

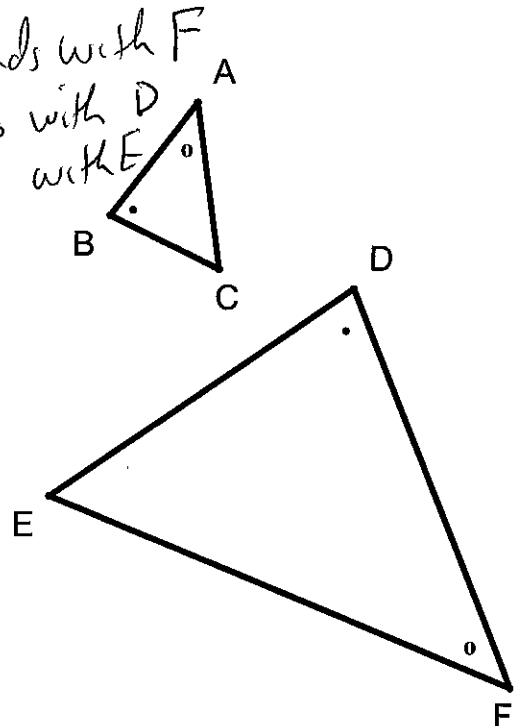
Part I: Selected Response

Place your answers on the answer sheet provided for Part I. Do not return the sheets containing the questions for part I. (10 marks)

1) Which answer below correctly identifies and labels the pair of similar triangles seen to the right?

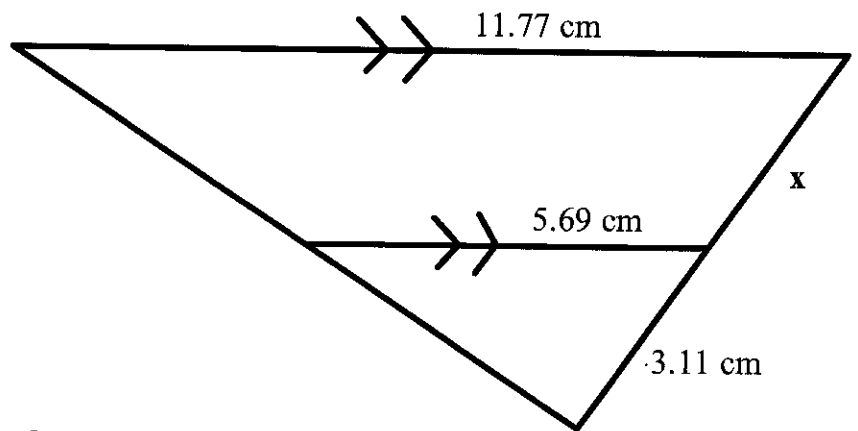
- a)  $\triangle ABC \approx \triangle DEF$
- b)  $\triangle ABC \approx \triangle FED$
- c)  $\triangle ABC \approx \triangle FDE$
- d)  $\triangle ABC \approx \triangle DFE$

A corresponds with F  
 B corresponds with D  
 C corresponds with E



2) What is the value for x in the diagram to the right?

- a) 1.51 cm
- b) 3.32 cm
- c) 6.39 cm
- d) 18.91 cm



$$\frac{3.11}{3.11+x} = \frac{5.69}{11.77}$$

$$5.69(3.11+x) = 3.11 \times 11.77$$

$$17.6959 + 5.69x = 36.6047$$

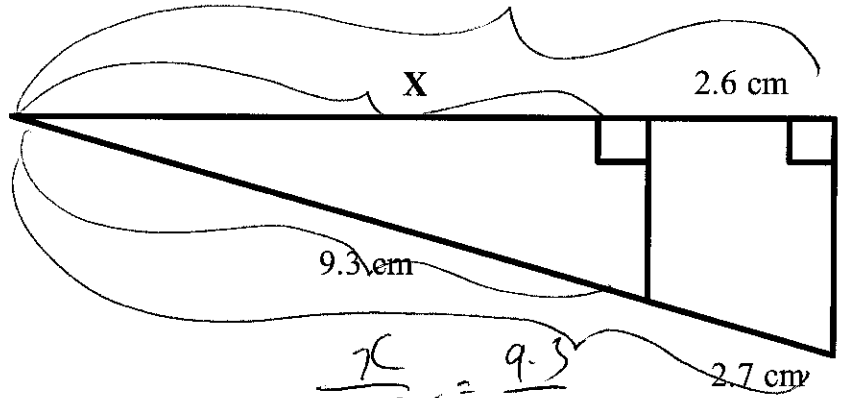
$$17.6959 = 36.6047 - 5.69x$$

$$\frac{5.69x}{5.69} = \frac{18.9088}{5.69}$$

$$x = 3.32 \text{ cm}$$

3) Which equation below would be the correct one to use to solve for x in the diagram to the right?

