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GOOD LUCK!

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For grading use:

Number Correct	
	(out of 20 problems)

Total	
	(out of 100 points)

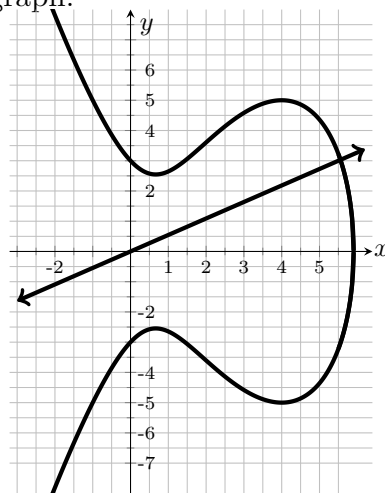
Multiple Choice Questions

*Show all your work on the page where the question appears.
Clearly mark your answer both on the cover page on this exam
and in the corresponding questions that follow.*

1. Determine the solutions to the system of equations in the following graph.

Possibilities:

- (a) $(x = 5.5, y = 3)$ only
- (b) $(x = 4, y = -5)$ only
- (c) $(x = -3, y = 5.5)$ only
- (d) $(x = 3, y = -3)$ only
- (e) $(x = 0, y = 3)$ and $(x = 0, y = -3)$



-
2. Use the substitution method to find all solutions of the system of equations.

$$\begin{aligned}x + y^2 &= 6 \\y - x &= -4\end{aligned}$$

Possibilities:

- (a) $(x = 2, y = 2)$ and $(x = 6, y = -2)$
 - (b) $(x = 2, y = -2)$ only
 - (c) No real solutions
 - (d) $(x = 5, y = 1)$ only
 - (e) $(x = 2, y = -2)$ and $(x = 5, y = 1)$
-

3. Use the elimination method to solve the system. The multiple choice problem only asks you for y .

$$11x + 17y = 146$$

$$11x + 16y = 140$$

Possibilities:

(a) Every solution has $y = \frac{6}{17}$

(b) Every solution has $y = -17$

(c) Every solution has $y = 4$

(d) Every solution has $y = \frac{6}{11}$

(e) Every solution has $y = 6$

4. Suppose you are solving the system of equations below using the elimination method. You eliminate x^2 by taking 9 times the top equation, and subtracting 8 times the bottom equation. What equation must you solve then?

$$8x^2 + 2y = 6$$

$$9x^2 + 4y^5 = 3$$

Possibilities:

(a) $18y - 32y^5 = 30$

(b) $\sqrt{6 - 9y} = 4y^5$

(c) $8x^2 + 2y = 9x^2 + 4y^5$

(d) $9x^2 + 4(6 - 8x^2)^5 = 3$

(e) $8x^2 + 2\sqrt[5]{3 - 9x^2} = 6$

5. Use the elimination method to find all solutions of the system of equations.

$$\begin{cases} \frac{25}{x} + \frac{26}{y} = 47 \\ \frac{7}{x} + \frac{13}{y} = 22 \end{cases}$$

Possibilities:

(a) $(x = 25, y = 26)$, $(x = -25, y = 26)$, $(x = 7, y = 13)$, and $(x = -7, y = -13)$

(b) $(x = 25, y = 26)$ and $(x = 7, y = 13)$

(c) $\left(x = \frac{11}{3}, y = \frac{11}{17}\right)$ only

(d) $\left(x = \frac{11}{3}, y = \frac{11}{17}\right)$ and $\left(x = -\frac{11}{3}, y = -\frac{11}{17}\right)$

(e) $(x = -25, y = 26)$ and $(x = -7, y = 13)$

6. Use substitution to solve the system.

$$\begin{aligned} 9x + 2y &= 29 \\ 8x + y &= 19 \end{aligned}$$

Possibilities:

(a) $x = -\frac{7}{299}, y = -\frac{7}{251}$

(b) $x = \frac{9}{7}, y = \frac{61}{7}$

(c) $x = \frac{29}{9}, y = \frac{19}{8}$

(d) $x = \frac{61}{7}, y = \frac{9}{7}$

(e) $x = 299, y = 251$

-
7. Use algebraic, graphical, or numerical methods to find all real solutions of the equation, approximating when necessary to four decimal places.

$$(x + 2)^9 + 13x = 36 + (x + 2)^9$$

Possibilities:

- (a) $x = 2.7692$
- (b) $x = 2.7709$
- (c) $x = 2.7726$
- (d) $x = 2.7743$
- (e) $x = 2.7760$

-
8. Find an equation that helps solve for the worker's old salary, call it x , in the following problem:
A worker gets a 3.75% pay raise and now makes \$1780 per month. What was the worker's old salary?

