

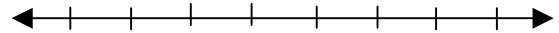
Part I. Show all work for possible partial credit. 5 points each.

1. Solve the equation for x . $4x - 3(1 - 2x) = x + 8$

2. Solve the inequality, giving its solution set in both interval and graph forms.

$$\frac{2 + 3k}{-5} < 1$$

Graph solution:



Interval solution:

3. Find the intercepts and use them to graph the equation.

$$4x - 3y = -12$$

4. Find the slope of the line containing the pair of points $\left(2, \frac{1}{3}\right)$ and $\left(2, -\frac{1}{4}\right)$.

If it does not exist, indicate so.

5. Find the product: $(3r + 2t^2)(3r - 2t^2)$

6. Simplify the expression: $2^{-2} - \left(\frac{2}{3}\right)^2$

Solutions

7. Simplify, use only positive exponents. Assume all variables represent positive real numbers. $\left(9m^{-\frac{1}{2}}n^{\frac{3}{4}}\right)^{\frac{1}{2}}$

8. Divide: $\frac{x^3 - 3x + 20}{x - 2}$

9. Factor: $2x^3 + x^2 - 4x - 2$

10. Factor: $32x - 18x^3$

11. Given $f(x) = 3x^2 - 2x$, evaluate

(a) $f(-3)$

(b) $f(2) - f(1)$

Solutions

12. Express in lowest terms: $\frac{4x^2 - 12x}{2x^2 - 18}$

13. Express the radical in simplified form. Assume that all variables represent positive real numbers.

(a) $\sqrt{48a^4b^9}$

(b) $\sqrt[4]{16a^4b^9}$

14. Rationalize the denominator: $\frac{1}{2\sqrt{5} + \sqrt{3}}$

15. Solve for F .

$$C = \frac{5}{9}(F - 32)$$

$$F = \frac{9C + 32}{5}$$

16. Identify the **vertex** of the graph of each quadratic function.

(a) $f(x) = x^2 - 3$
Vertex: (,)

(b) $f(x) = -(x + 2)^2$
Vertex: (,)

Part II. Show all work for possible partial credit. 8 points each

17. Solve for x . $\frac{3x + 2}{3} - \frac{x + 4}{4} = 3$

Solutions

18. Find the equation of the line through the point (3,-4) and parallel to $2x + y = 7$.

The standard form of the equation is $\Rightarrow \square x + \square y = \square$.

The slope intercept form is $\Rightarrow y = \square x + \square$.

19. Simplify the expression. Express using only positive exponents. $(-4a^{-2})^2(a^3)^{-3}$

20. For the following pair of functions, find the following. Be sure to express in simplest form.

$$f(x) = 4x^2 - 5 \text{ and } g(x) = -2x^2 + x + 7$$

(a) $(f - g)(x) =$

(b) $(f + g)(1) =$

Solutions

21. Graph the function by creating a table of ordered pairs. Label all intercepts.

$$f(x) = 2x^2 - 8$$

22. Perform the indicated operation. Reduce to lowest terms.

$$\frac{4}{x^2 - x} + \frac{2}{x^2 - 3x + 2} =$$

23. Divide and simplify: $\frac{x^2 - 25}{x^2 - 6x + 9} \div \frac{5x - 25}{x^2 + 6x - 27}$

24. Graph the function and give its domain and range.

$$f(x) = \sqrt{x - 3}$$

(a) Choose the domain.

(b) Choose the range.

(A) $(-\infty, \infty)$ (B) $(0, \infty)$

(A) $[0, \infty)$ (B) $(-\infty, 0]$

(C) $[3, \infty)$ (D) $(3, \infty)$

(C) $[3, \infty)$ (D) $(0, \infty)$

25. Expand. $(2x - 5)^3$.

26. Solve using the quadratic formula: $5x^2 + 3x - 1 = 0$

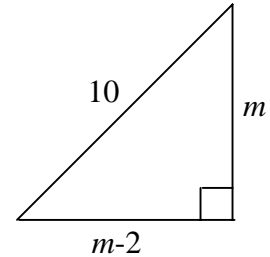
27. Solve the equation. $x(x - 3) = 18$

28. Solve $z = \sqrt{\frac{7hc}{q}}$ for q .

Solutions

Part III. Choose 3 of the following 6 problems. You must indicate the 3 problems to be graded. If not, we will grade the first four. Show all work for possible partial credit. 8 Points Each.

