

## 2nd Semester Final Review

1  $\frac{4x + 20}{x^2 - 1} \div \frac{2x + 10}{x^2 + 4x - 5} =$

A)  $\frac{4(x + 5)}{(x + 1)}$

B)  $\frac{2(x + 5)}{(x + 1)}$

C)  $\frac{2(x + 5)}{(x + 1)(x - 1)^2}$

D)  $\frac{2(x + 1)}{4x}$

2  $\frac{x}{3x - 3} - \frac{x + 1}{x^2 - 1} =$

A)  $\frac{1}{x^2 - 3x - 2}$

B)  $\frac{x - 3}{3x - 3}$

C)  $\frac{1}{3}$

D)  $\frac{x - 1}{3x - 3}$

3 Which is a simplified form of  $\frac{(2a^2b^{-2})^3}{4b^3c^{-8}}$ ?

A)  $\frac{3a^5c^8}{2b^2}$

B)  $\frac{2a^6}{b^3c^8}$

C)  $\frac{a^6c^8}{2b^9}$

D)  $\frac{2a^6c^8}{b^9}$

4  $\frac{8x^3}{3y} \div \frac{9y^{-2}}{6x^2} =$

A)  $\frac{4x}{y^3}$

B)  $\frac{16x^5}{9y^3}$

C)  $\frac{16x^5y}{9}$

D)  $\frac{8x^5}{9}$

5 Solve:  $\frac{-2}{x + 4} = \frac{4}{x + 3}$

A)  $-\frac{13}{6}$

B) -11

C)  $-\frac{8}{3}$

D)  $-\frac{11}{3}$

6 Solve:  $\frac{6}{x^2 - 9} - \frac{1}{x - 3} = 1$

A) -4

B) 2

C)  $\frac{-1 \pm \sqrt{73}}{2}$

D) 3 or -4

7 Which of these is *not* equivalent to  $\log_3 9^5$ ?

A)  $5 \log_3 9$

B) 10

C)  $\log_3 9 + \log_3 9 + \log_3 9 + \log_3 9 + \log_3 9$

D)  $2^5$

8 If  $\log 5 \approx 0.6990$  and  $\log 6 \approx 0.7782$ , what is the approximate value of  $\log 30$ ?

A) 0.7386

B) 1.4772

C) 1.5564

D) 2.1762

- 9 What is the solution to the equation  $2^x = 5$ ?
- A)  $x = 2.5$       B)  $x = \frac{\log_{10} 5}{\log_{10} 2}$       C)  $x = \log 5$       D)  $x = \frac{\log_{10} 2}{\log_{10} 5}$

- 10 If  $\log(5x + 20) = 3$ , what is the value of  $x$ ?
- A)  $-\frac{19}{5}$       B)  $-\frac{17}{5}$       C) 196      D) 204

- 11 Which is the first *incorrect* step in simplifying  $\log_8 16 + \log_8 32$ ?
- Step 1:  $\log_8 16 + \log_8 32 = \log_8(16 \cdot 32)$   
 Step 2:  $\log_8(16 \cdot 32) = \log_8 512$   
 Step 3:  $\log_8 512 = 3$
- A) Step 1      B) Step 2      C) Step 3      D) Each step is correct.

- 12 What is the missing information?
- $\log 5x^{-7}y^4 = \underline{\hspace{2cm} ? \hspace{2cm}} = \log 5 - 7 \log x + 4 \log y$
- A)  $\log 5 \cdot \log x^{-7} \cdot \log y^4$       C)  $\log 5 + \log x^{-7} + \log y^4$   
 B)  $\log 5 - \log x^{-7} + \log y^4$       D)  $\frac{\log 5}{\log x^{-7}} + \log y^4$

- 13 Three students are simplifying  $\frac{4^{\frac{1}{2}}}{4^{\frac{2}{3}}}$ . The first step for each student is shown. Which student's first step is incorrect?

Student 1:  $\frac{4^{\frac{1}{2}}}{4^{\frac{2}{3}}} = \frac{\sqrt{4}}{\sqrt[3]{4^2}}$

Student 2:  $\frac{4^{\frac{1}{2}}}{4^{\frac{2}{3}}} = 4^{\left(\frac{1}{2} \div \frac{2}{3}\right)}$

Student 3:  $\frac{4^{\frac{1}{2}}}{4^{\frac{2}{3}}} = 4^{\left(\frac{1}{2} - \frac{2}{3}\right)}$

- A) Student 1      B) Student 2      C) Student 3      D) Each student is correct.