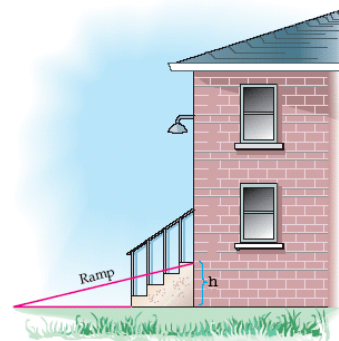
Possibilities:

- (a) $x = 1780 - 3.75$
- (b) $0.0375x = 1780$
- (c) $x = (3.75)(1780)$
- (d) $x + 0.0375x = 1780$
- (e) $3.75x = 1780$

-
9. The door of a campus building is $h = 17$ inches above ground level. To allow wheelchair access, the steps in front of the door are to be replaced by a straight ramp with constant slope $\frac{1}{20}$, as shown in the figure. How long must the ramp be?

Possibilities:

- (a) 37.00 inches
- (b) 357.00 inches
- (c) 0.85 inches
- (d) 26.25 inches
- (e) 340.42 inches



-
10. Find the equilibrium price. In the supply and demand equations, p is price (in dollars) and x is quantity (in thousands). Please round your answer to the nearest hundredth (the nearest cent).

$$\begin{aligned}\text{Supply: } p &= 8x - 2 \\ \text{Demand: } p &= -9x + 4\end{aligned}$$

Possibilities:

- (a) $p = \$8.50$
 - (b) $p = \$0.82$
 - (c) $p = \$1$
 - (d) $p = \$0.35$
 - (e) $p = \$2$
-
11. The cost of a nut mix depends on how many pounds of each type of nut it contains: peanuts cost \$3.00 per pound and cashews cost \$4.50 per pound. How many pounds of peanuts and cashews should be added to 10 pounds of \$4.00 per pound mixed nuts to get 41 pounds of \$3.50 per pound mixed nuts?

Possibilities:

- (a) 15.50 lbs of peanuts and 15.50 lbs of cashews
 - (b) 24.00 lbs of peanuts and 7.00 lbs of cashews
 - (c) 13.67 lbs of peanuts and 27.33 lbs of cashews
 - (d) 27.33 lbs of peanuts and 13.67 lbs of cashews
 - (e) 7.00 lbs of peanuts and 24.00 lbs of cashews
-

12. Solve the inequality. Answer in interval notation.

$$|x - 8| \geq 2$$

Possibilities:

- (a) $[2, \infty)$
- (b) $[2, 8]$
- (c) $[0, 10]$
- (d) $(-\infty, 6] \cup [10, \infty)$
- (e) $[6, 10]$

13. Solve the inequality. Answer in interval notation.

$$12x + 18 > 8x + 4$$

Possibilities:

- (a) $[-\frac{7}{2}, \infty)$
- (b) $[\frac{1}{2}, \frac{3}{2}]$
- (c) $(-\frac{7}{2}, \infty)$
- (d) $(-\infty, \infty)$
- (e) $(-\infty, 12] \cup [18, \infty)$

14. A rectangle must have an area of 54 square inches and a length of at most 3 inches. How wide can this rectangle be?

Possibilities:

- (a) at most 162 inches
- (b) at least 6 inches
- (c) at most 6 inches
- (d) at least 18 inches
- (e) at most 18 inches

15. A business executive is considering two options for leasing a car. The first option is \$325 per month, but the first month costs \$160 extra. The second option is \$345 per month with no extra cost for the first month. The business executive wants to know which option is cheapest based on how many months they plan on leasing the car. Which choice below most accurately describes the situation?

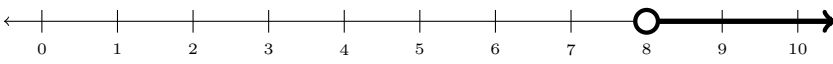
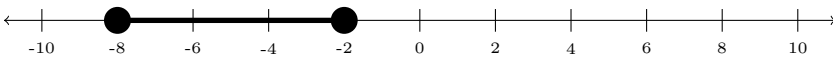
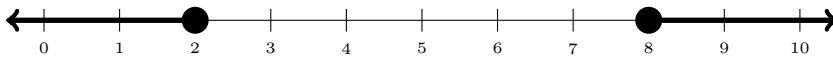
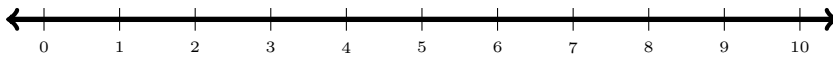
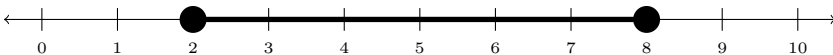
Possibilities:

