

Winter Holiday Homework

Class: _____

Name: _____

List:

Part 1: review Algebra 2 chapter 1-6

Part 2: preview Algebra 2 chapter 7&8

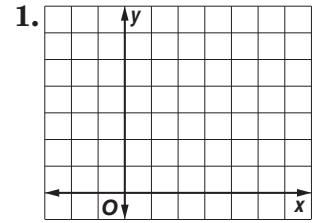
Part 3: complete worksheets

7**Chapter 7 Quiz 1**

(Lessons 7-1 and 7-2)

SCORE _____

1. Sketch the graph of $y = 3\left(\frac{1}{2}\right)^x$. Then state the function's domain and range.



2. Write an exponential function whose graph passes through the points $(0, -5)$ and $(-2, -20)$. Then determine whether the function represents exponential *growth* or *decay*.

3. Solve $\left(\frac{1}{3}\right)^m = 27^{m+2}$.

4. Solve $25^{4t+1} \geq 125^{2t}$.

5. **MULTIPLE CHOICE** Solve $6^{2x-1} = 36^{-x}$.

A 0

B $\frac{1}{4}$ C $\frac{1}{2}$ D $\frac{3}{4}$

2. _____

3. _____

4. _____

5. _____

NAME _____ DATE _____ PERIOD _____

7**Chapter 7 Quiz 2**

(Lessons 7-3 and 7-4)

SCORE _____

1. Write the equation $81^{\frac{1}{2}} = 9$ in logarithmic form.

2. Write the equation $\log_{216} 36 = \frac{2}{3}$ in exponential form.

3. Evaluate $\log_{16} 64$.

4. Solve $\log_{16} n = -\frac{1}{2}$.

5. Solve $\log_5 (4x - 1) \geq \log_5 (x + 2)$.

6. Write the equation $3^{-3} = \frac{1}{27}$ in logarithmic form.

Solve each equation.

7. $\log_7 36 - \log_7 (2x) = \log_7 4$

8. $\log_3 x = \frac{1}{2} \log_3 25 - 5 \log_3 2$

9. $\log_5 (3x + 4) + \log_5 (x - 2) = 3$

10. **MULTIPLE CHOICE** Solve $\log_2 (x + 1) + \log_2 (x - 5) = 4$.

A 5

B 6

C 7

D 8

10. _____

7 Chapter 7 Quiz 3

SCORE _____

(Lessons 7-5 and 7-6)

Use $\log_5 2 \approx 0.4307$ and $\log_5 3 \approx 0.6826$ to approximate the value of each expression.

1. $\log_5 \frac{8}{3}$

2. $\log_5 24$

1. _____

2. _____

3. MULTIPLE CHOICE Solve $\log_8 x + \log_8 (x + 7) = 1$.

A -8

B -1

C 1

D 8

3. _____

For Questions 4 and 5, solve each equation or inequality. Round to the nearest ten-thousandth.

4. $4^{2m} = 130$

4. _____

5. $5^{x+4} = 2^{3x}$

5. _____

7 Chapter 7 Quiz 4

SCORE _____

(Lessons 7-7 and 7-8)

1. Write an equivalent logarithmic equation for $e^3 = 2x$.

1. _____

2. Evaluate $e^{\ln 0.3}$.

2. _____

3. A substance decays according to the equation $y = ae^{-0.0025t}$, where t is in minutes. Find the half-life of the substance. Round to the nearest tenth.

3. _____

4. MULTIPLE CHOICE In 1925, the population of a city was 90,000. Its population increases by 2.1% per year. What will the population be in 2020?

A 4,073,333

B 136,382

C 648,169

D 6.6×10^{12}

4. _____

5. A type of bacteria doubles in number every 25 minutes. Find the constant k for this type of bacteria, then write the equation for modeling this exponential growth.

5. _____

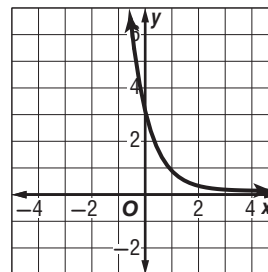
7**Chapter 7 Mid-Chapter Test**

SCORE _____

*(Lessons 7-1 through 7-4)***Part I** Write the letter for the correct answer in the blank at the right of each question.