29. In the given right triangle, find the length of the indicated sides. Full credit will be given for the correct equation and the solution to that equation.



30. Solve $x^4 - 14x^2 + 45 = 0$.

Grade

31. The width of the top of a table is 5m less than twice the length. The area is $63m^2$. Find the dimensions of the table.

Grade

32. Solve $\sqrt{7x+4} = x+2$. Check all solutions.

Grade

33. Kellen's boat goes 12 mph. Find the rate of the river current if she can go 6 miles upstream in the same amount of time that it takes her to go 10 miles downstream.

Grade

34. Solve for x.

Grade

$$\frac{6}{y+3} + \frac{2}{y} = \frac{5y-3}{y^2-9}$$

Solutions

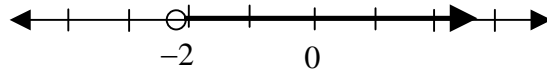
BE SURE YOU HAVE MARKED THE 3 PROBLEMS TO BE GRADED.

SOLUTIONS

$$\begin{aligned}
 1. \quad & 4x - 3(1 - 2x) = x + 8 \\
 & 4x - 3 + 6x = x + 8 \\
 & 10x - 3 = x + 8 \\
 & x = \frac{11}{9}
 \end{aligned}$$

$$\begin{aligned}
 2. \quad & 2 + 3k > -5 \\
 & 3k > -7 \\
 & k > -7/3
 \end{aligned}$$

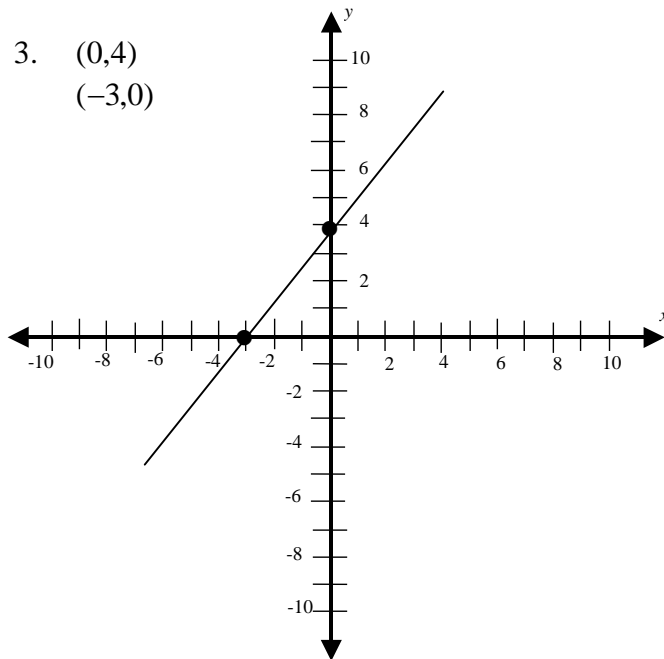
Graph solution:



Interval solution:

$$(-7/3, \infty)$$

$$\begin{aligned}
 3. \quad & (0,4) \\
 & (-3,0)
 \end{aligned}$$



$$4. \quad m = \frac{\frac{1}{3} + \frac{1}{4}}{0}; \text{ Does not exist.}$$

$$5. \quad (3r + 2t^2)(3r - 2t^2) = 9r^2 - 4t^4$$

$$\begin{aligned}
 6. \quad & 2^{-2} - \left(\frac{2}{3}\right)^2 = \frac{1}{4} - \frac{4}{9} \\
 & = -\frac{7}{36}
 \end{aligned}$$

