

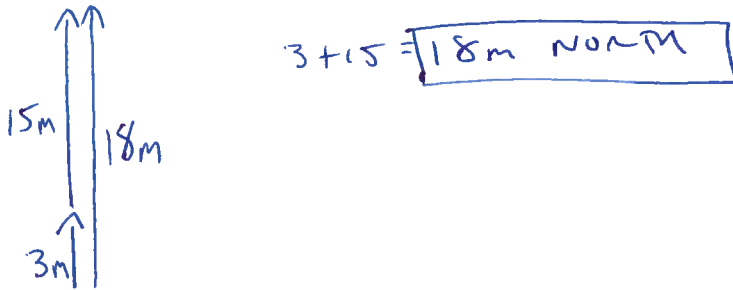
Name SOLUTIONS

Date \_\_\_\_\_

### Vector Addition Practice

Draw a head to tail diagrams for each problem.

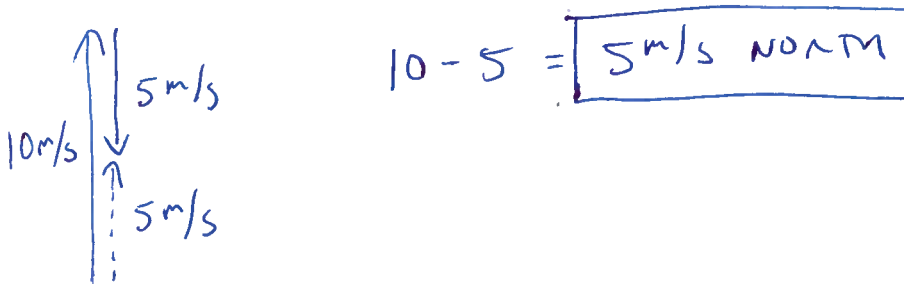
- 1) A person walks 3 m to the north. They stop for a rest. They then travel 15 m farther to the north. What was their resultant displacement?



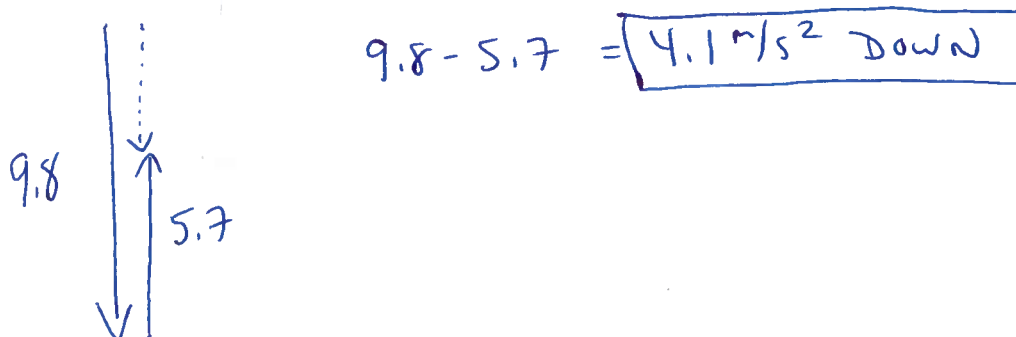
- 2) A person walks to the east for 700 m. The person then turns and walks to the west for 200 m. What is the resultant displacement?



- 3) Einstein is riding a bicycle and is pedaling at 10 m/s to the north. A 5 m/s wind is pushing to the south. What is the resultant velocity of Einstein and his bicycle?



- 4) The acceleration due to gravity is  $9.8 \text{ m/s}^2$  down. Air resistance and updraft supplies an upward acceleration of  $5.7 \text{ m/s}^2$  to a plastic wiffle ball falling through the air. What is the resultant acceleration of the ball?



5) A hiker travels 800 m east, stops, checks a map and then travels 200 m south. How far is the hiker from their starting point?

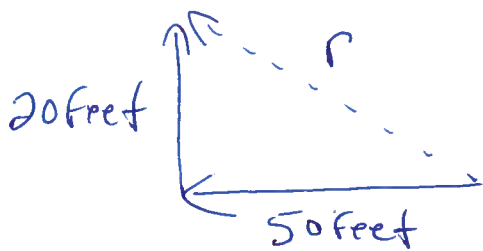


$$r^2 = 800^2 + 200^2$$

$$r^2 = 680,000$$

$$r = \sqrt{680,000} = \boxed{825 \text{ m}}$$

6) During a practice, one player kicks a soccer ball 50 feet to the west. Another player then kicks it 20 feet to the north. What is the resultant displacement of the soccer ball?