1. Find the domain and range of the function shown.

- A** $D = \{x \mid x > 0\}$, $R = \{\text{all real numbers}\}$
B $D = \{\text{all real numbers}\}$, $R = \{y \mid y < 0\}$
C $D = \{\text{all real numbers}\}$, $R = \{y \mid y > 0\}$
D $D = \{x \mid x > 0\}$, $R = \{y \mid y > 0\}$



1. _____

2. Solve $4^{2x} = 8^{x+4}$.

- F** 2 **G** 6 **H** 12 **J** 24

2. _____

3. Write the equation $4^3 = 64$ in logarithmic form.

- A** $\log_3 4 = 64$ **C** $\log_{64} 3 = 4$
B $\log_4 64 = 3$ **D** $\log_4 3 = 64$

3. _____

4. Evaluate $\log_4 32$.

- F** $\frac{5}{2}$ **G** 8 **H** 3 **J** $\frac{2}{5}$

4. _____

5. Solve $\log_3 (7x - 3) \geq \log_3 (5x)$.

- A** $\{x \mid x \geq \frac{3}{2}\}$ **B** $\{x \mid x > \frac{3}{7}\}$ **C** $\{x \mid x \geq 0\}$ **D** $\{x \mid x \geq \frac{2}{3}\}$

5. _____

6. Write the equation $5^4 = 625$ in logarithmic form.

- F** $\log_4 625 = 5$ **H** $\log_5 625 = 4$
G $\log_4 5 = 625$ **J** $\log_5 4 = 625$

6. _____

7. Write the equation $\log_7 49 = 2$ in exponential form.

- A** $7^2 = 49$ **C** $49^2 = 7$
B $49^7 = 2$ **D** $2^7 = 49$

7. _____

8. Solve $\log_5 (2x - 1) > \log_5 (4x)$.

- F** $\{x \mid x < \frac{1}{2}\}$ **H** $\{x \mid x > -\frac{1}{2}\}$
G $\{x \mid x < -\frac{1}{2}\}$ **J** no solution

8. _____

Part II9. Write an exponential function whose graph passes through the points $(0, -3)$ and $(4, -48)$.

9. _____

10. Write $\log_{\frac{1}{5}} m = -2$ in exponential form.

10. _____

7 Chapter 7 Vocabulary Test

SCORE _____

asymptote	exponential decay	growth factor	natural base, e
Change of Base Formula	exponential equation	logarithm	natural base exponential function
common logarithm	exponential function	logarithmic equation	natural logarithm
compound interest	exponential growth	logarithmic function	
decay factor	exponential inequality	logarithmic inequality	

Choose from the terms above to complete each sentence.

1. A logarithm with base e is called a(n) _____. **1.** _____
2. The function $y = 10^x$ is an example of a(n) _____. **2.** _____
3. The equation $y = e^{-0.2t}$ is a model for _____. **3.** _____
4. The inverse of the function $y = e^x$ is the _____. **4.** _____
5. The equation $y = 100(1 + 0.1)^t$ is a model for _____. **5.** _____
6. An exponential function with base e is called a(n) _____. **6.** _____
7. $y = \log_2 x$ is an example of a(n) _____. **7.** _____
8. $5^{x+1} = 125$ and $9^x = 27^{2x+1}$ are examples of _____. **8.** _____
9. A logarithm with base 10 is called a(n) _____. **9.** _____
10. In the equation $y = 20(1 + 0.02)^t$, $1 + 0.02$ is the _____. **10.** _____

Define each term in your own words.

11. logarithm **11.** _____
12. natural base, e **12.** _____

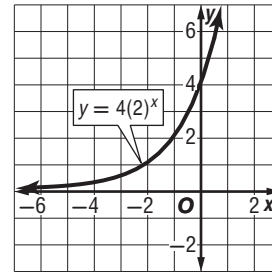
7 Chapter 7 Test, Form 1

SCORE _____

Write the letter for the correct answer in the blank at the right of each question.

1. Find the domain and range of the function whose graph is shown.

- A** $D = \{x \mid x > 0\}; R = \{y \mid y > 0\}$
B $D = \{\text{all real numbers}\}; R = \{y \mid y > 0\}$
C $D = \{x \mid x > 0\}; R = \{\text{all real numbers}\}$
D $D = \{\text{all real numbers}\}; R = \{y \mid y < 0\}$



1. _____

2. Which function represents exponential growth?

- F** $y = 9\left(\frac{1}{3}\right)^x$ **G** $y = 4x^4$ **H** $y = 12\left(\frac{1}{5}\right)^x$ **J** $y = 10(3)^x$