$$7. \quad \left(9m^{-\frac{1}{2}}n^{\frac{3}{4}}\right)^{\frac{1}{2}}$$

$$\begin{aligned}
 8. \quad & \frac{x^2 + 2x + 1}{x - 2} \mid \frac{x^3 + 0x^2 - 3x + 20}{x^3 - 2x^2} \\
 & \frac{2x^2 - 3x}{2x^2 - 4x} \\
 & \frac{x + 20}{x - 2} \\
 & + 22
 \end{aligned}$$

$$x^2 + 2x + 1 + \frac{22}{x - 2}$$

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$$9. \quad 2x^3 + x^2 - 4x - 2$$

$$x^2(2x+1) - 2(2x+1)$$

$$(x^2 - 2)(2x+1)$$

$$10. \quad 32x - 18x^3$$

$$2x(16 - 9x^2)$$

$$2x(4 - 3x)(4 + 3x)$$

$$11. \quad (a) \quad f(-3) = 27 + 6 = 33$$

$$(b) \quad f(2) - f(1) = 8 - 1 = 7$$

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$$12. \quad \frac{4x^2 - 12x}{2x^2 - 18} = \frac{4x(x-3)}{2(x-3)(x+3)} = \frac{2x}{x+3}$$

$$13. \quad (a) \quad \sqrt{48a^4b^9} = 4a^2b^4\sqrt{3b}$$

$$(b) \quad \sqrt[4]{16a^4b^9} = 2ab^2\sqrt[4]{b}$$

$$14. \quad \frac{1}{2\sqrt{5} + \sqrt{3}} \cdot \frac{2\sqrt{5} - \sqrt{3}}{2\sqrt{5} - \sqrt{3}} = \frac{2\sqrt{5} - \sqrt{3}}{17}$$

$$15. \quad C = \frac{5}{9}(F - 32)$$

$$F = \frac{9C + 32}{5}$$

$$16. \quad (a) \quad (0, -3) \qquad (b) \quad (-2, 0)$$

Part II. Show all work for possible partial credit. 8 points each

$$17. \quad \frac{3x+2}{3} - \frac{x+4}{4} = 3$$

$$4(3x+2) - 3(x+4) = 36$$

$$9x - 4 = 36$$

$$x = \frac{40}{9}$$

$$18. \quad \text{Standard form: } 2x + y = 2$$

$$\text{Slope intercept form: } y = -2x + 2$$

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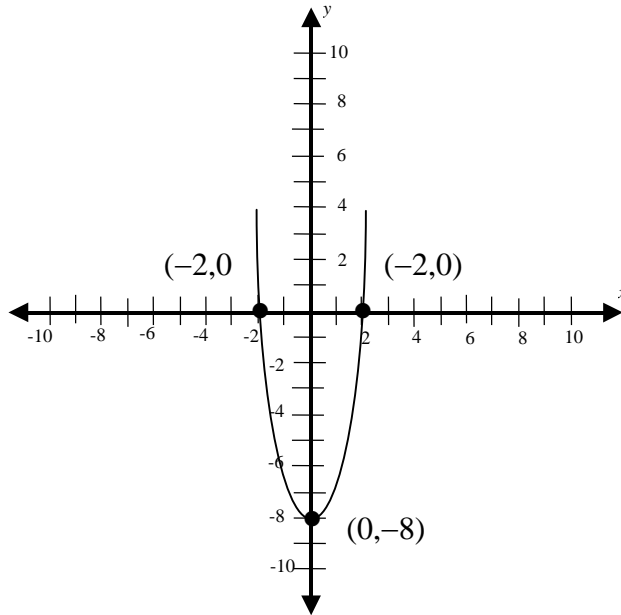
$$19. \quad (-4a^{-2})^2 (a^3)^{-3}$$

