

4. $\frac{15 \text{ cm}^2}{12 \text{ cm}^2} = \frac{5}{4}$

7. $\frac{7 \text{ ft}}{12 \text{ in.}} = \frac{7 \cancel{\text{ft}}}{12 \cancel{\text{in.}}} \cdot \frac{12 \cancel{\text{in.}}}{1 \cancel{\text{ft}}} = \frac{84}{12} = \frac{7}{1}$

8. $\frac{80 \text{ cm}}{2 \text{ m}} = \frac{80 \cancel{\text{cm}}}{2 \cancel{\text{m}}} \cdot \frac{1 \cancel{\text{m}}}{100 \cancel{\text{cm}}} = \frac{80}{200} = \frac{2}{5}$

11. $\frac{5 \text{ in.}}{15 \text{ in.}} = \frac{5 \cancel{\text{in.}}}{15 \cancel{\text{in.}}} = \frac{1}{3}$

12. $\frac{18 \text{ cm}}{16 \text{ cm}} = \frac{18 \cancel{\text{cm}}}{16 \cancel{\text{cm}}} = \frac{9}{8}$

18. Because $l : w$ is 10 : 1, represent l by $10x$ and w by x .

$2l + 2w = P$
 $2(10x) + 2(x) = 154$
 $22x = 154$
 $x = 7$

Length = $10x = 10(7) = 70$ Width = $x = 7$
 The length is 70 feet and the width is 7 feet.

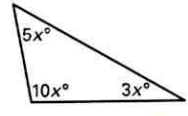
19. Because $AB : BC$ is 2 : 7, represent AB by $2x$ and BC by $7x$.

$AB + BC = AC$
 $2x + 7x = 36$
 $9x = 36$
 $x = 4$

$AB = 2x = 2(4) = 8$ $BC = 7x = 7(4) = 28$
 AB is 8 units and BC is 28 units.

20. $3x^\circ + 5x^\circ + 10x^\circ = 180^\circ$

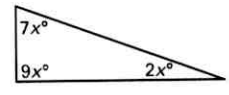
$18x = 180$
 $x = 10$



The angle measures are $3(10^\circ) = 30^\circ$, $5(10^\circ) = 50^\circ$, and $10(10^\circ) = 100^\circ$.

21. $2x^\circ + 7x^\circ + 9x^\circ = 180^\circ$

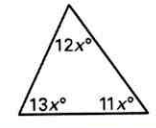
$18x = 180$
 $x = 10$



The angle measures are $2(10^\circ) = 20^\circ$, $7(10^\circ) = 70^\circ$, and $9(10^\circ) = 90^\circ$.

22. $11x^\circ + 12x^\circ + 13x^\circ = 180^\circ$

$36x = 180$
 $x = 5$



The angle measures are $11(5^\circ) = 55^\circ$, $12(5^\circ) = 60^\circ$, and $13(5^\circ) = 65^\circ$.

23. $\frac{6}{x} = \frac{3}{2}$
 $6 \cdot 2 = x \cdot 3$
 $12 = 3x$
 $4 = x$

24. $\frac{y}{20} = \frac{3}{10}$
 $y \cdot 10 = 20 \cdot 3$
 $10y = 60$
 $y = 6$

25. $\frac{2}{7} = \frac{12}{z}$
 $2 \cdot z = 7 \cdot 12$
 $2z = 84$
 $z = 42$

27. $\frac{1}{c+5} = \frac{3}{24}$
 $1 \cdot 24 = 3(c+5)$
 $24 = 3c + 15$
 $9 = 3c$
 $3 = c$

29. $\frac{1+3b}{4} = \frac{5}{2}$
 $2(1+3b) = 4 \cdot 5$
 $2+6b = 20$
 $6b = 18$
 $b = 3$

30. $\frac{3}{2p+5} = \frac{1}{9p}$
 $3 \cdot 9p = 1(2p+5)$
 $27p = 2p+5$
 $25p = 5$
 $p = \frac{1}{5}$

31. $x = \sqrt{ab}$
 $= \sqrt{2 \cdot 18}$
 $= \sqrt{36}$
 $= 6$

The geometric mean of 2 and 18 is 6.

33. $x = \sqrt{ab}$
 $= \sqrt{32 \cdot 8}$
 $= \sqrt{256}$
 $= 16$

The geometric mean of 32 and 8 is 16.

