1) Find the missing length, \( x \), in triangle ABC below

2) Find the missing length, \( x \), in triangle DEF below
3) Find the missing length, $x$, in triangle ABC below.

\[ \triangle ABC \]

- $A$ to $B$: 9 cm
- $B$ to $C$: $x$ cm
- $A$ to $C$: 27 cm

\[ \triangle DEF \]

- $D$ to $E$: 15 cm
- $E$ to $F$: 21 cm

4) Find the missing length, $x$, in triangle DEF below.

\[ \triangle DEF \]

- $D$ to $E$: 24 cm
- $E$ to $F$: $x$ cm
- $D$ to $F$: 27 cm

5) Triangle ABC is similar to triangle DEF.

\[ \triangle ABC \]

- $A$ to $B$: 2 cm
- $B$ to $C$: 4 cm
- $A$ to $C$: $x$ cm

\[ \triangle DEF \]

- $D$ to $E$: 6 cm
- $E$ to $F$: $y$ cm
- $D$ to $F$: 18 cm

Find a) $x$ \hspace{2cm} b) $y$
6) Triangle ABC is similar to triangle DEF.

\[ \begin{align*}
\text{A} & \quad \text{B} \\
30 \text{ cm} & \quad 18 \text{ cm} & \quad w \\
116 & \quad y \text{ cm} \\
\text{C} & \quad \text{D} \\
18 & \quad 21 \text{ cm} & \quad 21 \text{ cm} & \quad 31 \\
\text{F} & \quad \text{E} \\
45 \text{ cm} & \quad \text{D} \\
45 \text{ cm} & \quad \text{D} \\
\text{F} & \quad \text{F} \\
\end{align*} \]

Find a) \( v \) b) \( w \) c) \( x \) d) \( y \)

7) Triangle ABC is similar to triangle DEF.

\[ \begin{align*}
\text{A} & \quad \text{B} \\
3 \text{ cm} & \quad 10 \text{ cm} & \quad x \text{ cm} \\
\text{C} & \quad \text{C} \\
x \text{ cm} & \quad x \text{ cm} \\
\text{D} & \quad \text{D} \\
48 \text{ cm} & \quad 48 \text{ cm} & \quad 40 \text{ cm} \\
\text{F} & \quad \text{F} \\
\end{align*} \]

Find a) \( x \) b) \( y \)
8) Triangle ABC is similar to triangle DEF.

\[\frac{AB}{DE} = \frac{BC}{EF} = \frac{AC}{DF}\]

\[\frac{119}{22} = \frac{16}{w} = \frac{22}{33}\]

Find a) \(v\) b) \(w\) c) \(x\) d) \(y\)

9) Find the missing length, \(x\), in the picture below
10) Find the missing length, $x$, in the picture below

![Triangle with sides 4 cm, 10 cm, 30 cm, 12 cm, $x$ cm, and 6 cm](image)

11) Find the missing length, $x$, in the picture below

![Triangle with sides $x$ cm, 5 cm, 9 cm, 6 cm, 20 cm, and 30 cm](image)
12) Find the missing lengths, $x$ and $y$, in the picture below

```
2 cm  8 cm
A    B
y cm  x cm

24 cm
```

13) Find the missing length, $x$, in the picture below

```
2 cm  5 cm
A    B
2 cm  7 cm

2 cm
```

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14) Find the missing lengths, $x$ and $y$, in the picture below

```
\begin{figure}
\centering
\includegraphics[width=0.5\textwidth]{triangle.png}
\end{figure}
```

15) Find the missing length, $x$, in triangle CDE below

```
\begin{figure}
\centering
\includegraphics[width=0.5\textwidth]{triangle2.png}
\end{figure}
```
16) Find the missing length, $x$, in triangle CDE below

```
A
/  \\
/    \\
x cm /     \\
/       \\
C
\  \\
\ 7 cm \\
\  \\
B
```

```
A
/  \\
/    \\
\  \\
\ 4 cm \\
\  \\
B
```

```
A
/  \\
/    \\
\  \\
\ 3 cm \\
\  \\
C
```

```
A
/  \\
/    \\
\  \\
\ 5 cm \\
\  \\
B
```

```
E
/  \\
/    \\
\  \\
\ 3 cm \\
\  \\
D
```

```
E
/  \\
/    \\
\  \\
\ 44 cm \\
\  \\
D
```

```
E
/  \\
/    \\
\  \\
\ 21 cm \\
\  \\
D
```

```
E
/  \\
/    \\
\  \\
\ 16 cm \\
\  \\
D
```

```
E
/  \\
/    \\
\  \\
\ 36 cm \\
\  \\
D
```