- (a) The first option is cheaper if the lease is 7 months or shorter, the second option is cheaper if the lease is 9 months or longer, and the two options are the same price if the lease is exactly 8 months
- (b) The first option is cheaper if the lease is 9 months or longer, the second option is cheaper if the lease is 7 months or shorter, and the two options are the same price if the lease is exactly 8 months
- (c) Both options cost the same regardless of the length of the lease.
- (d) The first option is cheaper if the lease is 21 months or longer, the second option is cheaper if the lease is 19 months or shorter, and the two options are the same price if the lease is exactly 20 months
- (e) The first option is cheaper if the lease is 19 months or shorter, the second option is cheaper if the lease is 21 months or longer, and the two options are the same price if the lease is exactly 20 months

16. Solve the inequality. Answer by choosing the correct number line.

$$0 < (x - 8)(x - 2)^2$$

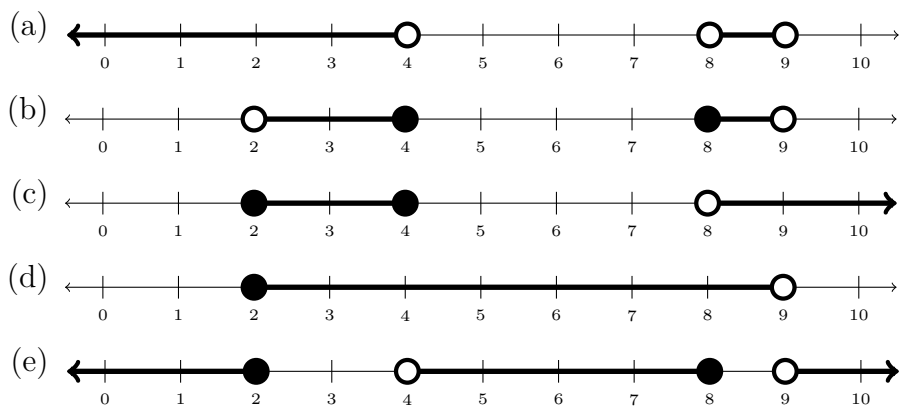
Possibilities:

- (a) 
- (b) 
- (c) 
- (d) 
- (e) 

17. Solve the inequality. Answer by choosing the correct number line.

$$0 \leq \frac{(x-8)(x-2)}{(x-9)(x-4)}$$

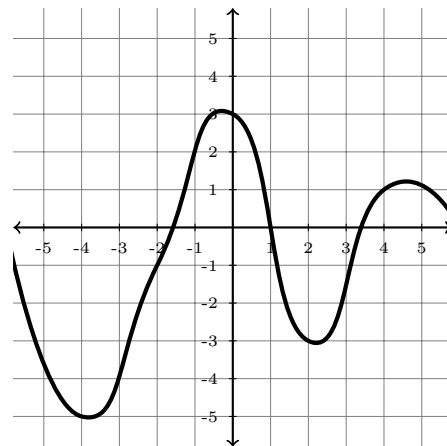
Possibilities:



18. Find $f(4)$ from the graph of $y = f(x)$.

Possibilities:

- (a) $f(4) = 4$
- (b) $f(4) = 0$
- (c) $f(4) = 7$
- (d) $f(4) = 1$
- (e) $f(4) = 3$



19. Let the piecewise function $g(x)$ be given by:

$$g(x) = \begin{cases} x^2 + 3 & \text{if } x \leq 2 \\ |x - 11| & \text{if } 2 < x \leq 6 \\ 10x + 2 & \text{if } 6 < x < 9 \\ \sqrt{x - 5} & \text{if } 9 \leq x \end{cases}$$

Evaluate $g(5)$

Possibilities:

- (a) $g(5) = 28$
- (b) $g(5) = 52$
- (c) $g(5) = 6$
- (d) $g(5) = 5$
- (e) $g(5) = 0$

20. Let $f(x) = 2x^2 + 8x$. Find $\frac{f(x+h) - f(x)}{h}$ if $h \neq 0$. Simplify your answer.

Possibilities:

- (a) 16
 - (b) $\frac{h + 16x}{h}$
 - (c) $4x + 2h + 8$
 - (d) $2h + 8$
 - (e) $4x + 8h$
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