14 Which is the first *incorrect* step in simplifying  $(14^{-5} \cdot 6^3)^2$ ?

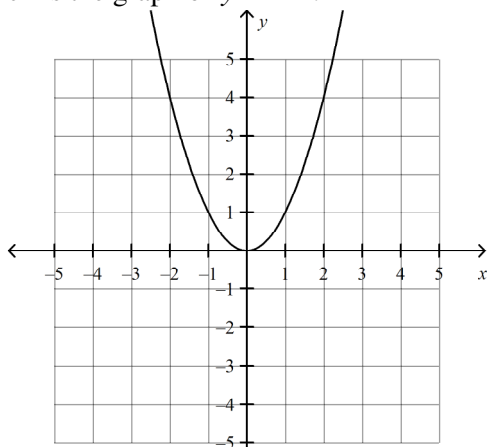
Step 1:  $(14^{-5} \cdot 6^3)^2 = \left(\frac{6^3}{14^5}\right)^2$

Step 2:  $\left(\frac{6^3}{14^5}\right)^2 = \frac{(6^3)^2}{(14^5)^2}$

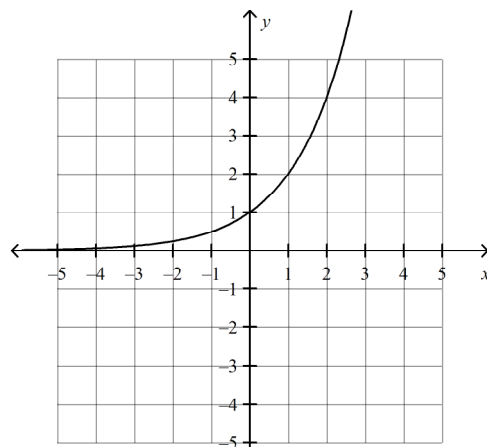
Step 3:  $\frac{(6^3)^2}{(14^5)^2} = \frac{6^5}{14^7}$

- A) Step 1                      B) Step 2                      C) Step 3                      D) Each step is correct.

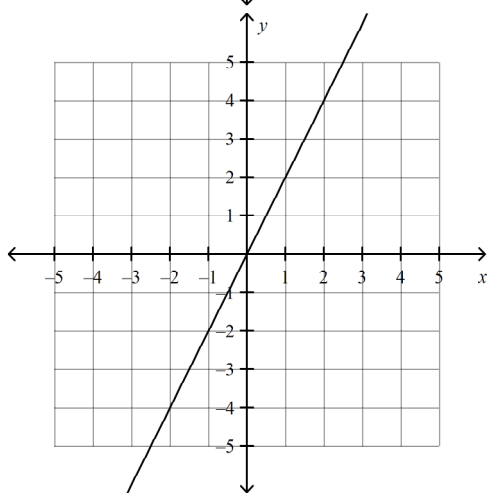
15 Which is the graph of  $y = 2^x$ ?



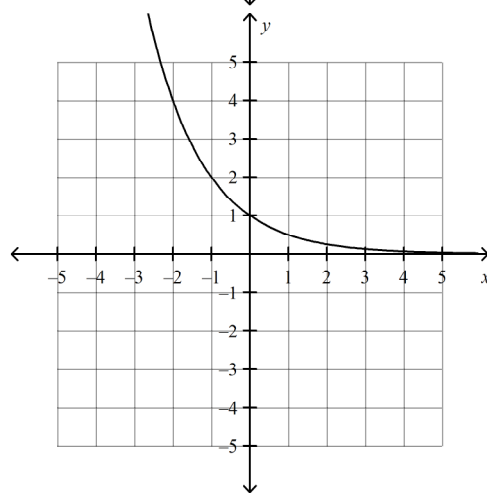
A)



C)



B)



D)

- 16) An investment amount is growing exponentially with time, as shown in the table below.

Year	Amount of Investment
0	\$10,000
1	\$10,400
5	\$12,167

Which of the following equations expresses the investment amount,  $y$ , present at any time,  $t$ ?

