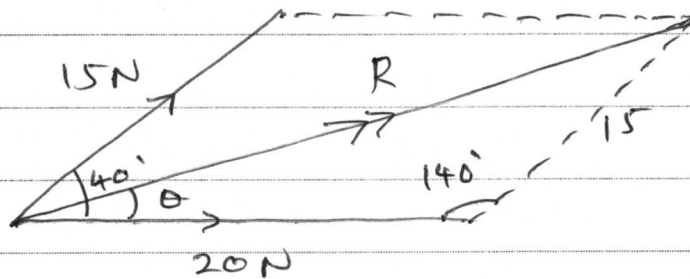


Answers - Resultant Force

①



$$R^2 = 20^2 + 15^2 - 2(20)(15)\cos 140^\circ$$

$$R = 32.933\dots$$

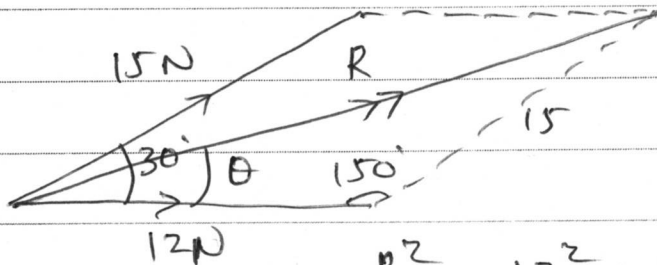
$$R = \underline{\underline{32.9\text{ N}}} \quad (3 \text{ s.f.})$$

$$\frac{\sin \theta}{15} = \frac{\sin 140^\circ}{32.93}$$

$$\sin \theta = \frac{15 \sin 140^\circ}{32.93}$$

$$\theta = \underline{\underline{17.0^\circ}} \quad (3 \text{ s.f.})$$

②



$$R^2 = 12^2 + 15^2 - 2(12)(15)\cos 150^\circ$$

$$R = 26.091\dots$$

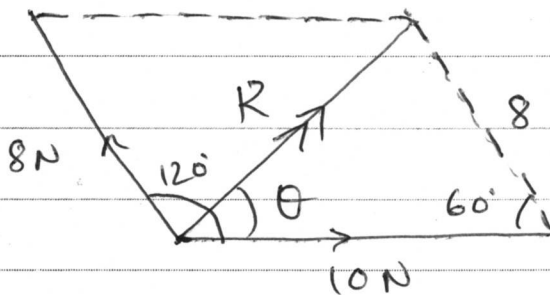
$$R = \underline{\underline{26.1\text{ N}}} \quad (3 \text{ s.f.})$$

$$\frac{\sin \theta}{15} = \frac{\sin 150^\circ}{26.09}$$

$$\sin \theta = \frac{15 \sin 150^\circ}{26.09}$$

$$\theta = \underline{\underline{16.7^\circ}} \quad (3 \text{ s.f.})$$

3



$$R^2 = 10^2 + 8^2 - 2(10)(8) \cos 60^\circ$$

$$R = 9.165 \dots$$

$$R = 9.2 \text{ N} \quad (2 \text{ d.p.})$$

$$\frac{\sin \theta}{8} = \frac{\sin 60^\circ}{9.165}$$

$$\sin \theta = \frac{8 \sin 60^\circ}{9.165}$$

$$\theta = \underline{\underline{49.1^\circ}} \quad (1 \text{ d.p.})$$

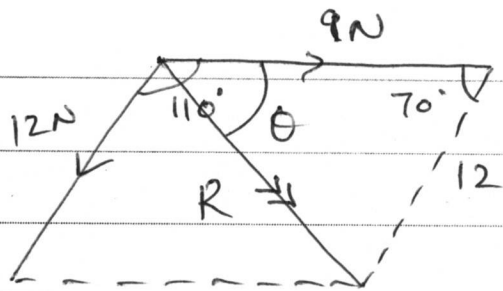
4

Similar to Q3.

Answers: Resultant force = 4.1 N (1 d.p.)

Angle with the 8 N = 47.0° (1 d.p.)

5



$$R^2 = 9^2 + 12^2 - 2(9)(12)\cos 70^\circ$$

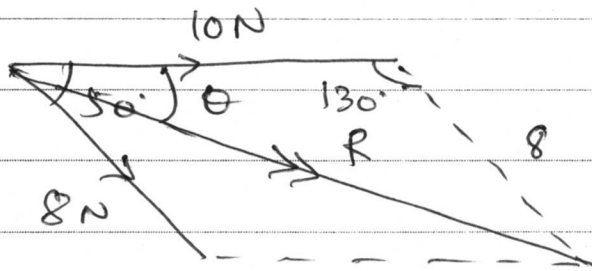
$$R = 12.293\dots$$

$$\underline{\underline{R = 12.3\text{ N (1 d.p.)}}}$$

$$\frac{\sin \theta}{12} = \frac{\sin 70^\circ}{12.29}$$

$$\underline{\underline{\theta = 66.6^\circ}}$$

6



$$R^2 = 10^2 + 8^2 - 2(10)(8)\cos 130^\circ$$

$$\cancel{R = 17.394\dots} \quad R = 16.335\dots$$

$$\underline{\underline{R = 16.3\text{ N (1 d.p.)}}}$$

$$\frac{\sin \theta}{8} = \frac{\sin 130^\circ}{\cancel{17.394} 16.335}$$

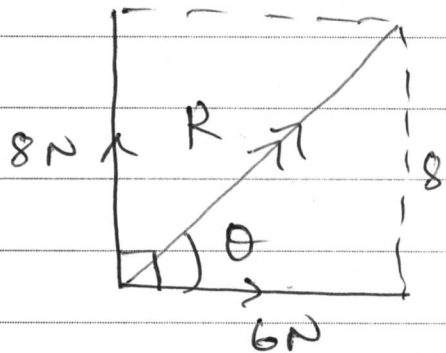
$$\underline{\underline{\theta = 22.0^\circ (1\text{ d.p.})}}$$

⑦ Similar diagram to Q6.

$$\text{Resultant Force} = \underline{\underline{14.8 \text{ N}}} \text{ (1 d.p.)}$$

$$\text{Angle with any ^{one} of the 8 N forces} = \underline{\underline{22.5^\circ}}$$

⑧



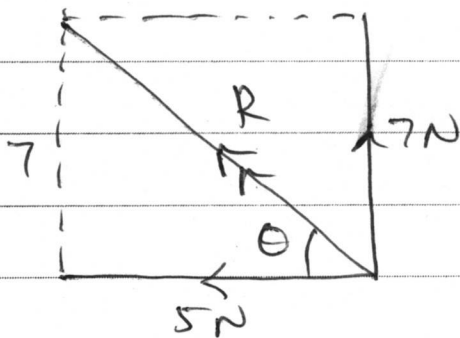
$$R = \sqrt{8^2 + 6^2}$$

$$R = \underline{\underline{10 \text{ N}}}$$

$$\tan \theta = \frac{8}{6}$$

$$\theta = \underline{\underline{53.1^\circ}} \text{ (1 d.p.)}$$

⑨



$$R = \sqrt{5^2 + 7^2}$$

$$= \underline{\underline{8.6 \text{ N}}} \text{ (1 d.p.)}$$

$$\tan \theta = \frac{7}{5}$$

$$\theta = \underline{\underline{54.5^\circ}} \text{ (1 d.p.)}$$

⑩

Diagram is similar to that in Q8.

$$\text{Resultant force} = 14.4 \text{ N (1 d.p.)}$$

$$\text{Angle with the 8 N} = \underline{\underline{56.3^\circ}} \text{ (1 d.p.)}$$