- a)  $\frac{X}{2.6} = \frac{9.3}{2.7}$
- b)  $\frac{X}{2.6} = \frac{9.3}{12.0}$
- c)  $\frac{X}{X+2.6} = \frac{9.3}{2.7}$
- (d)  $\frac{X}{X+2.6} = \frac{9.3}{12.0}$



$\frac{x}{x+2.6} = \frac{9.3}{9.3+2.6}$

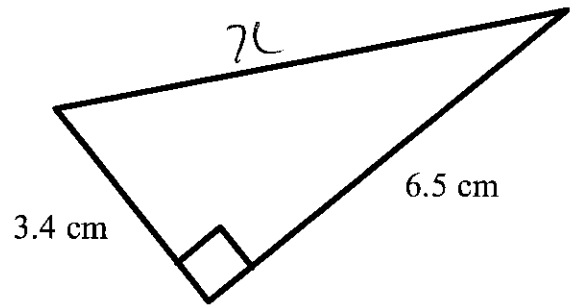
4) Which of the following represents a Pythagorean triple?

- a) 3, 6, 9
- b)  $\sqrt{2}, 2, \sqrt{7}$
- (c) 5, 7,  $\sqrt{74}$
- d) 24, 32, 41

$5^2 + 7^2 = 25 + 49 = 74$   
 $5^2 + 7^2 = (\sqrt{74})^2$

5) What is the value for x in the diagram to the right?

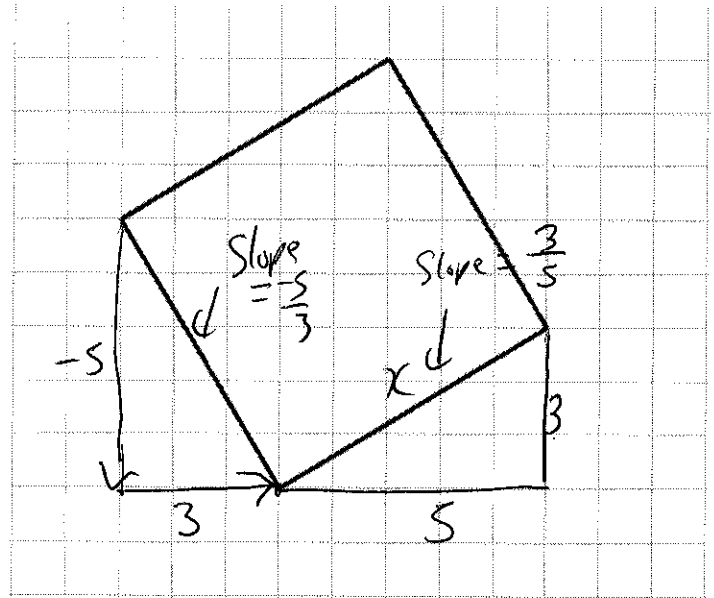
- a) 5.5 cm
- (b) 7.3 cm
- c) 30.7 cm
- d) 70.3 cm



$x^2 = 3.4^2 + 6.5^2$   
 $x^2 = 53.81$   
 $\sqrt{x^2} = \sqrt{53.81}$   
 $x = 7.3 \text{ cm}$

6) What is the length of one of the sides in the square towards the right?

- a)  $\sqrt{8}$  units
- b) 8 units
- c)  $\sqrt{34}$  units
- d) 34 units



7) What is the area for the square?

- a)  $\sqrt{8}$  units
- b) 8 units
- c)  $\sqrt{34}$  units
- d) 34 units

$$A = 5^2$$

$$A = \sqrt{34} \times \sqrt{34}$$

$$A = 34$$

8) What is special about the slopes of the adjacent sides in the above square?

- a) They are equal.
- b) They are negative reciprocals of one another.
- c) They are reciprocals of one another.
- d) There is nothing special about their slopes.

$$5^2 + 3^2 = x^2$$

$$25 + 9 = x^2$$

$$34 = x^2$$

$$\sqrt{34} = \sqrt{x^2}$$

$$\sqrt{34} = x$$

9) If the numbers 6, 8, 10 are multiplied by any number, which answer below is true?