$$\frac{16}{a^{13}}$$

$$20. \quad (a) \quad (f - g)(x) = 6x^2 - x - 12$$

$$(b) \quad (f + g)(1) = 5$$

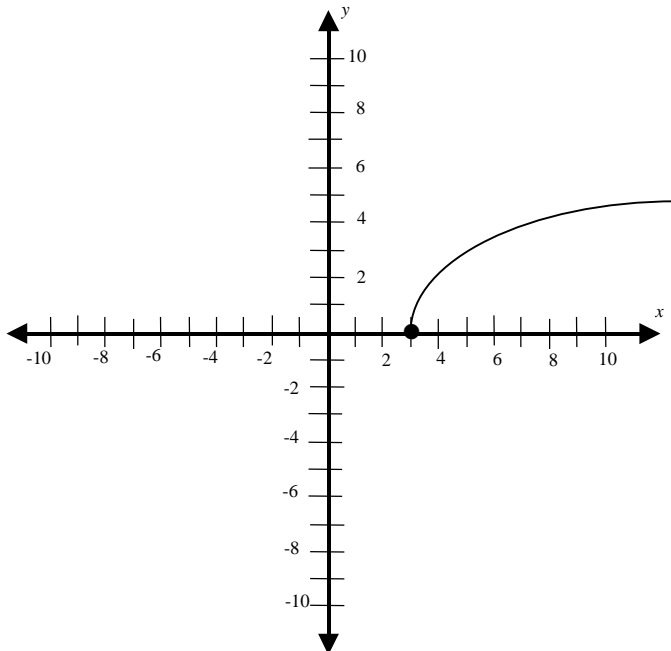
21.



$$22. \frac{4}{x^2 - x} + \frac{2}{x^2 - 3x + 2} = \frac{4}{x(x-1)} + \frac{2}{(x-2)(x-1)} = \frac{4x-8+2x}{x(x-1)(x-2)} = \frac{6x-8}{x(x-1)(x-2)}$$

$$23. \frac{x^2 - 25}{x^2 - 6x + 9} \div \frac{5x - 25}{x^2 + 6x - 27} = \frac{(x-5)(x+5)}{(x-3)^2} \cdot \frac{(x+9)(x-3)}{5(x-5)} = \frac{(x+5)(x+9)}{5(x-3)}$$

24. a) (C) $[3, \infty)$ (b) (A) $[0, \infty)$



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25. $(2x - 5)^3 = 8x^3 - 60x^2 + 150x - 125$

27. $x(x - 3) = 18$
 $x^2 - 3x - 18 = 0$
 $(x - 6)(x + 3)$
 $x = -3, 6$

29. equation of right triangle: $(m - 2)^2 + m^2 = 100$

solution to equation:

$$2m^2 - 4m - 96 = 0$$

$$m^2 - 2m - 48 = 0$$

$$(m - 8)(m + 6) = 0$$

$m = 8$; sides of length 8 and 6

31. $l(2l - 5) = 63$
 $2l^2 - 5l - 63 = 0$
 $(2l + 9)(l - 7) = 0$
 $l = 7$; dimensions 7×9

33.

	<i>r</i>	<i>t</i>	<i>d</i>
Up	12 - c	t	6
Down	12 + c	t	10

$$\frac{6}{12 - c} = \frac{10}{12 + c}$$

$$72 + 6c = 120 - 10c$$

$$16c = 48$$

$$c = 3 \text{ mph}$$

26. $x = \frac{-3 \pm \sqrt{9 + 20}}{10}$
 $= \frac{-3 \pm \sqrt{29}}{10}$

28. $z = \sqrt{\frac{7hc}{q}}$
 $z^2 q = 7hc$
 $q = \frac{7hc}{z^2}$

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30. $x^4 - 14x^2 + 45 = 0$
 $(x^2 - 9)(x^2 - 5) = 0$
 $x = \pm 3, \pm \sqrt{5}$

32. $\sqrt{7x + 4} = x + 2$
 $7x + 4 = x^2 + 4x + 4$
 $0 = x^2 - 3x$
 $x = 0, x = 3$ "Both Check"

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34. $\frac{6}{y + 3} + \frac{2}{y} = \frac{5y - 3}{y^2 - 9}$
 $6y(y - 3) + 2(y^2 - 9) = 5y^2 - 3y$
 $6y^2 + 2y^2 - 18y - 18 = 5y^2 - 3y$
 $3y^2 - 15y - 18 = 0$
 $y^2 - 5y - 6 = 0$
 $y = -1, 6$