

Direct Proportion using Squared roots

- 1) g is directly proportional to the square root of h . When $g = 10$, $h = 25$. Find the value of h when $g = 6$.
- 3) y is directly proportional to the square root of x . When $y = 8$, $x = 16$. Find the value of x when $y = 14$.
- 4) m is directly proportional to the square root of n . When $m = 21$, $n = 9$. Find the value of n when $m = 14$.
- 5) a is directly proportional to the square root of b . When $a = 18$, $b = 81$. Find the value of b when $a = 6$.
- 6) r is directly proportional to the square root of s . When $r = 20$, $s = 25$. Find the value of s when $r = 12$.
- 7) k is directly proportional to the square root of t . When $k = 9$, $t = 4$. Find the value of t when $k = 3$.
- 8) d is directly proportional to the square root of c . When $d = 16$, $c = 4$. Find the value of c when $d = 4$.
- 9) h is directly proportional to the square root of j . When $h = 30$, $j = 100$. Find the value of j when $h = 12$.
- 11) f is directly proportional to the square root of g . When $f = 5$, $g = 1$. Find the value of g when $f = 20$.
- 12) s is directly proportional to the square root of p . When $s = 18$, $p = 16$. Find the value of p when $s = 9$.
- 13) t is directly proportional to the square root of u . When $t = 24$, $u = 36$. Find the value of u when $t = 8$.

1) g is directly proportional to the square root of h.

Step 1: Write the relationship as $g = k\sqrt{h}$.

Step 2: Use the given values $g = 10$, $h = 25$:

$$10 = k\sqrt{25} \text{ so } k = 10 \div \sqrt{25} = 10 \div 5.0 = 2.0.$$

Step 3: When $g = 6$, substitute into $g = 2.0\sqrt{h}$:

$$6 = 2.0\sqrt{h} \text{ so } \sqrt{h} = 6 \div 2.0 = 3.0.$$

$$\text{Therefore } h = (\sqrt{h})^2 = (3.0)^2 = 9.0.$$

Answer: $h = 9.0$.

3) y is directly proportional to the square root of x.

Step 1: Write the relationship as $y = k\sqrt{x}$.

Step 2: Use the given values $y = 8$, $x = 16$:

$$8 = k\sqrt{16} \text{ so } k = 8 \div \sqrt{16} = 8 \div 4.0 = 2.0.$$

Step 3: When $y = 14$, substitute into $y = 2.0\sqrt{x}$:

$$14 = 2.0\sqrt{x} \text{ so } \sqrt{x} = 14 \div 2.0 = 7.0.$$

$$\text{Therefore } x = (\sqrt{x})^2 = (7.0)^2 = 49.0.$$

Answer: $x = 49.0$.

4) m is directly proportional to the square root of n.

Step 1: Write the relationship as $m = k\sqrt{n}$.

Step 2: Use the given values $m = 21$, $n = 9$:

$$21 = k\sqrt{9} \text{ so } k = 21 \div \sqrt{9} = 21 \div 3.0 = 7.0.$$

Step 3: When $m = 14$, substitute into $m = 7.0\sqrt{n}$:

$$14 = 7.0\sqrt{n} \text{ so } \sqrt{n} = 14 \div 7.0 = 2.0.$$

$$\text{Therefore } n = (\sqrt{n})^2 = (2.0)^2 = 4.0.$$

Answer: $n = 4.0$.

5) a is directly proportional to the square root of b.

Step 1: Write the relationship as $a = k\sqrt{b}$.

Step 2: Use the given values $a = 18$, $b = 81$:

$$18 = k\sqrt{81} \text{ so } k = 18 \div \sqrt{81} = 18 \div 9.0 = 2.0.$$

Step 3: When $a = 6$, substitute into $a = 2.0\sqrt{b}$:

$$6 = 2.0\sqrt{b} \text{ so } \sqrt{b} = 6 \div 2.0 = 3.0.$$

$$\text{Therefore } b = (\sqrt{b})^2 = (3.0)^2 = 9.0.$$

Answer: $b = 9.0$.

6) r is directly proportional to the square root of s.

Step 1: Write the relationship as $r = k\sqrt{s}$.

