

Solve each proportion using the property about the means and extremes.

(1) $\frac{x-2}{5} = \frac{x}{7}$ $x = \underline{\hspace{2cm}}$

(2) If shirts are on sale at two for \$25, how much will 5 shirts cost ?

Solve the inequality, graph the inequality, and write the solution set in interval notation.

(3) $4 - 3x \leq x$

(4) $\frac{1}{4}x - \frac{1}{3} \leq x + 2$

Solve each equation, if possible.

$$(5) |4x - 4| = 20 \quad x = \underline{\hspace{2cm}}$$

$$(6) \left| x - \frac{1}{4} \right| = |x + 4| \quad x = \underline{\hspace{2cm}}$$

$$(7) |x - 21| = -8 \quad x = \underline{\hspace{2cm}}$$

Solve the inequality, graph the inequality, and write the solution set in interval notation.

$$(8) \left| \frac{1}{2}x - 3 \right| - 4 < 2$$

$$(9) \left| \frac{1}{6}x + 6 \right| + 2 < 2$$

$$(10) \left| \frac{x - 2}{3} \right| > 4$$

Solve the equation.

(11) $2q^2 - 9 = q(q + 3) + q^2$ $q =$ _____

Factor each expression.

(12) $-56x^4y^3z^2 - 72x^3y^4z^5 + 80xy^2z^3 =$ _____

Factor each trinomial, if possible. Write only prime terms.

(13) $6z^2 + 17z + 12 =$ _____

(14) $x^4 + 11x^2 + 24 =$ _____

Factor each expression completely.

(15) $x^2 - 6x + 9 - 4y^2 =$ _____

(16) $x^3 - 27y^3 =$ _____

(17) $x^9 + y^6 =$ _____

Use synthetic division to perform the division.

(18) $(4x^3 + 5x^2 - 1) \div (x + 2)$ Remainder = _____ , Quotient = _____

Use the Factor Theorem and determine whether the first expression is a factor of $P(x)$.

(19) $x + 2$; $P(x) = 2x^3 - x^2 - 7x + 6$ Yes / No

(20) $x - 3$; $P(x) = x^3 - 3x^2 + x - 8$ Yes / No

Find the midpoint of the segment joining the given points.

(21) $P(5, 9)$ and $Q(8, 13)$ Midpoint = (___ , ___)

Find the slope of the line that passes through the given points.

(22) $P(-2, 5)$ and $Q(4, 9)$ $m =$ _____

Draw the following lines.

(23) $2x + 3y = 6$

(24) $x + 1 = 0$

(25) $y = 2$

Find the slope of the following lines.

(26) $x = \frac{3 - y}{4}$ $m = \underline{\hspace{2cm}}$

(27) $4y = 3(y + 2)$ $m = \underline{\hspace{2cm}}$

Determine whether the lines with the given slopes are parallel, perpendicular, or neither.

(28) $m_1 = -0.25$ and $m_2 = 4$ Parallel / Perpendicular / Neither

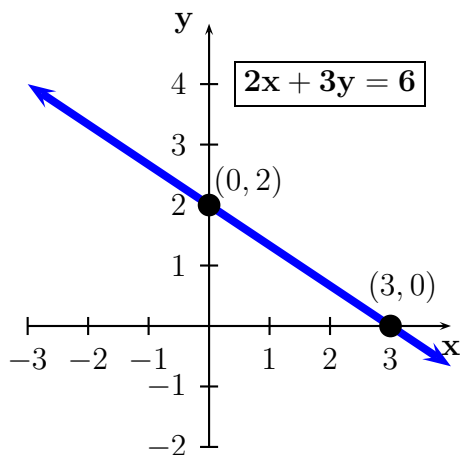
Determine whether the line PQ is parallel or perpendicular (or neither) to a line with a slope of -2 .

(29) $P(-2, 3)$, $Q(4, -9)$ Parallel / Perpendicular / Neither

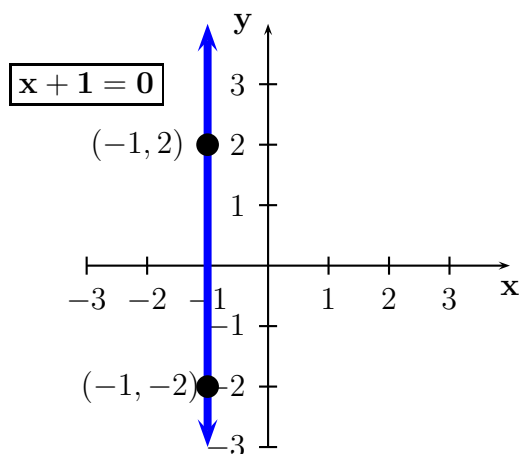
Answers

1. $x = 7$
2. \$62.50
3. $x \geq 1$
4. $x \geq -\frac{28}{9}$
5. Two solutions: $x = 6, -4$
6. Only one solution: $x = -\frac{15}{8}$
7. No solutions.
8. $-6 < x < 18$ or the interval solution: $x \in (-6, 8)$.
9. No solution, you get a contradiction .
10. $x < -10$ or $x > 14$. The interval solution is: $x \in (-\infty, -10) \cup (14, \infty)$.
11. $q = -3$
12. $-8xy^2z^2(7x^3y + 9x^2y^2z^3 - 10z)$
13. $(2z + 3)(3z + 4)$
14. $(x^2 + 8)(x^2 + 3)$
15. $(x - 3 + 2y)(x - 3 - 2y)$
16. $(x - 3y)(x^2 + 3xy + 9y^2)$
17. $(x^3 + y^2)(x^6 - x^3y^2 + y^4)$
18. Remainder = -13 , Quotient = $4x^2 - 3x + 6$
19. Yes, $P(-2) = 0$.
20. No, $P(3) = -5$.
21. $\left(\frac{13}{2}, 11\right)$
22. $m = \frac{2}{3}$

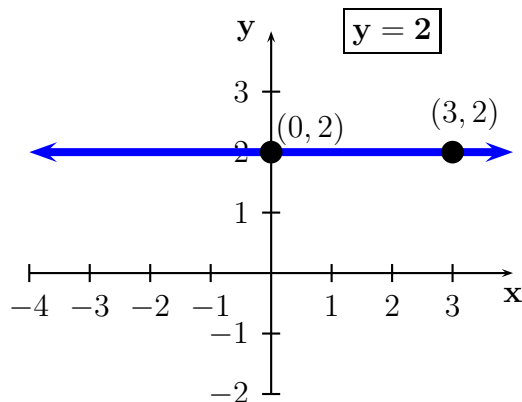
23. This is the line $2x + 3y = 6$ (find two points, and draw it, for example the x and y -intercepts) :



24. This is the line $x + 1 = 0$, which is the same as $x = -1$ (vertical line) :



25. This is the line $y = 2$ (horizontal line) :



26. $m = -4$
27. $m = 0$ (horizontal line) .
28. They are perpendicular : $m_1 \cdot m_2 = -1$.
29. They are parallel, the slope of the line passing the points $P(-2, 3)$, $Q(4, -9)$ is equal to -2 (equal slopes, parallel lines).