2. _____

3. The graph of which exponential function passes through the points (0, 4) and (1, 24)?

- A** $y = 4(6)^x$ **B** $y = 3(8)^x$ **C** $y = 2(2)^x$ **D** $y = 10(3)^x$

3. _____

4. Solve $8^{x+2} = 32^{2x+4}$.

- F** -2 **G** -1 **H** 0 **J** 1

4. _____

5. Solve $2^{3m-4} > 4$.

- A** $\{x \mid m < 0\}$ **B** $\{x \mid m > 0\}$ **C** $\{x \mid m > 2\}$ **D** $\left\{x \mid m > \frac{5}{3}\right\}$

5. _____

6. Write the equation $4^3 = 64$ in logarithmic form.

- F** $\log_4 3 = 64$ **G** $\log_3 4 = 64$ **H** $\log_{64} 4 = 3$ **J** $\log_4 64 = 3$

6. _____

7. Write the equation $\log_{12} 144 = 2$ in exponential form.

- A** $144^2 = 12$ **B** $12^2 = 144$ **C** $2^{12} = 144$ **D** $144^{12} = 2$

7. _____

8. Evaluate $\log_2 8$.

- F** 3 **G** 4 **H** 16 **J** 64

8. _____

9. Solve $\log_3 n = 2$.

- A** 6 **B** 5 **C** 8 **D** 9

9. _____

10. Solve $\log_2 2m > \log_2 (m + 5)$.

- F** $\left\{x \mid m > \frac{5}{3}\right\}$ **G** $\{x \mid m < 5\}$ **H** $\{x \mid m > 5\}$ **J** $\{x \mid m > -5\}$

10. _____

7 Chapter 7 Test, Form 1 (continued)**11.** Use $\log_5 2 \approx 0.4307$ to approximate the value of $\log_5 4$.

- A** 0.8614 **B** 0.8980 **C** 1.3652 **D** 0.1855 **11.** _____

12. Solve $\log_6 10 + \log_6 x = \log_6 40$.

- F** 180 **G** 4 **H** 5 **J** 30 **12.** _____

13. Solve $4^x = 20$. Round to the nearest ten-thousandth.

- A** 0.4628 **B** 1.5214 **C** 0.6990 **D** 2.1610 **13.** _____

14. Solve $3^x \geq 21$. Round to the nearest ten-thousandth.

- F** $\{x | x \geq 0.8451\}$ **G** $\{x | x \geq 2.7712\}$ **H** $\{x | x \geq 0.3608\}$ **J** $\{x | x \geq 7.0000\}$ **14.** _____

15. Express $\log_9 22$ in terms of common logarithms.

- A** $\log \frac{22}{9}$ **B** $\log 198$ **C** $\frac{\log 22}{\log 9}$ **D** $\frac{\log 9}{\log 22}$ **15.** _____

16. Evaluate $e^{\ln 4}$.

- F** e^4 **G** 4^e **H** $\ln 4$ **J** 4 **16.** _____

17. Solve $e^x > 2.7$.

- A** $\{x | x < 0.9933\}$ **B** $\{x | x > 0.9933\}$ **C** $\{x | x > 1.0668\}$ **D** $\{x | x < 1.0668\}$ **17.** _____

18. Solve $\ln 3x = 1$.

- F** 20.0855 **G** 0.3333 **H** 0.9061 **J** 8.1548 **18.** _____

19. AUTOMOBILES Lydia bought a car for \$20,000. It is expected to depreciate at a continuous rate. What will be the value of the car in 2 years? Use $k = 0.105$ and round to the nearest dollar.

- A** \$16,212 **B** \$16,012 **C** \$19,867 **D** \$18,567 **19.** _____

20. ART Martin bought a painting for \$5000. It is expected to appreciate at a continuous rate of 4%. How much will the painting be worth in 6 years? Round to the nearest cent.

- F** \$6200.00 **G** \$5360.38 **H** \$37,647.68 **J** \$6356.25 **20.** _____

Bonus Evaluate $3 \log_2 64 + e^{\ln 5} + \log_{\frac{1}{3}} 9$.**B:** _____

8**Chapter 8 Quiz 1***(Lessons 8-1 and 8-2)*

SCORE _____

Simplify each expression.

1. $\frac{x^2 - 6x + 8}{3x - 12} \div \frac{x^2 - 4}{x^2 + 5x + 6}$

2. $\frac{5y}{y^2 - 3y} - \frac{7}{3 - y}$

1. _____

3. **MULTIPLE CHOICE** For what value(s) of x is the expression $\frac{x^2 - 5x - 14}{x^2 + 7x + 10}$ undefined?