- a) The result is a Pythagorean triple.
- b) The result is not a Pythagorean triple.
- c) The result is equal to 1.
- d) The result is equal to 0.

$$6 \times 2 = 12$$

$$8 \times 2 = 16$$

$$10 \times 2 = 20$$

$$12^2 + 16^2 = 20^2$$

$$144 + 256 = 400$$

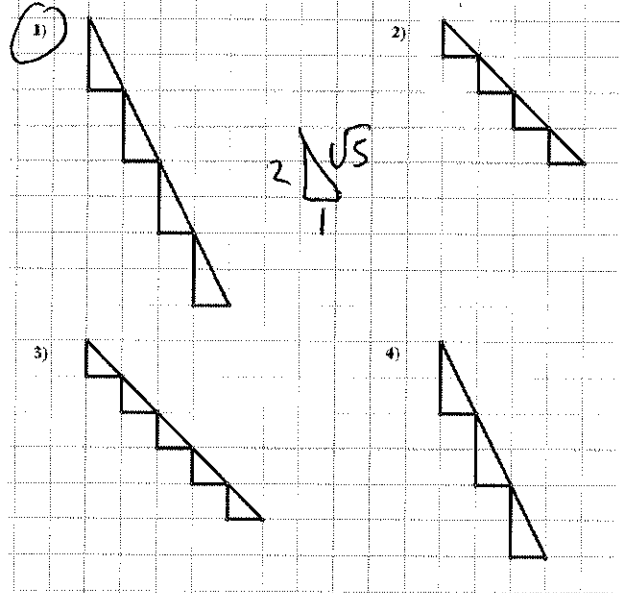
$$400 = 400$$

10) Which diagram to the right best depicts the fact that  $\sqrt{80} = 4\sqrt{5}$

- a) 1
- b) 2
- c) 3
- d) 4

$$2^2 + 1^2 = 4 + 1 = 5$$

$$\sqrt{5}$$

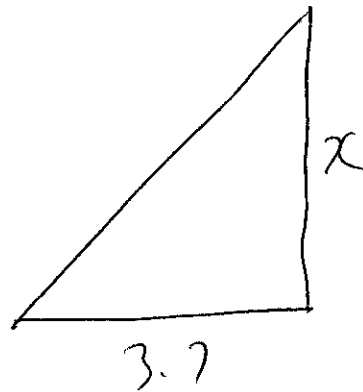
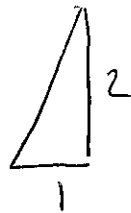


1	6
c	c
2	7
b	d
3	8
d	b
4	9
c	a
5	10
b	a

PART II: Constructed Response

Students are required to answer all questions in the space provided. All workings, including diagrams, should be shown. Submit the answer sheet for Part I and all pages of Part II. Place your name on each page.

- 11) A 2m tall man casts a 1m long shadow. At the same time a tree casts a 3.7m long shadow. How tall is the tree? (5 marks)

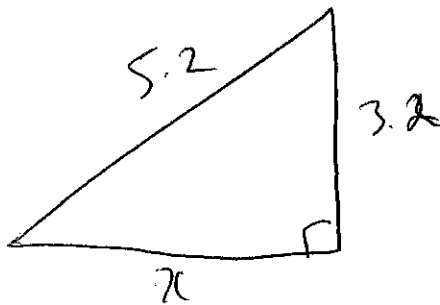


$$\frac{1}{2} = \frac{3.7}{x}$$

$$x = 7.4$$

The tree is 7.4 m tall.

- 12) Firefighters have a 5.2 m extension ladder to reach high places. In order to reach 3.2 m up a building, how far away from the building should the foot of the ladder be placed? (5 marks)



$$c^2 = a^2 + b^2$$

$$5.2^2 = 3.2^2 + x^2$$

$$27.04 = 10.24 + x^2$$

$$27.04 - 10.24 = 10.24 - 10.24 + x^2$$

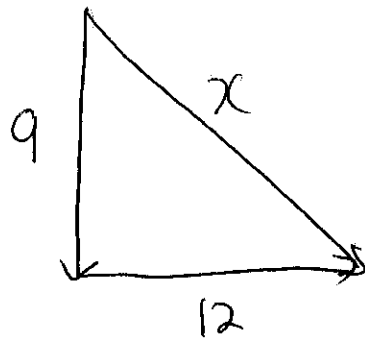
$$16.8 = x^2$$

$$\sqrt{16.8} = \sqrt{x^2}$$

$$4.1 = x$$

The foot of the ladder should be placed 4.1 m from the building

- 13) 3. George rides his bike 9 km south and then 12 km east. How far is he from his starting point? (5 marks)



$$x^2 = 9^2 + 12^2$$

$$x^2 = 81 + 144$$

$$x^2 = 225$$

$$\sqrt{x^2} = \sqrt{225}$$

$$x = 15$$

He is 15 km from his starting point.

