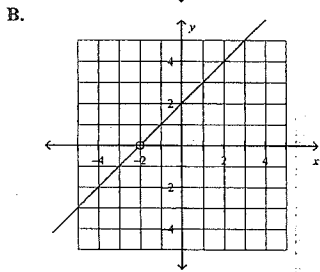
hole at  $x = -2$



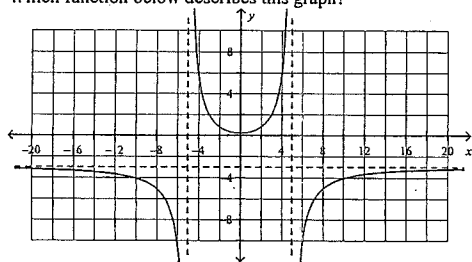
$$y = -x + 1, \quad x \neq -2$$

$\uparrow$  slope       $\uparrow$  y-int

$$y = -(-2) + 1 = 3 \quad \text{hole } (-2, 3)$$



10. Which function below describes this graph?



A.  $y = \frac{-3x^2 - 5}{x^2 - 25}$   $\leftarrow$  VA at  $x = \pm 5$

B.  $y = \frac{2x^2 - 5}{x^2 - 25}$

C.  $y = \frac{-3x^2 - 5}{x^2 + 5}$

D.  $y = \frac{-3x^2 - 5}{x^2}$

$$2x^2 - 5 = 0$$

$$2x^2 = 5$$

$x = \pm \frac{\sqrt{5}}{2}$  x-intercepts

can't be B because the graph doesn't have x-intercepts

$$-3x^2 - 5 = 0$$

$$-3x^2 = \frac{5}{-3}$$

$x = \text{undefined}$   
 $\therefore$  no x-intercepts