2. _____

A -5, 2

C -2

3. _____

B 0, 2, 5

D -5, -2

4. _____

Find the LCM of each set of polynomials.

4. $12a^2, 15b^3, 20ab^2$

5. $5x^2 - 20, 3x + 6$

5. _____

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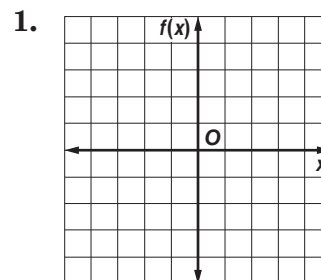
8**Chapter 8 Quiz 2***(Lesson 8-3)*

SCORE _____

Graph each function. State the domain and range.

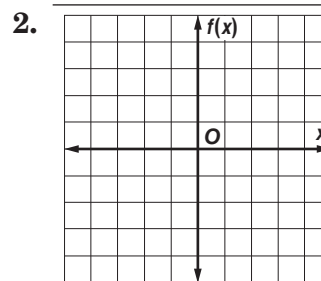
1. $f(x) = \frac{2}{x}$

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

**Determine the values for x for which $f(x)$ is undefined.**

3. $f(x) = \frac{4}{x^2 - 2x - 3}$

4. $f(x) = \frac{x^2 + 4x}{x^2 + 4x - 12}$

5. **MULTIPLE CHOICE** Which domain and range match the equation $f(x) = \frac{3}{x + 1}$?A $\{x|x \neq 1\}$ and $\{f(x)|f(x) \neq 0\}$ B $\{x|x \neq -1\}$ and $\{f(x)|f(x) \neq 0\}$ C $\{x|x \neq 0\}$ and $\{f(x)|f(x) \neq 1\}$ D $\{x|x \neq 0\}$ and $\{f(x)|f(x) \neq -1\}$

3. _____

4. _____

5. _____

8**Chapter 8 Quiz 3**

(Lessons 8-4 and 8-5)

SCORE _____

1. State whether $rt = 30$ represents a *direct*, *joint*, *inverse*, or *combined* variation. Then name the constant of variation.
2. Suppose y varies jointly as x and z . Find y when $x = 1$ and $z = 4$, if $y = 96$ when $x = 4$ and $z = 8$.

Graph each function.

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

4. $f(x) = \frac{-1}{x-3}$

5. Which domain and range match the equation

$$f(x) = \frac{-1}{x+4} + 2?$$

- A** $\{x \mid x \neq 4\}$ and $\{f(x) \mid f(x) \neq 2\}$
B $\{x \mid x \neq -4\}$ and $\{f(x) \mid f(x) \neq 2\}$
C $\{x \mid x \neq 2\}$ and $\{f(x) \mid f(x) \neq 4\}$
D $\{x \mid x \neq 2\}$ and $\{f(x) \mid f(x) \neq -4\}$

1. _____

2. _____

3. 4. 

5. _____

8**Chapter 8 Quiz 4**

(Lesson 8-6)

SCORE _____

For Questions 1–4, solve each equation or inequality.

1. $\frac{6}{x+2} = \frac{x-7}{x+2} + \frac{1}{4}$

2. $\frac{t-5}{t-3} = \frac{t-3}{t+3} + \frac{1}{t-3}$

1. _____

2. _____

3. $3 + \frac{2}{t} > \frac{8}{t}$

4. $\frac{6}{m+5} > 2$

3. _____

4. _____

5. **NUMBER THEORY** The ratio of two less than a number to six more than that number is 2 to 3. Which of the following numbers is it?

A 8**B** 18**C** 22**D** 24

5. _____

8**Chapter 8 Mid-Chapter Test**

SCORE _____

*(Lessons 8-1 through 8-3)***Part I** Write the letter for the correct answer in the blank at the right of each question.1. For what value(s) of x is the expression $\frac{2x(x-3)}{(x+4)(x^2-9)}$ undefined?**A** $-4, 9$ **B** $-4, -3, 0, 3$ **C** $-4, 0, 3, 9$ **D** $-4, -3, 3$

1. _____

For Questions 2–5, simplify each expression.2. $\frac{9y^2-1}{2y-1} \cdot \frac{1-2y}{3y-1}$ **F** $-3y-1$ **G** $3y+1$ **H** $-3y+1$ **J** $3y-1$

2. _____

3. $\frac{c^2-c-20}{c^2-6c+5} \div \frac{c^2-16}{3c-3}$ **A** $\frac{3}{c-4}$ **B** $\frac{3}{c+4}$ **C** $\frac{c+4}{3}$ **D** $\frac{c-4}{3}$