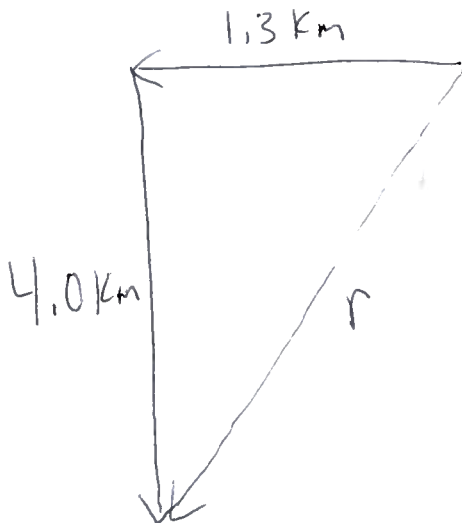
$$r^2 = 20^2 + 50^2$$

$$r^2 = 2900$$

$$r = \sqrt{2900}$$

$$r = \boxed{53.9 \text{ feet}}$$

7) A runner goes for a cross country run. The run is 1.3 km to the west and then 4.0 km to the south. How far is the runner from their starting point?

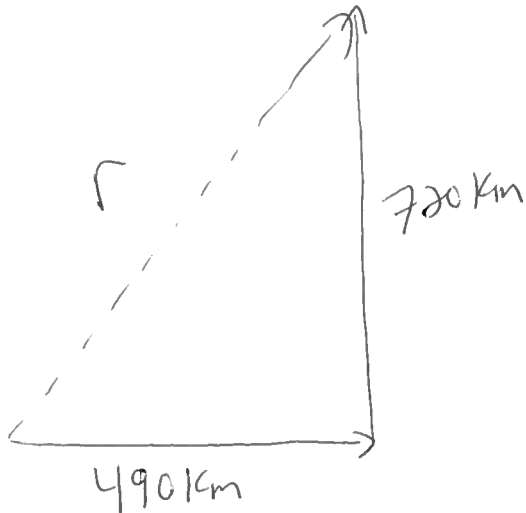


$$r^2 = 1.3^2 + 4^2$$

$$r^2 = \sqrt{17.69}$$

$$r = \boxed{4.2 \text{ km}}$$

- 8) A family goes on a road trip. They drive 490 km to the east. They then drive 720 km to the north. How far is the family from where they started?



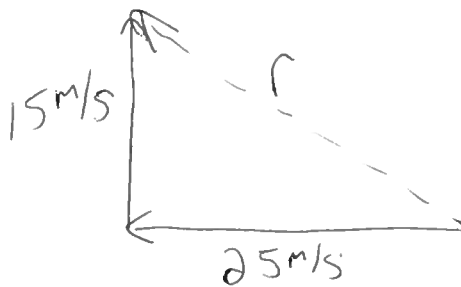
$$r^2 = 720^2 + 490^2$$

$$r^2 = 758500$$

$$r = \sqrt{758500}$$

$$r = \boxed{871 \text{ km}}$$

- 9) A boater drives a motorboat out in the bay. The boat has a speed 25 m/s directed west but a current pushes it north at 15 m/s. What is the resultant speed of the boat?



$$r^2 = 15^2 + 25^2$$

$$r^2 = 850$$

$$r = \sqrt{850}$$

$$r = \boxed{29.2 \text{ m/s}}$$

- 10) How long will it take the boat to travel a distance of 4 km?

$$v = 29.2 \text{ m/s}$$

$$d = 4 \text{ km} = 4000 \text{ m}$$

$$t = ?$$

$$d = vt$$

$$4000 = 29.2 t$$

$$\frac{4000}{29.2} = t = \boxed{137 \text{ s}}$$

Answers: 1) 18 m north 2) 500 m east 3) 5 m/s north 4) 4.1 m/s<sup>2</sup> down 5) 825 m 6) 53.9 feet 7) 4.2 km 8) 871 km 9) 29.2 m/s 10) 137 s