- A)  $y = 10,000(0.04)^t$                       C)  $y = 10,000(1.04)^t$   
 B)  $y = 10,000(1.04)^{\frac{t}{4}}$                       D)  $y = 10,000 + 1.04t$
- 17) Simplify:  $9^{-5/2}$   
 A)  $\frac{1}{243}$                       B)  $-22.5$                       C)  $-3.6$                       D)  $-\frac{45}{18}$
- 18) An initial population of 895 quail increases at an annual rate of 7%. Write an exponential function to model the quail population.  
 A)  $f(x) = 895(1.07)^x$                       C)  $f(x) = 895(0.07)^x$   
 B)  $f(x) = 895(7)^x$                       D)  $f(x) = (895 \cdot 0.07)^x$
- 19) Condense:  $3 \ln x - 2 \ln c$   
 A)  $\ln \frac{x^3}{c^2}$                       B)  $\ln(x^3 + c^2)$                       C)  $\ln(x^3 - c^2)$                       D)  $\ln x^3 c^2$
- 20) Simplify  $\ln e^3$ .  
 A) 3                      B)  $\frac{1}{3e}$                       C)  $3e$                       D)  $\frac{1}{3}$
- 21) Which of these is *not* equivalent to  $\log_5 12$ ?  
 A)  $\log_5 2 + \log_5 2 + \log_5 3$                       C)  $\frac{\log 12}{\log 5}$   
 B)  $(\log_5 2)(\log_5 2)(\log_5 3)$                       D)  $\log_5 24 - \log_5 2$
- 22) Which of these is *not* equivalent to  $\log_4 \frac{45}{9}$ ?  
 A)  $\frac{\log_4 45}{\log_4 9}$                       C)  $\log_4 45 - \log_4 9$   
 B)  $\log_4 5$                       D)  $\frac{\log 5}{\log 4}$
- 23) If  $x$  is a real number, for what values of  $x$  is the equation  $\frac{x^2 + 2x - 15}{2x^2 + 10x} = \frac{x - 3}{2x}$  true?  
 A) all values of  $x$                       C) no values of  $x$   
 B) some values of  $x$                       D) impossible to determine

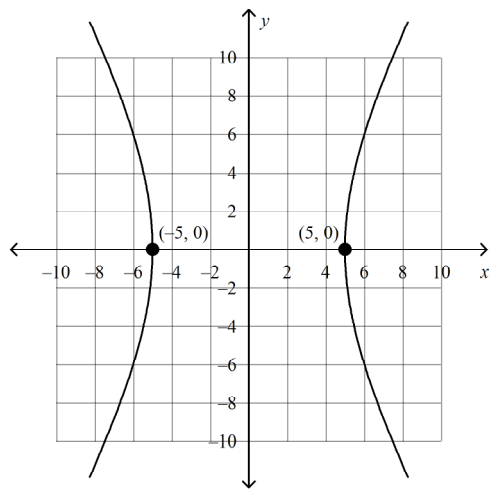
24 On a recent test, Deanna wrote the equation  $\sqrt{4x^2} = 2x$ . Which of the following statements is correct about the statement she wrote?

- A) The equation is always true.
- B) The equation is never true when  $x < 0$ .
- C) The equation is never true when  $x \leq 0$ .
- D) The equation is never true.

25 If  $x$  is a real number, which of the following statements is correct about the equation  $\frac{12x + 4}{2} = \frac{24x + 16}{4}$ ?

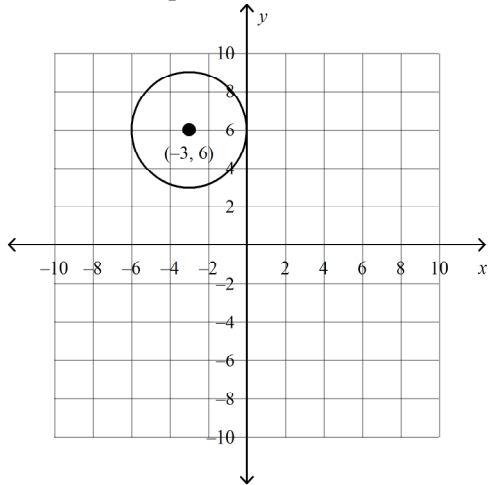
- A) The equation is always true.
- B) The equation is always true, except when  $x = -\frac{1}{3}$  or  $x = -\frac{2}{3}$ .
- C) The equation is sometimes true.
- D) The equation is never true.

26 The asymptotes of the hyperbola graphed below are  $y = \pm \frac{9}{5}x$ . What is the equation of the hyperbola?



- |  |  |
|--|--|
| <ul style="list-style-type: none"> <li>A) <math>\frac{x^2}{5} - \frac{y^2}{9} = 1</math></li> <li>B) <math>\frac{x^2}{81} - \frac{y^2}{25} = 1</math></li> </ul> | <ul style="list-style-type: none"> <li>C) <math>\frac{x^2}{25} + \frac{y^2}{81} = 1</math></li> <li>D) <math>\frac{x^2}{25} - \frac{y^2}{81} = 1</math></li> </ul> |
|--|--|

- 27 What is the equation of the circle?