Step 2: Use the given values $r = 20$, $s = 25$:

$$20 = k\sqrt{25} \text{ so } k = 20 \div \sqrt{25} = 20 \div 5.0 = 4.0.$$

Step 3: When $r = 12$, substitute into $r = 4.0\sqrt{s}$:

$$12 = 4.0\sqrt{s} \text{ so } \sqrt{s} = 12 \div 4.0 = 3.0.$$

$$\text{Therefore } s = (\sqrt{s})^2 = (3.0)^2 = 9.0.$$

Answer: $s = 9.0$.

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7) k is directly proportional to the square root of t.

Step 1: Write the relationship as $k = k\sqrt{t}$.

Step 2: Use the given values $k = 9$, $t = 4$:

$$9 = k\sqrt{4} \text{ so } k = 9 \div \sqrt{4} = 9 \div 2.0 = 4.5.$$

Step 3: When $k = 3$, substitute into $k = 4.5\sqrt{t}$:

$$3 = 4.5\sqrt{t} \text{ so } \sqrt{t} = 3 \div 4.5 = 0.6666666666666666.$$

$$\text{Therefore } t = (\sqrt{t})^2 = (0.6666666666666666)^2 = 0.4444444444444444.$$

Answer: $t = 0.4444444444444444$.

8) d is directly proportional to the square root of c.

Step 1: Write the relationship as $d = k\sqrt{c}$.

Step 2: Use the given values $d = 16$, $c = 4$:

$$16 = k\sqrt{4} \text{ so } k = 16 \div \sqrt{4} = 16 \div 2.0 = 8.0.$$

Step 3: When $d = 4$, substitute into $d = 8.0\sqrt{c}$:

$$4 = 8.0\sqrt{c} \text{ so } \sqrt{c} = 4 \div 8.0 = 0.5.$$

$$\text{Therefore } c = (\sqrt{c})^2 = (0.5)^2 = 0.25.$$

Answer: $c = 0.25$.

9) h is directly proportional to the square root of j.

Step 1: Write the relationship as $h = k\sqrt{j}$.

Step 2: Use the given values $h = 30$, $j = 100$:

$$30 = k\sqrt{100} \text{ so } k = 30 \div \sqrt{100} = 30 \div 10.0 = 3.0.$$

Step 3: When $h = 12$, substitute into $h = 3.0\sqrt{j}$:

$$12 = 3.0\sqrt{j} \text{ so } \sqrt{j} = 12 \div 3.0 = 4.0.$$

$$\text{Therefore } j = (\sqrt{j})^2 = (4.0)^2 = 16.0.$$

Answer: $j = 16.0$.

11) f is directly proportional to the square root of g.

Step 1: Write the relationship as $f = k\sqrt{g}$.

Step 2: Use the given values $f = 5$, $g = 1$:

$$5 = k\sqrt{1} \text{ so } k = 5 \div \sqrt{1} = 5 \div 1.0 = 5.0.$$

Step 3: When $f = 20$, substitute into $f = 5.0\sqrt{g}$:

$$20 = 5.0\sqrt{g} \text{ so } \sqrt{g} = 20 \div 5.0 = 4.0.$$

$$\text{Therefore } g = (\sqrt{g})^2 = (4.0)^2 = 16.0.$$

Answer: $g = 16.0$.

12) s is directly proportional to the square root of p.

Step 1: Write the relationship as $s = k\sqrt{p}$.

Step 2: Use the given values $s = 18$, $p = 16$:

$$18 = k\sqrt{16} \text{ so } k = 18 \div \sqrt{16} = 18 \div 4.0 = 4.5.$$

Step 3: When $s = 9$, substitute into $s = 4.5\sqrt{p}$:

$$9 = 4.5\sqrt{p} \text{ so } \sqrt{p} = 9 \div 4.5 = 2.0.$$

$$\text{Therefore } p = (\sqrt{p})^2 = (2.0)^2 = 4.0.$$

Answer: $p = 4.0$.

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13) t is directly proportional to the square root of u .

Step 1: Write the relationship as $t = k\sqrt{u}$.

Step 2: Use the given values $t = 24$, $u = 36$:

$$24 = k\sqrt{36} \text{ so } k = 24 \div \sqrt{36} = 24 \div 6.0 = 4.0.$$

Step 3: When $t = 8$, substitute into $t = 4.0\sqrt{u}$:

$$8 = 4.0\sqrt{u} \text{ so } \sqrt{u} = 8 \div 4.0 = 2.0.$$

$$\text{Therefore } u = (\sqrt{u})^2 = (2.0)^2 = 4.0.$$

Answer: $u = 4.0$.