17) Find the missing length, $x$, in triangle ABC below
18) Find the missing length, \( x \), in triangle ABC below.

\[
\begin{array}{c}
 A \\
 \downarrow \\
 C \\
 \downarrow \\
 B \\
 \end{array}
\quad\begin{array}{c}
 4 \text{ cm} \\
 \downarrow \\
 24 \text{ cm} \\
 \downarrow \\
 12 \text{ cm} \\
 \end{array}
\quad\begin{array}{c}
 E \\
 \downarrow \\
 D \\
 \end{array}
\]

\[
x \text{ cm}
\]

\[
30 \text{ cm}
\]

19) Find the missing lengths, \( x \) and \( y \), in the diagram below.

\[
\begin{array}{c}
 A \\
 \downarrow \\
 C \\
 \downarrow \\
 B \\
 \end{array}
\quad\begin{array}{c}
 2 \text{ cm} \\
 \downarrow \\
 3 \text{ cm} \\
 \downarrow \\
 8 \text{ cm} \\
 \end{array}
\quad\begin{array}{c}
 E \\
 \downarrow \\
 D \\
 \end{array}
\]

\[
x \text{ cm}
\]

\[
y \text{ cm}
\]

\[
20 \text{ cm}
\]
20) Find the missing lengths, $x$ and $y$, in the diagram below.

21) Describe each position A, B, C, D and E on the probability scale using appropriate vocabulary.

22) Mackenzie bought a bag of sweets, 6 of them are yellow, 3 are green and 5 are orange.

Find the probability that a randomly selected sweet is

a) not yellow

b) yellow or green

Find the probability of:

a) choosing the letter s  
b) not choosing the letter s

24) One student is chosen at random from the test results given in the table below.

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>19</td>
<td>7</td>
<td>20</td>
<td>46</td>
</tr>
<tr>
<td>Female</td>
<td>9</td>
<td>3</td>
<td>12</td>
<td>24</td>
</tr>
<tr>
<td>Total</td>
<td>28</td>
<td>10</td>
<td>32</td>
<td>70</td>
</tr>
</tbody>
</table>

Find the probability that the student did not get a grade A

25) Brayden tosses a coin. Find the probability he gets a head.

26) Frank rolls a dice. Find the probability he gets a two.

27) Alfonso rolls a dice. Find the probability he gets a number greater than two.
28) Find the probability that for a random spin of the spinner, the arrow points to 9. [1]

29) Find the probability that for a random spin of the spinner, the arrow points to 2. [1]

30) Find the probability that for a random spin of the spinner, the arrow points to 2. [1]
31) If you select a card at random from a standard pack of 52 playing cards (ace is counted as 1), find the probability of choosing:

a) a two of Diamonds

b) a Heart

c) a two

32) If you select a card at random from a standard pack of cards (ace is counted as 1), find the probability of choosing:

a) an eight of

b) a Club or Diamond

c) a number smaller than 6

33) A card is drawn randomly from a standard 52-card deck.

Find the probability that the card drawn is:

a) a diamond or five

b) a jack or spade

c) a four or red card
34) A number is chosen at random from the set of numbers
1,2,3,4,5,6,7,8,9,10,11,12,13,14

Find the probability that the number is:

a) an even number
b) an odd number

35) A number is chosen at random from the set of numbers
1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17

Find the probability that the number is:

a) a square number
b) a prime number
c) a multiple of 4

36) A number is chosen at random from the set of numbers
1,2,3,4,5,6

Find the probability that the number is:

a) a factor of 17
b) a cube number
37) A marble is drawn randomly from a jar that contains 4 purple marbles, 2 brown balls, and 5 yellow marbles.

Find the probability of selecting:

a) a purple marble

b) a brown marble

c) a yellow marble

38) A marble is drawn randomly from a jar that contains 7 pink marbles, 5 white balls, and 12 blue marbles.