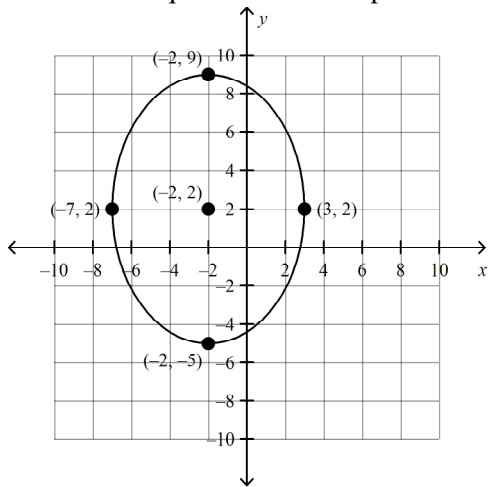


- A)  $(x + 3)^2 + (y - 6)^2 = 3$       C)  $(x - 3)^2 + (y + 6)^2 = 9$   
 B)  $(x + 3)^2 + (y - 6)^2 = 1$       D)  $(x + 3)^2 + (y - 6)^2 = 9$

- 28 The graph of  $\frac{x^2}{8} + \frac{y^2}{9} = 1$  is an ellipse. What are the foci of the ellipse?

- A)  $(2\sqrt{2}, 0)$  and  $(-2\sqrt{2}, 0)$       C)  $(0, 1)$  and  $(0, -1)$   
 B)  $(2\sqrt{2}, 3)$  and  $(-2\sqrt{2}, 3)$       D)  $(1, 0)$  and  $(-1, 0)$

- 29 What is the equation of the ellipse?



- A)  $\frac{x^2}{25} + \frac{y^2}{49} = 1$       C)  $\frac{(x - 2)^2}{25} + \frac{(y + 2)^2}{49} = 1$   
 B)  $\frac{(x + 2)^2}{25} + \frac{(y - 2)^2}{49} = 1$       D)  $\frac{(x + 2)^2}{49} + \frac{(y - 2)^2}{25} = 1$

- 30] The graph of  $16x^2 - 4y^2 = 64$  is a hyperbola. Which set of equations represents the asymptotes of the hyperbola's graph?
- A)  $y = \frac{1}{4}x, y = -\frac{1}{4}x$                       C)  $y = 2x, y = -2x$   
 B)  $y = \frac{1}{2}x, y = -\frac{1}{2}x$                       D)  $y = 4x, y = -4x$
- 31]  $x^2 - 6y^2 - 28x + 24y + 148 = 0$   
 What is the graph of the equation of the conic given above?  
 A) circle                      B) ellipse                      C) parabola                      D) hyperbola
- 32]  $x^2 + y^2 + 8x - 16y + 72 = 0$   
 What is the standard form of the equation of the conic given above?  
 A)  $(x + 4)^2 + (y - 8)^2 = 80$                       C)  $(x + 4)^2 + (y - 8)^2 = 8$   
 B)  $(x + 4)^2 + (y - 8)^2 = 152$                       D)  $(x + 4)^2 + (y - 8)^2 = 2\sqrt{2}$
- 33]  $4x^2 - 9y^2 - 8x - 54y - 113 = 0$   
 What is the standard form of the equation of the conic given above?  
 A)  $\frac{(x - 1)^2}{9} - \frac{(y + 3)^2}{4} = 1$                       C)  $4(x - 1)^2 - 9(y + 3)^2 = 123$   
 B)  $\frac{(x - 1)^2}{49.5} - \frac{(y + 3)^2}{22} = 1$                       D)  $\frac{(x - 1)^2}{49.5} + \frac{(y + 3)^2}{22} = 1$
- 34]  $6x^2 + 48x - y + 105 = 0$   
 What is the graph of the equation of the conic given above?  
 A) circle                      B) ellipse                      C) parabola                      D) hyperbola
- 35]  $6x^2 + 8y^2 - 132x - 160y + 1478 = 0$   
 What is the graph of the equation of the conic given above?  
 A) circle                      B) ellipse                      C) parabola                      D) hyperbola
- 36] Liz asked Charlie to pick her up a cup of frozen yogurt. She asked for any two toppings from these six: chocolate chips, granola, peanuts, raspberries, walnuts, and strawberries. What is the probability that Charlie brings her a frozen yogurt topped with chocolate chips and raspberries?
- A)  $\frac{1}{30}$                       B)  $\frac{1}{15}$                       C)  $\frac{1}{12}$                       D)  $\frac{1}{3}$
- 37] Jackson has homework in 5 of his classes: Spanish, History, Math, English, and Science. If he randomly chooses the order in which to study, what is the probability that he does Math first, Science second, and Spanish third?
- A)  $\frac{1}{10}$                       B)  $\frac{1}{20}$                       C)  $\frac{1}{30}$                       D)  $\frac{1}{60}$