- 14) Simplify the following:

a)  $\sqrt{225}$  (1 mark)

$$\sqrt{225} = \sqrt{15 \times 15} = 15$$

b)  $\sqrt{338}$  (2 marks)

$$\sqrt{2 \times 169} = \sqrt{2} \times \sqrt{169} = 13\sqrt{2}$$

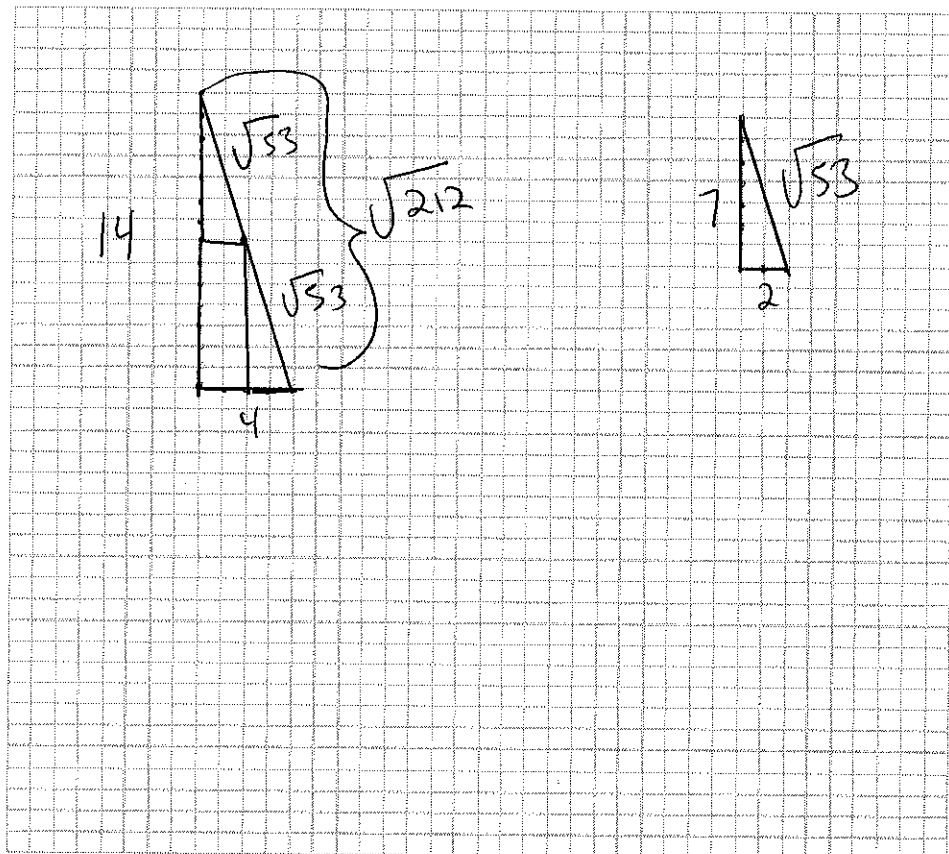
c)  $\frac{1}{5}\sqrt{2} - \frac{2}{3}\sqrt{3} + \frac{2}{7}\sqrt{3} - \frac{4}{9}\sqrt{2} - \frac{1}{45}\sqrt{5}$  (3 marks)

$$\begin{aligned} & \frac{1}{5}\sqrt{2} - \frac{4}{9}\sqrt{2} - \frac{2}{3}\sqrt{3} + \frac{2}{7}\sqrt{3} - \frac{1}{45}\sqrt{5} \\ = & \frac{9\sqrt{2}}{45} - \frac{20\sqrt{2}}{45} - \frac{14\sqrt{3}}{21} + \frac{6\sqrt{3}}{21} - \frac{1}{45}\sqrt{5} \\ = & \frac{-11\sqrt{2}}{45} - \frac{8\sqrt{3}}{21} - \frac{1}{45}\sqrt{5} \end{aligned}$$

d)  $3\sqrt{45} - \sqrt{343} + \sqrt{80} - 2\sqrt{28} - \sqrt{35}$  (4 marks)

$$\begin{aligned} & 3(\sqrt{9 \times 5}) - \sqrt{7 \times 49} + \sqrt{16 \times 5} - 2(\sqrt{4 \times 7}) - \sqrt{35} \\ = & 3(3\sqrt{5}) - 7\sqrt{7} + 4\sqrt{5} - 2(2\sqrt{7}) - \sqrt{35} \\ = & 9\sqrt{5} - 7\sqrt{7} + 4\sqrt{5} - 4\sqrt{7} - \sqrt{35} \\ = & 9\sqrt{5} + 4\sqrt{5} - 7\sqrt{7} - 4\sqrt{7} - \sqrt{35} \\ = & 13\sqrt{5} - 11\sqrt{7} - \sqrt{35} \end{aligned}$$

- 15) On the below grid, draw a triangle that has a hypotenuse of  $\sqrt{53}$ . Use your diagram to also show that  $\sqrt{212} = 2\sqrt{53}$  (5 marks)



$$49 + 4 = 53$$

$$7^2 + 2^2 = 53$$

$$196 + 16 = 212$$

$$14^2 + 4^2 = 212$$