Find the probability of selecting:

a) a pink marble

b) a white marble

c) a blue marble

39) A counter is drawn randomly from a jar that contains 3 white counters, 5 green balls, and 4 red counters.

Find the probability of selecting:

a) a counter that is not white

b) a white or red counter

c) a blue counter

d) a counter that is not purple
40) Corey chooses a letter at random from the word SIX.  
Find the probability that he chooses:  

a) an X  
b) an S

41) Eduardo chooses a letter at random from the word SYMMETRY.  
Find the probability that he chooses:  

a) a T  
b) an M

42) Damien chooses a letter at random from the word SIGNIFICANT.  
Find the probability that he chooses:  

a) an N  
b) an I

43) The sample space below shows the results obtained from tossing a coin and throwing a die.  
Find the probability of getting Heads and a square number.

<table>
<thead>
<tr>
<th>Coin</th>
<th>Die</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>H</td>
<td>1</td>
<td>H,1</td>
<td>H,2</td>
<td>H,3</td>
<td>H,4</td>
<td>H,5</td>
</tr>
<tr>
<td>T</td>
<td>T,1</td>
<td>T,2</td>
<td>T,3</td>
<td>T,4</td>
<td>T,5</td>
<td>T,6</td>
</tr>
</tbody>
</table>
44) The sample space below shows the outcomes from throwing two dice.

Find the probability that the two dice add to 10.

<table>
<thead>
<tr>
<th></th>
<th>Dice 1</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>1</td>
<td>1,1</td>
<td>1,2</td>
<td>1,3</td>
<td>1,4</td>
<td>1,5</td>
</tr>
<tr>
<td>2</td>
<td>2,1</td>
<td>2,2</td>
<td>2,3</td>
<td>2,4</td>
<td>2,5</td>
</tr>
<tr>
<td>3</td>
<td>3,1</td>
<td>3,2</td>
<td>3,3</td>
<td>3,4</td>
<td>3,5</td>
</tr>
<tr>
<td>4</td>
<td>4,1</td>
<td>4,2</td>
<td>4,3</td>
<td>4,4</td>
<td>4,5</td>
</tr>
<tr>
<td>5</td>
<td>5,1</td>
<td>5,2</td>
<td>5,3</td>
<td>5,4</td>
<td>5,5</td>
</tr>
<tr>
<td>6</td>
<td>6,1</td>
<td>6,2</td>
<td>6,3</td>
<td>6,4</td>
<td>6,5</td>
</tr>
</tbody>
</table>

45) The sample space below shows the scores obtained from throwing two dice and adding them together.

Find the probability that the two dice add to 2.

<table>
<thead>
<tr>
<th></th>
<th>Dice 1</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>+</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
</tr>
<tr>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
<td>11</td>
</tr>
<tr>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
<td>11</td>
<td>12</td>
</tr>
</tbody>
</table>
46) The sample space below shows the scores obtained from throwing two dice and adding them together. Find the probability that the two dice add to 4 or more.

<table>
<thead>
<tr>
<th>Dice 1</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
</tr>
<tr>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
<td>11</td>
</tr>
<tr>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
<td>11</td>
<td>12</td>
</tr>
</tbody>
</table>

47) Two dice are rolled. What is the probability that the sum of the two dice is 5? [1]

48) Two dice are rolled. What is the probability that the product of the two dice is 8? [1]

49) Two dice are rolled. What is the probability that the sum of the two dice is greater than or equal to 9? [1]
50) Wyatt picks two counters out of a jar that contains 5 white counters and 2 red counters. Note that he returns the first counter to the jar before he picks the second.

Find the probability that Wyatt picks two red counters.

51) A group of people were asked if they owned a dog. 129 responded "yes", and 94 responded "no".

Find the probability that if a person is chosen at random, they own a dog.

52) A roulette wheel has slots numbered from 0 to 38.