3. _____

4. $\frac{\frac{3m^2-12}{4m^2+8m}}{\frac{6m-12}{8m^2+16m}}$ **F** $\frac{9(m-2)}{16m^2(m+2)}$ **G** $\frac{m(m^2-4)}{m-2}$ **H** $m+2$ **J** $\frac{4(m+2)}{3}$

4. _____

5. $\frac{1}{5} - \frac{3}{4w} + \frac{3}{10w}$ **A** $\frac{4w-21}{20w}$ **B** $\frac{4w-9}{20w}$ **C** $\frac{1}{20w}$ **D** $-\frac{1}{4w}$

5. _____

Part II6. Simplify $\frac{x}{x^2+x-6} - \frac{1}{x^2-6x+8}$.

6. _____

For Questions 7 and 8, find the LCM for each set of polynomials.

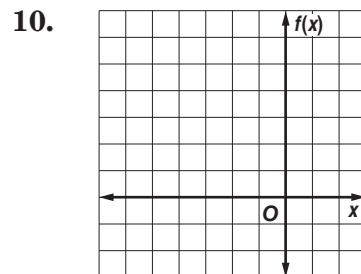
7. _____

7. $12r^3, 18r^2t, 24t^4$ 8. $9c-15, 21c-35$

8. _____

9. Determine the equations of any asymptotes in the graph of $f(x) = \frac{x+3}{x^2-x-12}$.

9. _____

10. Graph $f(x) = \frac{4}{(x+2)^2}$.

8

Chapter 8 Vocabulary Test

SCORE _____

asymptote	horizontal asymptote	point discontinuity	reciprocal function
combined variation	hyperbola	rational equation	vertical asymptote
complex fraction	inverse variation	rational expression	weighed average
constant of variation	joint variation	rational function	
direct variation	oblique asymptote	rational inequality	

Underline or circle the correct word or phrase to complete each sentence.

- The equation $y = \frac{3}{x}$ is an example of
(*direct variation, inverse variation*). 1. _____
- $r(x) = \frac{x^2 + 6x + 9}{x^2 + 5x + 6}$ is an example of a
(*rational function, rational expression*). 2. _____
- The graph of $y = \frac{3}{x + 5}$ has a(n)
(*asymptote, point discontinuity*). 3. _____
- Adding or subtracting rational expressions requires
you to find a(n) (*least common denominator, asymptote*). 4. _____
- The formula for simple interest, $I = Prt$, is an example of
(*direct variation, joint variation*). 5. _____
- The graph of $y = \frac{x^2 + 2x - 15}{x - 3}$ has a
(*point discontinuity, asymptote*) at $x = 3$. 6. _____
- $\frac{2}{t} + \frac{3}{t^2} < 1$ is an example of a
(*rational inequality, rational equation*). 7. _____
- If you walk at a steady speed, your speed
and the time it takes to walk 1 mile are
(*asymptotes, inversely proportional*) to each other. 8. _____
- The equation $C = \pi d$ gives the circumference
of a circle in terms of its diameter. Here, π is called the
(*constant of variation, point discontinuity*). 9. _____
- If the rational expression in a rational function is
not written in lowest terms, the graph of the function
may have a (*constant of variation, point discontinuity*). 10. _____

Define each term in your own words.

11. rational expression

12. complex fraction

8**Chapter 8 Test, Form 1**

SCORE _____

Write the letter for the correct answer in the blank at the right of each question.**For Questions 1–6, simplify each expression.**

1. $\frac{24pn}{18p^2}$ A $\frac{3p}{4n}$ B $\frac{4pn}{3}$ C $\frac{4n}{3p}$ D $\frac{4}{3}$ 1. _____

2. $\frac{6a+12}{5} \cdot \frac{10}{a+2}$ F 12 G 24 H $12a+12$ J $24a$ 2. _____

3. $\frac{y}{x^2-y^2} \div \frac{y^2}{x-y}$ A $\frac{1}{y(x+y)}$ B $\frac{y^3}{x^3-x^2y-xy^2+y^3}$ C $\frac{x+y}{y}$ D $\frac{1}{y(x-y)}$ 3. _____

4. $\frac{\frac{m^2}{5f^2}}{\frac{m}{f^3}}$ F $5mf$ G $\frac{m}{5f}$ H $\frac{1}{5}mf$ J $\frac{m^2}{f}$ 4. _____

5. $\frac{10}{pr} + \frac{4}{r}$ A $\frac{10+4p}{pr^2}$ B $\frac{14}{r(p+1)}$ C $\frac{10p+4}{pr}$ D $\frac{10+4p}{pr}$ 5. _____

6. $\frac{4}{k+1} + \frac{9}{2(k+1)}$ F $\frac{13}{2(k+1)}$ G $\frac{17}{2(k+1)}$ H $\frac{11}{(k+1)}$ J $\frac{8}{9}$ 6. _____

For Questions 7 and 8, find the LCM of each set of polynomials.