35. $x = \sqrt{ab}$
 $= \sqrt{2 \cdot 25}$
 $= \sqrt{2 \cdot 5 \cdot 5}$
 $= 5\sqrt{2}$

The geometric mean of 2 and 25 is $5\sqrt{2}$.

36. $x = \sqrt{ab}$
 $= \sqrt{6 \cdot 20}$
 $= \sqrt{120}$
 $= \sqrt{2 \cdot 2 \cdot 30}$
 $= 2\sqrt{30}$

The geometric mean of 6 and 20 is $2\sqrt{30}$.

26. $\frac{j+1}{5} = \frac{4}{10}$
 $10(j+1) = 5 \cdot 4$
 $10j + 10 = 20$
 $10j = 10$
 $j = 1$

28. $\frac{4}{a-3} = \frac{2}{5}$
 $4 \cdot 5 = 2(a-3)$
 $20 = 2a - 6$
 $26 = 2a$
 $13 = a$

32. $x = \sqrt{ab}$
 $= \sqrt{4 \cdot 25}$
 $= \sqrt{100}$
 $= 10$

The geometric mean of 4 and 25 is 10.

34. $x = \sqrt{ab}$
 $= \sqrt{4 \cdot 16}$
 $= \sqrt{64}$
 $= 8$

The geometric mean of 4 and 16 is 8.

$\sqrt{50} = 2 \cdot 25 = 5 \cdot 5$
 ↓ simplify

$\sqrt{120} = 2 \cdot 60 = 2 \cdot 30 = 2 \cdot 15 = 3 \cdot 15$

38. When $x = 10$ and $z = 8$, $x : z$ is $10 : 8$.

$$10 : 8 = \frac{10}{8} = \frac{5}{4} = 5 : 4$$

39. When $x = 10$ and $y = 3$, $\frac{8y}{x} = \frac{8(3)}{10} = \frac{24}{10} = \frac{12}{5}$.

40. When $x = 10$ and $z = 8$, $\frac{4}{2x + 2z} = \frac{4}{2(10) + 2(8)} = \frac{4}{36} = \frac{1}{9}$.

41. When $x = 10$, $x = 3$, and $z = 8$,

$$\frac{2x - z}{3y} = \frac{2(10) - 8}{3(3)} = \frac{12}{9} = \frac{4}{3}$$

42. $\frac{2x + 5}{3} = \frac{x - 5}{4}$

$$4(2x + 5) = 3(x - 5)$$

$$8x + 20 = 3x - 15$$

$$5x = -35$$

$$x = -7$$

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

$$5(2 - s) = 3(2s + 1)$$

$$10 - 5s = 6s + 3$$

$$7 = 11s$$

$$\frac{7}{11} = s$$

44. $\frac{15}{m} = \frac{m}{5}$

$$15 \cdot 5 = m \cdot m$$

$$75 = m^2$$

$$\pm\sqrt{75} = m$$

$$\pm\sqrt{5 \cdot 5 \cdot 3} = m$$

$$\pm 5\sqrt{3} = m$$

46. $5x^\circ + 3x^\circ = 180^\circ$

$$8x = 180$$

$$x = 22.5$$

45. $\frac{7}{q + 1} = \frac{q - 1}{5}$

$$7 \cdot 5 = (q + 1)(q - 1)$$

$$35 = q^2 - 1$$

$$36 = q^2$$

$$\pm 6 = q$$

The measures of the two supplementary angles are $5(22.5^\circ) = 112.5^\circ$ and $3(22.5^\circ) = 67.5^\circ$.

49. $\frac{3}{8} = \frac{AB}{BC}$

$$\frac{3}{8} = \frac{p}{24}$$

$$3 \cdot 24 = 8 \cdot p$$

$$72 = 8p$$

$$9 = p$$

54. Slope of line passing through $(-3, 2)$ and $(1, 1)$:

$$\frac{1 - 2}{1 - (-3)} = \frac{-1}{4}$$

Slope of line passing through $(1, 1)$ and $(x, 0)$:

$$\frac{0 - 1}{x - 1} = \frac{-1}{x - 1}$$

Because the points are collinear, the slopes between the points are equal.

$$\frac{-1}{4} = \frac{-1}{x - 1}$$

$$-1(x - 1) = 4 \cdot (-1)$$

$$-x + 1 = -4$$

$$-x = -5$$

$$x = 5$$