- 38] The table shows the results of a survey of college students. Find the probability that a student's first class of the day is a humanities class, given the student is male.

First Class of the Day for College Students

	Male	Female
Humanities	70	80
Science	50	80
Other	60	70

- A) 0.171                      B) 0.467                      C) 0.269                      D) 0.389
- 39] What is the rule for the following sequence? 3, 14, 25, ...?
- A)  $a_n = 3 + 11n$                       C)  $a_n = 3n + 11$   
 B)  $a_n = n + 11$                       D)  $a_n = 11n - 8$
- 40] What is the 35th term of the sequence 5, 11, 17, ...?
- A) 41                      B) 181                      C) 209                      D) 215
- 41] What is the sum of the first 6 terms of the series  $2 + 10 + 50 + \dots$ ?
- A) 297                      B) 322                      C) 7,812                      D) 39,062
- 42] What is the sum of the series  $1 - \frac{1}{4} + \frac{1}{16} - \dots$ ?
- A)  $\frac{4}{3}$                       B)  $\frac{4}{5}$                       C) 0                      D) no sum
- 43] Is the sequence geometric? If so, identify the common ratio. 2, -4, -16, -36, ...
- A) yes, -2                      B) yes, 2                      C) yes, -3                      D) no
- 44] Find the mean and standard deviation of the of data. Round to the nearest tenth. 20, 16, 18, 14, 9, 20, 16
- A) mean = 16;  
standard deviation = 3.6                      C) mean = 16;  
standard deviation = 12.7  
 B) mean = 16.1;  
standard deviation = 3.6                      D) mean = 16.1;  
standard deviation = 12.7



**2nd Semester Final Review  
Answer Section**

1	ANS: B	STA: CA A2 7.0
2	ANS: B	STA: CA A2 7.0
3	ANS: D	STA: CA A2 7.0
4	ANS: C	STA: CA A2 7.0
5	ANS: D	STA: CA A2 7.0
6	ANS: A	STA: CA A2 7.0
7	ANS: D	STA: CA A2 11.0
8	ANS: B	STA: CA A2 11.0
9	ANS: B	STA: CA A2 11.1
10	ANS: C	STA: CA A2 11.1
11	ANS: D	STA: CA A2 11.2
12	ANS: C	STA: CA A2 11.2
13	ANS: B	STA: CA A2 11.2
14	ANS: C	STA: CA A2 11.2
15	ANS: C	STA: CA A2 12.0
16	ANS: C	STA: CA A2 12.0
17	ANS: A	STA: CA A2 12.0
18	ANS: A	STA: CA A2 12.0
19	ANS: A	STA: CA A2 13.0   CA A2 14.0   CA A2 15.0
20	ANS: A	STA: CA A2 13.0   CA A2 14.0   CA A2 15.0
21	ANS: B	STA: CA A2 14.0
22	ANS: A	STA: CA A2 14.0
23	ANS: B	STA: CA A2 15.0
24	ANS: B	STA: CA A2 15.0
25	ANS: D	STA: CA A2 15.0
26	ANS: D	STA: CA A2 16.0
27	ANS: D	STA: CA A2 16.0
28	ANS: C	STA: CA A2 16.0
29	ANS: B	STA: CA A2 16.0
30	ANS: C	STA: CA A2 16.0
31	ANS: D	STA: CA A2 17.0
32	ANS: C	STA: CA A2 17.0
33	ANS: A	STA: CA A2 17.0
34	ANS: C	STA: CA A2 17.0
35	ANS: B	STA: CA A2 17.0

36	ANS: B	STA: CA A2 19.0
37	ANS: D	STA: CA A2 19.0
38	ANS: D	
39	ANS: D	STA: CA A2 22.0
40	ANS: C	STA: CA A2 22.0
41	ANS: C	STA: CA A2 22.0
42	ANS: B	STA: CA A2 22.0
43	ANS: D	STA: CA A2 22.0
44	ANS: B	