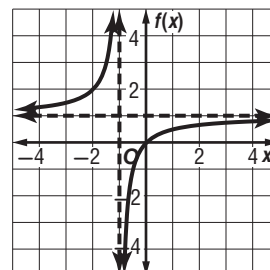
7. $10x^2, 30xy^2$ A $30x^2y^2$ B $300x^3y^2$ C $10x$ D $40x^2y^2$ 7. _____

8. $3z+12, 6z+24$ F $18(z+4)$ G $3(z+4)$ H $6(z+4)$ J $z+4$ 8. _____

9. Which is an equation of the vertical asymptote of the graph of $f(x) = \frac{x-1}{x-2}$?
A $f(x) = 1$ B $f(x) = 2$ C $x = 2$ D $x = 1$ 9. _____

10. Which rational function is graphed?

F $f(x) = \frac{2}{x+1}$ H $f(x) = \frac{2}{x-1}$
G $f(x) = \frac{x}{x-1}$ J $f(x) = \frac{x}{x+1}$

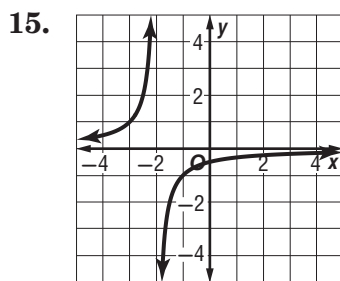


10. _____

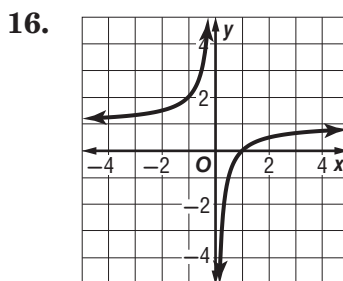
8**Chapter 8 Test, Form 1** (continued)

11. The equation $z = 30x$ represents a(n) ? variation.
A direct **B** joint **C** inverse **D** combined **11.** _____
12. Suppose y varies jointly as x and z . If $y = 24$ when $x = 2$ and $z = 3$, find y when $x = 1$ and $z = 5$.
F 5 **G** 20 **H** 10 **J** 4 **12.** _____
13. The equation $m = \frac{4}{n}$ represents a(n) ? variation.
A direct **B** joint **C** inverse **D** combined **13.** _____
14. If y varies inversely as x and $y = 2$ when $x = 10$, find y when $x = 5$.
F 1 **G** 4 **H** 25 **J** 100 **14.** _____

For Questions 15 and 16, identify the function represented by each graph.



- A** $y = \frac{1}{x} - 2$
B $y = -\frac{1}{x-2}$
C $y = \frac{1}{x} + 2$
D $y = -\frac{1}{x+2}$



- F** $y = \frac{1}{x} - 1$
G $y = \frac{1}{x-1}$
H $y = -\frac{1}{x} + 1$
J $y = -\frac{1}{x+1}$

17. Solve $\frac{6}{y+4} - \frac{2}{y-3} = 3$.
A $-\frac{5}{3}, -2$ **B** $\frac{5}{3}, -2$ **C** $\frac{5}{3}, 2$ **D** $-\frac{5}{3}, 2$ **17.** _____
18. Solve $\frac{x}{x^2 - 6x} = 1$.
F -7 **G** 5 **H** 7 **J** $-\frac{5}{7}$ **18.** _____
19. Solve $y + 4 = \frac{5}{y}$.
A -5, 1 **B** -1, 5 **C** ± 1 **D** \emptyset **19.** _____
20. Solve $\frac{9}{m-5} < 3$.
F $m < 5$ or $m > 8$ **H** $m < -2$ or $m > 5$
G $-2 < m < 5$ **J** $5 < m < 8$ **20.** _____

Bonus Determine the equations of any vertical asymptotes and the values of x for any points of discontinuity in the graph of $f(x) = \frac{x^2 - 9}{x^2 - 3x}$.

B: _____