Find the probability that the ball lands on an odd number.
Solutions for the assessment Revision 6: Similar Triangles and Probability

1) \(x = 7\) cm

2) \(x = 48\) cm

3) \(x = 5\) cm

4) \(x = 30\) cm

5) \(x = 6\) cm, \(y = 12\) cm

6) \(v = 14\) cm, \(w = 31^\circ\), \(x = 33^\circ\), \(y = 27\) cm

7) \(x = 12\) cm, \(y = 12\) cm

8) \(v = 10\) cm, \(w = 29^\circ\), \(x = 32^\circ\), \(y = 24\) cm

9) \(x = 11\) cm

10) \(x = 12\) cm

11) \(x = 2\) cm

12) \(x = 10\) cm, \(y = 6\) cm

13) \(x = 14\) cm

14) \(x = 10\) cm, \(y = 24\) cm

15) \(x = 18\) cm

16) \(x = 15\) cm

17) \(x = 11\) cm

18) \(x = 10\) cm

19) \(x = 5\) cm, \(y = 12\) cm

20) \(x = 12\) cm, \(y = 40\) cm

21) A = impossible, B = unlikely, C = evens, C = likely, D = certain

22) a) \(P(\text{not yellow}) = \frac{4}{7}\)
    b) \(P(\text{yellow or green}) = \frac{9}{14}\)

23) a) \(P(\text{choosing the letter s}) = \frac{1}{26}\)
    b) \(P(\text{not choosing the letter s}) = \frac{25}{26}\)

24) \(P(\text{did not get a grade A}) = \frac{3}{5}\)

25) \(P(\text{head}) = \frac{1}{2}\)
27) \( P(\text{a number greater than two}) = \frac{2}{3} \)

28) \( \frac{1}{10} \)

29) \( \frac{1}{4} \)

30) \( \frac{3}{10} \)

31) a) \( P(\text{a two of Diamonds}) = \frac{1}{52} \)
b) \( P(\text{a Heart}) = \frac{1}{4} \)
c) \( P(\text{a two}) = \frac{1}{13} \)

32) a) \( P(\text{an eight of Clubs}) = \frac{1}{52} \)
b) \( P(\text{a Club or Diamond}) = \frac{1}{2} \)
c) \( P(\text{a number smaller than 6}) = \frac{5}{13} \)

33) a) \( P(\text{a diamond or five}) = \frac{4}{13} \)
b) \( P(\text{a jack or spade}) = \frac{4}{13} \)
c) \( P(\text{a four or red card}) = \frac{7}{13} \)

34) a) \( P(\text{an even number}) = \frac{1}{2} \)
b) \( P(\text{odd number}) = \frac{1}{2} \)

35) a) \( P(\text{square number}) = \frac{4}{17} \)
b) \( P(\text{prime number}) = \frac{7}{17} \)
c) \( P(\text{multiple of 4}) = \frac{4}{17} \)

36) a) \( P(\text{factor of 17}) = \frac{1}{6} \)
b) \( P(\text{cube number}) = \frac{1}{6} \)

37) a) \( P(\text{purple marble}) = \frac{4}{11} \)
b) \( P(\text{brown marble}) = \frac{2}{11} \)
c) \( P(\text{yellow marble}) = \frac{5}{11} \)

38) a) \( P(\text{pink marble}) = \frac{7}{24} \)
b) \( P(\text{white marble}) = \frac{5}{24} \)
c) \( P(\text{blue marble}) = \frac{1}{2} \)

39) a) \( P(\text{not white}) = \frac{3}{4} \)
b) \( P(\text{white or red}) = \frac{7}{12} \)
c) \( P(\text{blue}) = 0 \)
d) \( P(\text{not purple}) = 1 \)

40) a) \( P(\text{an X}) = \frac{1}{3} \), b) \( P(\text{an S}) = \frac{1}{3} \)

41) a) \( P(\text{a T}) = \frac{1}{8} \), b) \( P(\text{an M}) = \frac{1}{4} \)

42) a) \( P(\text{an N}) = \frac{2}{11} \), b) \( P(\text{an I}) = \frac{3}{11} \)

43) \( P(\text{getting Heads and a square number}) = \frac{1}{12} \)

44) \( P(\text{dice add to 10}) = \frac{1}{12} \)
45) \( P(\text{dice add to 2}) = \frac{1}{36} \)

46) \( P(\text{dice add to 4 or more}) = \frac{11}{12} \)

47) \( P(\text{sum is 5}) = \frac{1}{9} \)

48) \( P(\text{product is 8}) = \frac{1}{18} \)

49) \( P(\text{sum } \geq 9) = \frac{5}{18} \)

50) \( P(\text{R and R}) = \frac{4}{49} \)

51) \( \frac{129}{223} \)

52) \( P(\text{odd number}) = \frac{19}{39} \)